

Design Context

What influences architectural design today?

Global inequalities in total consumption:

Richest Fifth:
86% of private consumption expenditures
58% of total energy,
87% of the world's vehicle fleet

Poorest Fifth:
1.3% of private consumption expenditures
4% of total energy,
1% of the world's vehicle fleet

"... estimates show that the world's 225 richest people have a combined wealth of over \$1 trillion, equal to the annual income of the poorest 47% (2.5 billion) of the world's people."

"The real issue is not consumption itself but its patterns and effects."

*Human Development Report 1998 Overview,
United Nations Development Programme
<http://www.hdev.org/Trade/GlobalConsumption.asp>*

"Most of the environmental issues we see today can be linked to consumption," said Gary Gardner, director of research for Worldwatch. (Mayell, 2004)

"Junkspace is like being condemned to a perpetual jacuzzi with millions of your best friends." - Rem Koolhaas
Benedikt (2002)

In his article *Consumerism As A Social Disease*, Dowd confirms Smith's opinion that capitalism had no need for consumerism until the 20th century: "There was, of course, "consumption," but that is as different from consumerism as eating is from gluttony: we must eat to survive; gluttony is self-destructive."

Shah(2005) questions whether we as modern man have the ability to distinguish between the needs of necessity and that of luxury. He also raises another interesting point by quoting Robbins (Allyn & Bacon, 1999): "The single most important measure of economic growth is, after all, the gross national product ..., the sum total of goods and services produced by a given society in a given year."

Engberg and Styhre (2003:116) reiterates the dependant co-existence between production and consumption. They refer to Marx and Engels that said: "production is simultaneously consumption as well" and "consumption is simultaneously also production".

What effect did this have on the built environment? According to Engberg and Styhre the spaces of consumption no longer only existed in-between other mainly living and production-spaces through arcade architecture,

but has rather become the primary focus, spaces that are celebrated – as can be seen from the late modern shopping mall. "Consumption becomes an aesthetic experience; space and consumption are merged in the spatial practice producing spaces of consumption ..." (2003:116-117).

Koolhaas coined the term 'Junkspace' - too much of too little: "Junkspace is the sum total of our current architecture: we have built more than all previous history together, but we hardly register on the same scales. . . . It substitutes accumulation for hierarchy, addition for composition. More and more, more is more. Junkspace is overripe and undernourishing at the same time ..." (Benedikt, 2002)

From an interview by Whiting (1999) with Koolhaas:

SW: What about the contemporary corporation's impact on the public realm? ... and how is it affecting urbanism?

RK: ... Shopping has become the main ingredient of any new urban substance. The shift is colossal. The city used to be free; now you have to pay for it. We are witnessing the birth of the postpublic, the private city. It affects everything -- program, architecture, events. ...



Space has become a consumer commodity.

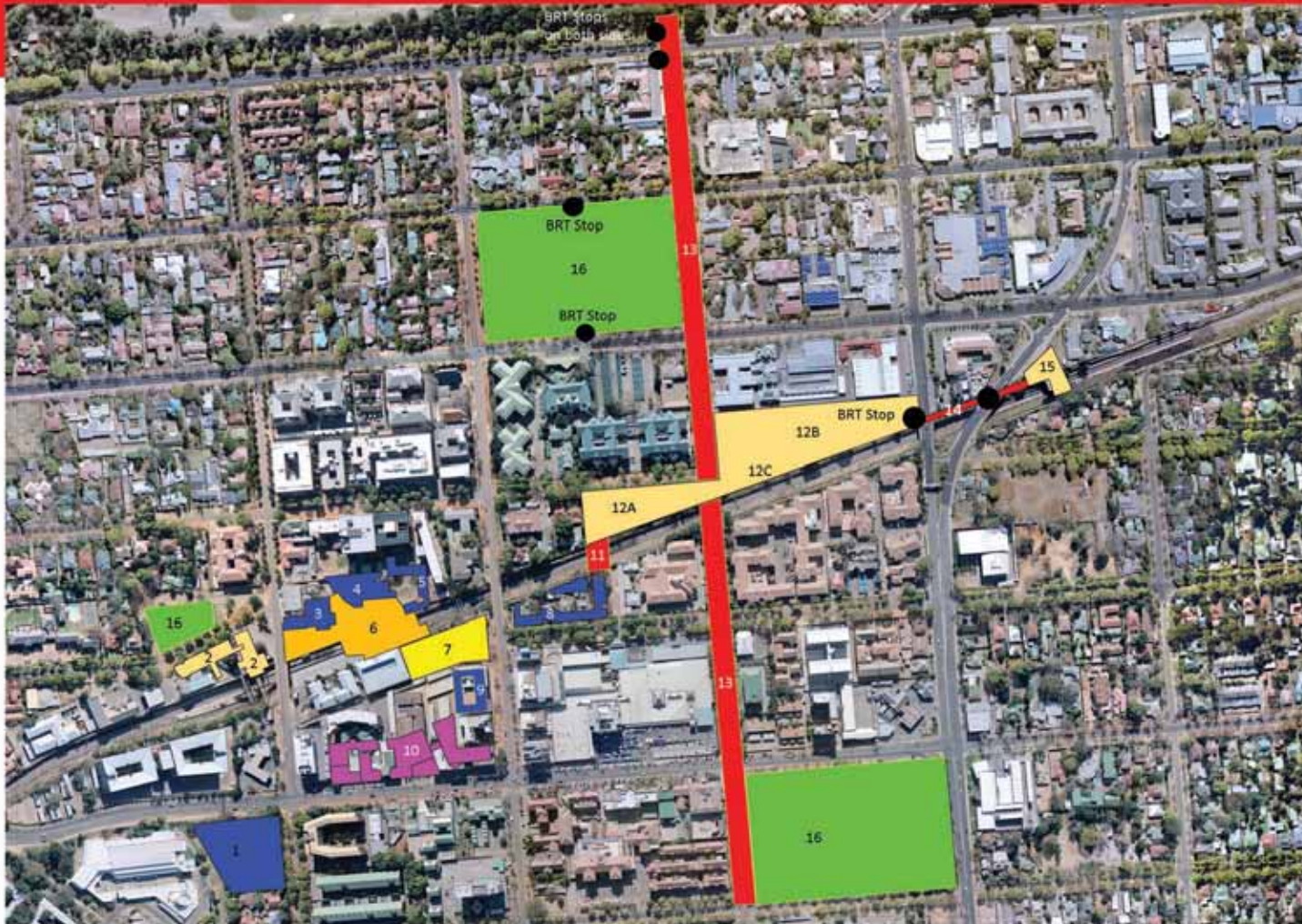
Context

Civic Spine
Spatial Development Framework

April 2008

MArch (Prof) group of students

- 1 **The Bridge (proposed)**
Establishes a link between Hatfield and the University of Pretoria, to facilitate the eventual merging.
- 2 **Metro Rail Rissik Station (proposed)**
The adaptive reuse of historic Rissik Station to address future needs and uses.
- 3 **Visual Arts Centre (proposed)**
Establishing art workshops to expose people to art through user participation.
- 4 **Music Performance Lab (proposed)**
Creating an awareness of the different disciplines within the music industry.
- 5 **K N O O P: (proposed)**
UP Fashion and Craft School Design
Creating a resource rich South African environment where design consultants will aid artisans to achieve viable careers in design. Done in collaboration with TEKO – a Scandinavian Fashion and Textile School of Design that is co-operating with South African tertiary institutions.
- 6 **Public square (proposed)**
Centrally located in the heart of the precinct, providing a place for people to meet.
- 7 **Indabox Civic Centre**
A forum for the people of Tshwane, to realize a shared value system that is respected and upheld by all, fostering a sense of ownership and community. Enabling them to optimize all the resources available to them.



- 8 **African Dialogue Centre (proposed)**
Creating understanding between African nations, through the means of performances, exhibitions and conferences.
- 9 **The Tower (proposed)**
High-rise with mixed uses - commercial, office, hotel and residential
- 10 **The Fields (newly built)**
High density residential complex
- 11 **Pedestrian Link (proposed)**
Enable Gautrain users to cross the railway track
- 12 **Gautrain RRL Hatfield Station (proposed)**
A Bus Terminal
B Vehicle Parking Garage
C Train Terminal
- 13 **Pedestrian bridge (proposed)**
Providing a safe link for pedestrians and bicycles to cross the busy roads in order to reach the BRT stop points
- 14 **Pedestrian walkway (proposed)**
Enabling commuters to cross underneath busy roads
- 15 **Metro Rail Station**
- 16 **Green open spaces**
Offering commuters an oasis when getting on/off at transit stop, which activates these under-utilized spaces. IT system notifies them in advance of next bus/train

Context

Hatfield Precinct
Identity Development Framework

March 2008
MArch (Prof) group of students

"FOR THE PEOPLE"

The Hatfield precinct must become a place for the people; a place for all.

Vision Statement

Integrating the University and Hatfield CBD precincts into one functioning network of innovation and social cohesion, amongst public, private and academic sectors. The transformation is a twofold interdependent proposal with the single vision as driving force:

UNI-R-CITY

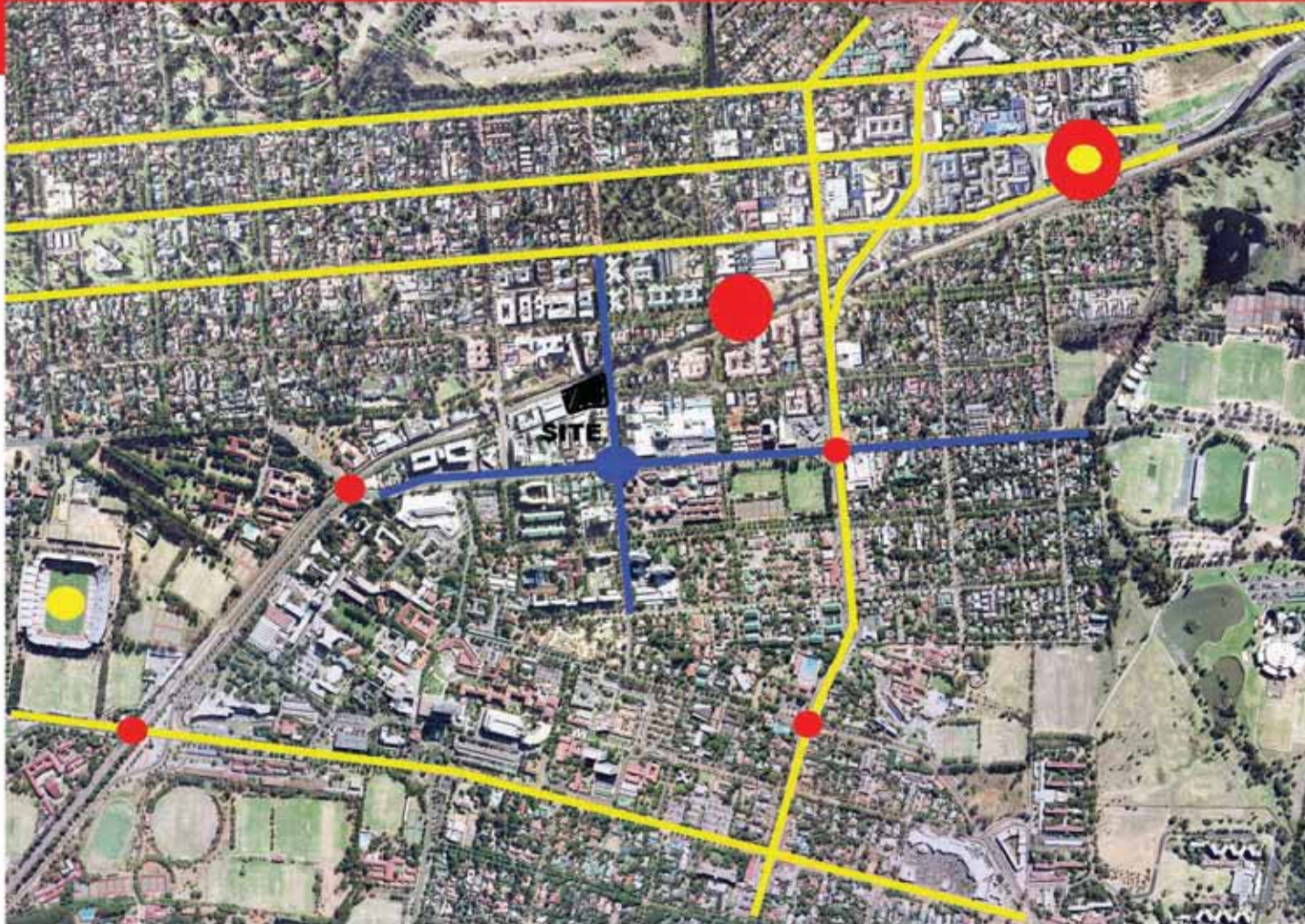
Unified Research City

The University of Pretoria's strategic objective is to become a world class research institute, developing a virtual world of spaces, lectures and libraries. Thus creating the need to pave the way for the community to fully utilise all the facilities that will become obsolete in the future.

S.T.A.R.T

Social Transition through Activating Regeneration Techniques

Establishing the Hatfield precinct as a vibrant multi-dimensional node, with continues social, cultural and civic regeneration that is driven by the creation of interdependent mixed-use nodes that include transportation, cultural, commercial and political activities. This will present a dynamic interface for social expression.



Urban Development

- Landmark
- Node
- Path
- Gateway
- BRT Routes

Context

Hatfield Metropolitan Core
Urban Development Framework

Aug 2007

City of Tshwane Metropolitan Municipality

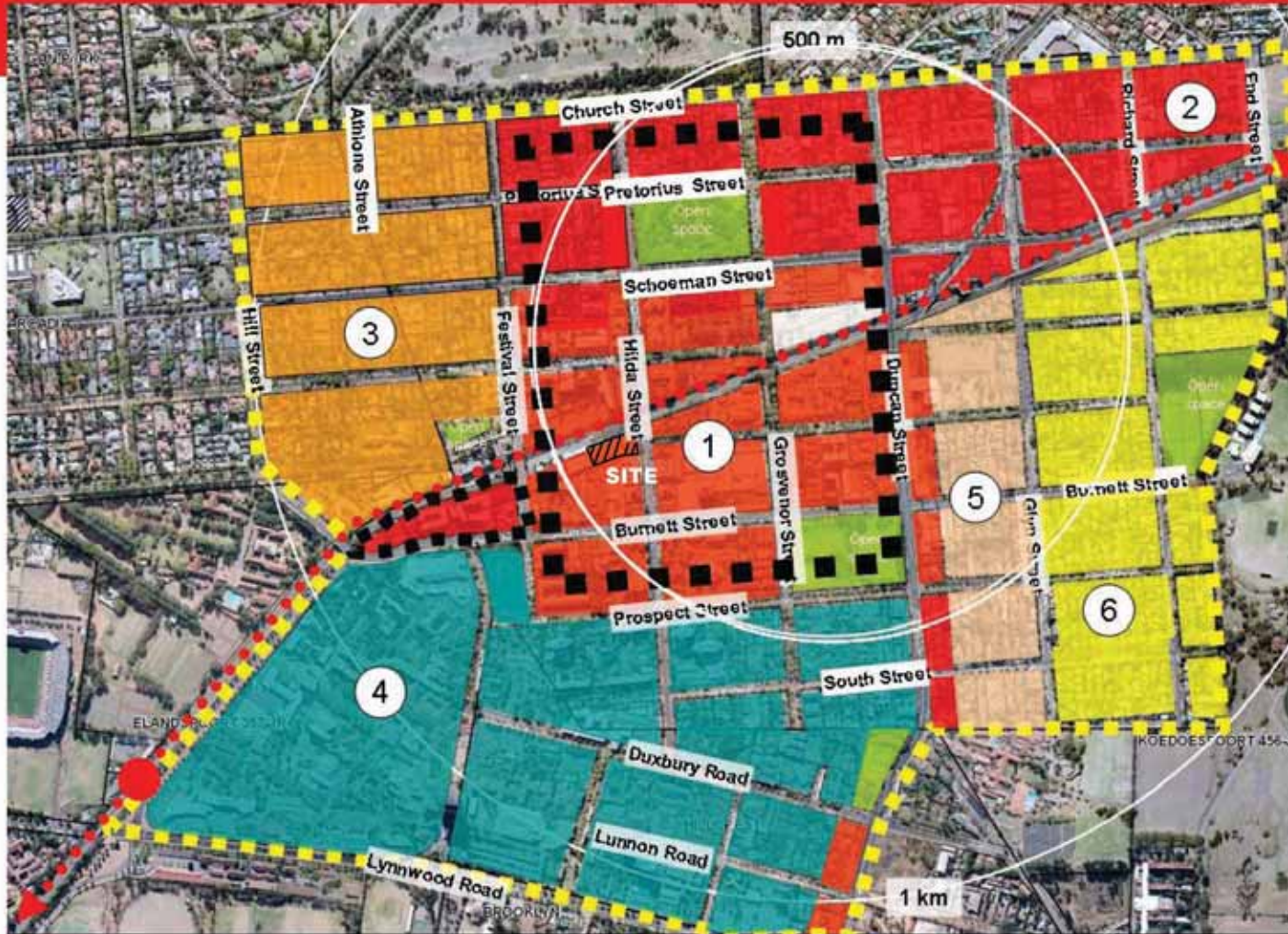
People draw people.

Critical look at future development in Hatfield for two reasons:

1. One of 6 Metropolitan Cores in the Tshwane Metropolitan Spatial Development Framework.
2. One of the three Gautrain Stations to be constructed in Tshwane.

Critical Requirements:

1. Clear identity and image.
2. Quality architecture.
3. Upgrading of the public domain and the integration of private developments with public space.
4. Intensification of development.
5. Mixed land use on site level.
6. Land use and transport integration.
7. Links for pedestrians and cyclists.
8. Service Infrastructure to support development.
9. Sound Urban Management.
 - a. Expansion of Hatfield CID to include Hatfield Metropolitan Core:
 - Safety and Security.
 - Cleanliness.
 - Liaison
 - Development Management
 - Partnerships
 - b. Bulk Rezoning of Land
 - c. Land Assembly



Focus on Transit Oriented Design:

1. Walkable design with pedestrian as the highest priority.
2. Train station as prominent feature of town center.
3. Regional node containing a mixture of uses in close proximity. (office, residential, retail and civic)
4. High density, high-quality development within 10-minute walking radius of train station.
5. Collector support transit systems
6. Designed to include the easy use of bicycles, scooters and walking as daily support transportation systems.
7. Reduced and managed parking inside 10-minute walking radius of town center/train station.

Legend

- 1 – Urban Core
- 2 – Mixed Use (motor related)
- 3 – Office / Residential
- 4 – University
- 5 – Mixed Use
- 6 – Residential

Image prepared by the City of Tshwane Metropolitan Municipality

Context

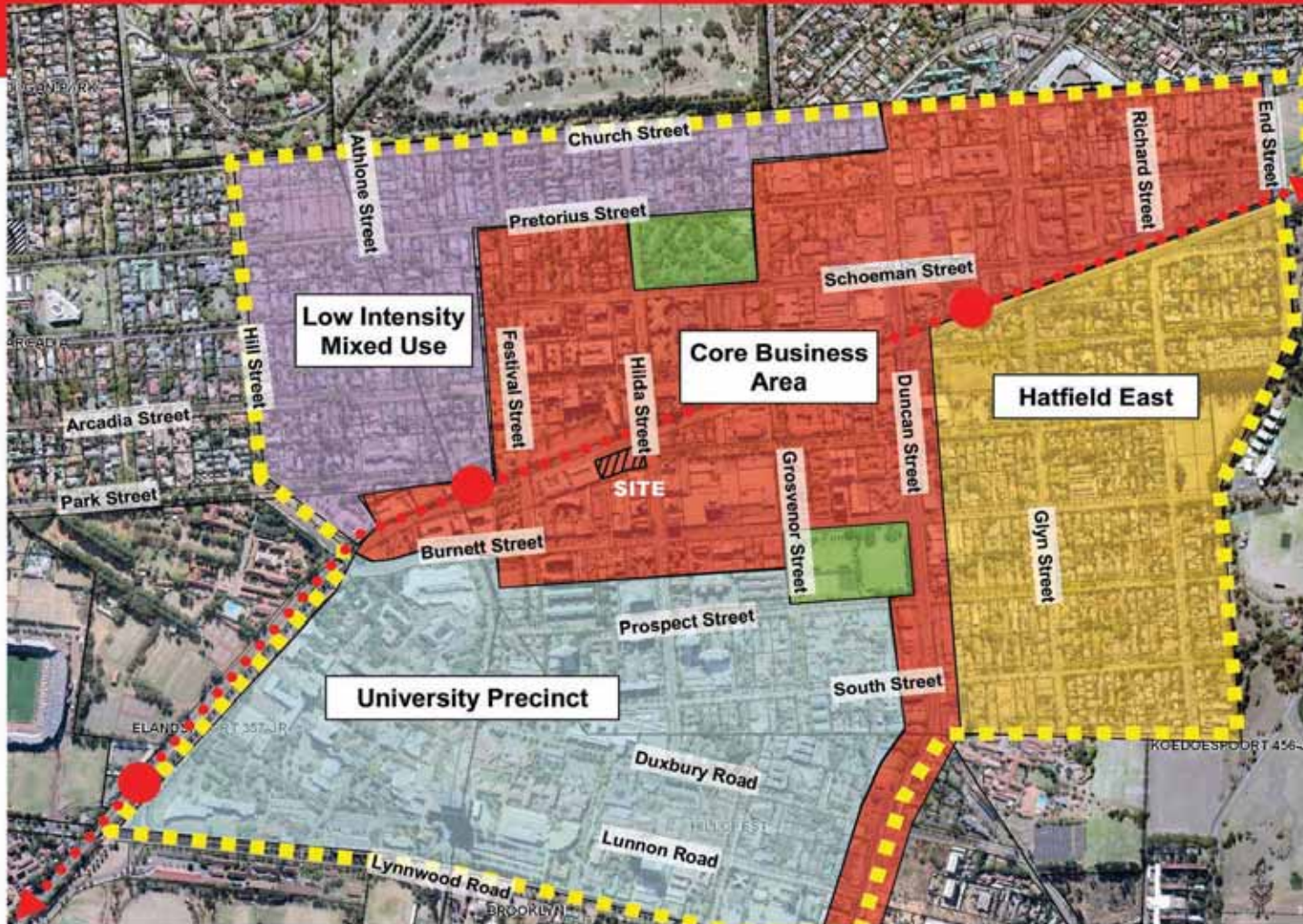
Current Hatfield Area

Strengths

- High density population enabling economic opportunities for small/medium enterprises that rely on passing trade
- Tree-lined walkways along Park
- Presence of buildings with heritage and cultural value
- Zones of tranquility and energy
- Few derelict areas
- Moderately developed infrastructure
- Services available
- Formal and informal economic activity
- High volume of pedestrian movement
- Variety of building uses
- Regular build-to lines to create defined urban space
- Permeability through blocks in core business area
- Night time activities along Burnett
- *The Fields* development increases passive surveillance along Burnett and Hilda and open area along rail track
- Variation in income groups
- Privatization assure maintenance
- UP provides constant source of new residents and users.

Weaknesses

- During vacation times business, especially food and beverage, have slow-down
- Very little civic space, hard open spaces are privatized
- Lack of safe public green space
- Security at night
- Spaces around bridges crossing the railway track are not properly defined
- Only perimeter movement around UP, no permeability



Opportunities

- Gautrain station will bring more people to area, thus increasing economic possibilities
- Growth in middle income group
- Residential buildings that take advantage of proximity to station that will connect with office environments along Gautrain route
- Permeability of blocks increased
- Spine development create civic space
- Integration of formal / informal trading
- Diversity of spaces and activities
- Co-existence of opposites is enhancement of variety
- Densification of area
 - greater volume residential buildings
 - increased pedestrian movement
 - better public transport, wider usage
 - walk-about city possible
- UP will likely keep on expanding as need for education grows. This will bring even more people to area.

Threats

- Private developments that goes unchecked might endanger civic space
- Green spaces could diminish further
- Increased population draws organised crime

Image prepared by the City of Tshwane Metropolitan Municipality

Context

Position of the Hatfield Precinct within the Transit Framework

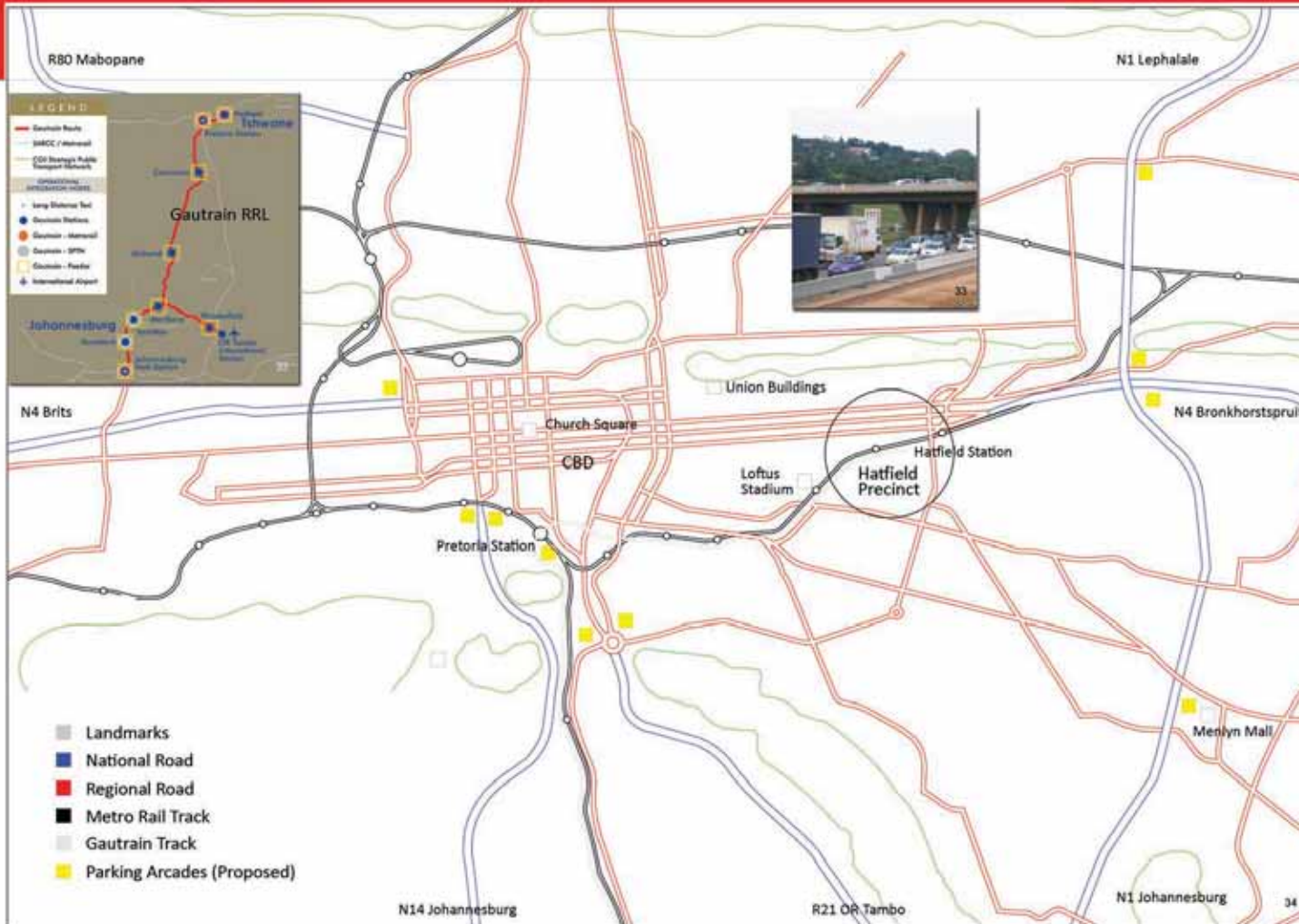
"Transport energy consumption increased by 22 % between 1990 and 2000. It is the largest energy-consuming sector, being responsible for about 35 % of total energy consumption in 2000. ... and road transport is the biggest, consuming around 72 % of transport energy"

European Environment Agency (EEA) Report: Energy consumption (2003)

"In recent years an academic and public discourse has led to this use of the word sustainability ... the challenging emphasis has been on human systems and anthropogenic problems, such as anthropogenic climate change, or the depletion of fossil fuel reserves ..."

(<http://en.wikipedia.org/wiki/Sustainability>)

In a scientific study done by the International Road Transport Union (IRU), it was noted that "... environmental efficiency of transport will be measured mainly in terms of primary energy consumption and CO2 emissions." The whole of the world's economy depends on the transport of goods and people, to and from market places. Being the single most important activity of the economy, it is the biggest consumer of energy and would thus be the biggest polluter as well. The deduction is thus that a more efficient transport system would be more sustainable.



From its humble beginnings as the capital of the ZAR in 1860, Pretoria expanded over the years; but did not follow 'traditional' growth from the center outwards. Due to *apartheid* principles followed by previous government city planners, townships were created (for non-white people) that were great distances from the CBD where they could only work and not live - the legacy of daily distance commuting. Eventually people could live where they wanted to.

The poor, seeking opportunities, moved to the city center, which resulted in the middle and high income population to move from the CBD to settle in suburbs in the north and east of Pretoria. As both Pretoria and Johannesburg grew, more people started commuting between these two cities, mainly along the N1 highway, which also connects the country from the north in Musina to the south in Cape Town, making it a very busy artery, especially in Gauteng (which generates 36% of the country's GDP) where it has resulted in heavy traffic congestion.

These factors prompted the Gauteng Provincial Government to develop the Gautrain RRL.



Design Context

Can we as architects make a difference?

"Building is a fundamental human activity, and yet our relationship to the built environment has gone way off course. This is due, in large part, to people's disconnectedness from the natural process of building, and instead turning over the responsibility for housing themselves to highly industrialized mass building practices. These practices have had catastrophic ecological consequences, are responsible for high rates of homelessness, and their social and psychological costs are devastating and incalculable."

Ann V. Edminster

<http://www.annv.com/press/annv-architect-advocate.html>

In terms of the *Triple Bottomline* principle, economic, social and environmental aspects have to be considered to ensure comprehensive sustainability. And many a time these aspects overlap. The scope of this document will deal mainly with the environmental effects resulting from the resources we consume to build with.

Several systems have been developed the world over to measure the sustainability of architectural interventions. The following two pages reflect the views of the *Canadian Architect* website.

http://www.canadianarchitect.com/ast/perspective_sustainability/measure_of_sustainability/measure_of_sustainability_intro.htm

At present the most commonly available simple (less complex) measures include:

- Embodied Energy
- Operating Energy
- Exergy (Absolute Energy Efficiency)
- Durability
- Externalities

These five measures provide valuable insights into the environmental impacts associated with human activities, and become useful components in the following multidimensional measures of sustainability:

- Ecological Footprint
- Eco-Labeling
- Life Cycle Assessment (LCA)²⁹

Embodied energy

Initial

Non-renewable energy consumed in the acquisition of raw materials

Direct energy

Transport products to site
Construct the building

Indirect energy

Acquire, process, and manufacture of materials, including transport

Recurring

Non-renewable energy consumed to maintain, repair, restore, refurbish or replace materials, components or systems during the life of the building.

MATERIAL	EMBODED ENERGY	
	MJ/kg	MJ/m ³
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2036
Concrete block	0.94	2360
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2790
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	31870
Steel (recycled)	8.9	37230
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.6	139
Glass	15.9	37560
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519960
PVC	70.0	93620
Copper	70.6	631164
Paint	92.3	117300
Lithium	116	150030
Polystyrene insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

29 NOTE: Embodied energy values based on several international sources - local values may vary.

Operating energy

Consumption of energy for heating, cooling, ventilation, lighting, equipment and appliances. Passive systems rely on the building envelope to take advantage of natural energy sources such as sunlight, wind, water, and the surrounding soil.

Active energy systems represent mechanical, electrical and/or chemical processes. Occupants of buildings can also contribute to the heating of buildings by virtue of metabolic processes.

Exergy - Absolute Energy Efficiency

Combination of energy quantity (which is conserved according to the first law of thermodynamics) and energy quality (which is consumed according to the second law of thermodynamics).

Exergy = Energy Quantity X Energy Quality
Energy is efficiently used when the quality of the source is matched to the quality demanded by the task. Are we using a 'chainsaw to cut butter'?

Durability

From a sustainability perspective, a material, component or system may be considered durable when its useful service life is fairly comparable to the time required for related impacts on the environment to be absorbed by the ecosystem. Non-durable components e.g. services and envelope, result in high life cycle costs due to maintenance, repair and premature replacement. It is often compromised when confusing it with the issue of first costs. It implies the need to contextualize the forces and phenomena impacting the building, thus envelopes will differ according to climatic zones and occupancies. Even different solar and wind orientations. An inflexible building which is not adaptive to evolving use could face demolition even though all of its components are durable and performing adequately.

Externalities

Environmental benefits or costs resulting as an unintended byproduct of an economic activity that accrue to someone other than the parties involved in the activity or economic transaction e.g. air pollution, Greenhouse gases, water pollution and land pollution. These are the costs that are not normally taken into account and at present, the environment is footing the bill for externalities.



Ecological Footprint

A measure of a community's demand on the global carrying capacity, which compares this with nature's available long-term carrying capacity. Unlike the previous measures of sustainability, ecological footprint is not confined to buildings and architecture, but holistically regards all human activities. Viewed from an architectural perspective though, it would be interesting to see if architects actually use more or less than one square metre of available ecological carrying capacity to deliver one square metre of building area, thereby demonstrating that less is more.

Durability Precedent:
Cedar Shake Clad Building,
Fruitvale, B.C. (circa 1900)



Eco-Labeling

Attempt to provide an indicator of how well a product is environmentally adapted. Typically, eco-labels are derived from programs having government, industry and consumer representation. Environmental standards and methods of assessing compliance to their requirements form the basis of eco-labels, which are normally issued by an independent certification organization. It attempts to encourage the manufacturing of products with a reduced impact on the environment, and to address public concerns about raw material scarcity, shrinking landfill space, and the impact of pollutants on the air and water. Eco-labeling is fundamentally different from the setting of minimum product standards or requirements in that it is intended to reward environmental leadership.

Life Cycle Assessment (LCA)

"Life Cycle Assessment is a process to evaluate the environmental burdens associated with a product, process, or activity by identifying and quantifying energy and materials used and wastes released to the environment; to assess the impact of those energy and materials used and releases to the environment; and to identify and evaluate opportunities to affect environmental improvements. The assessment includes the entire life cycle of the product, process or activity, encompassing, extracting and processing raw materials; manufacturing, transportation and distribution; use, re-use, maintenance; recycling, and final disposal"
(Guidelines for Life-Cycle Assessment: A Code of Practice, Society for Environmental Toxicology and Chemistry, SETAC, Brussels, 1993.)

Context
Site Orientation



Context

Site Analysis and Conclusions

Urban fabric

The building need to react to both the city grid and the angle of the railway track. The style of the surrounding buildings sets no particular trend, but is rather a 'hodgepodge' of architectural languages and activities. This particular city block is currently an obstacle because of its size and impermeability, but with the introduction of the plaza across the railway tracks, it will become much more permeable and can become the 'crossroads' of Hatfield. It is ambiguous in that it becomes a destiny because it provides a throughfare.

Prime Location

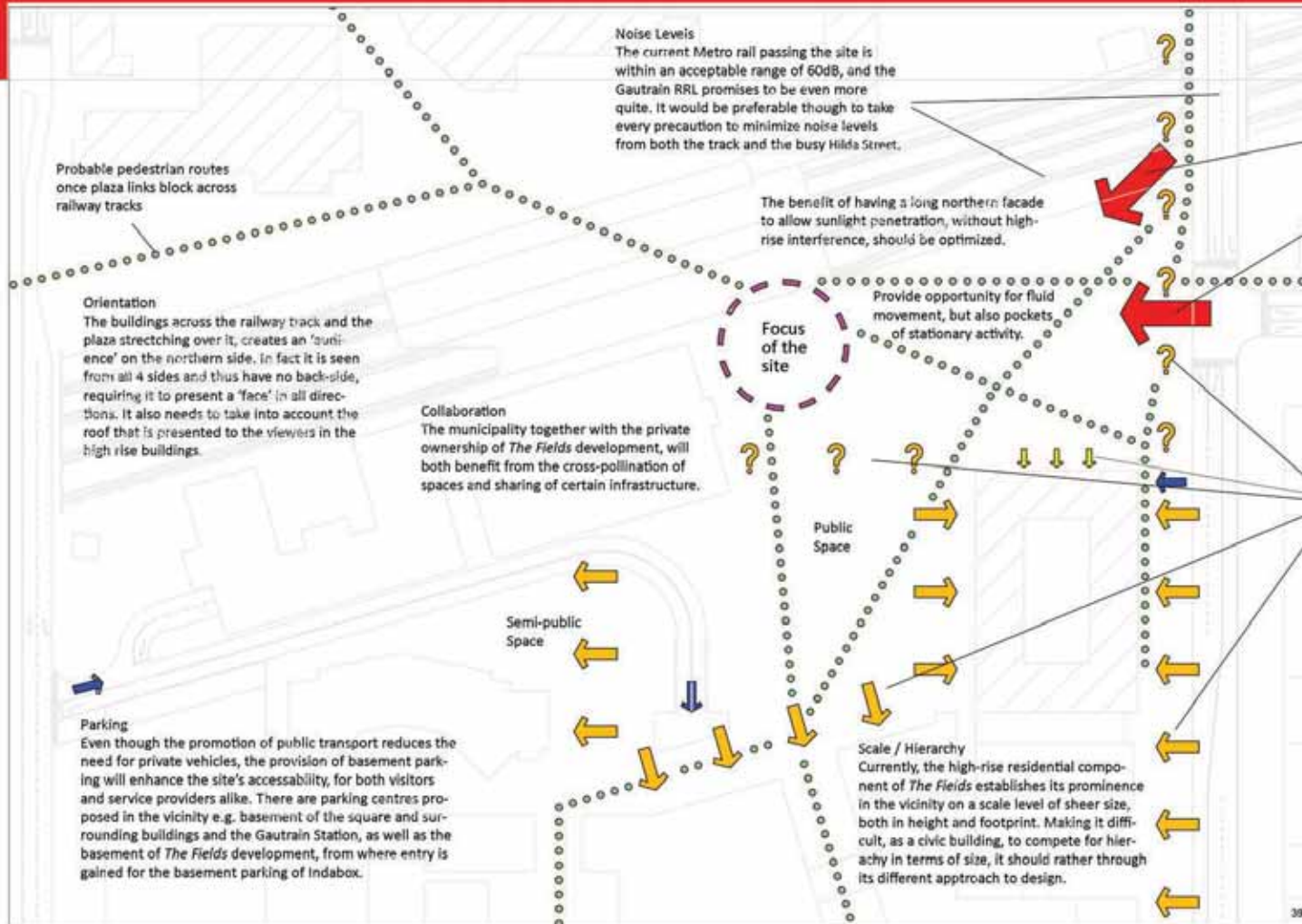
Being part of the urban core with its high densification, proximity of major public transport nodes, commercial activities, offices and residential areas, it creates a magnet for people. Providing a constant flux of people throughout the day and night, the area increases a sense of safety that enhances 24 hour activities. It can easily become the 'spill-out space' for the adjacent high density residential component. The site has the potential to become one of the well-known points of reference in the city. Making this the ideal location for civic functions.

Genius Loci

The building and its spaces needs to add to the vibrancy of both day and nighttime activities that are associated with this central urban hub that is infused with the energy of student life. It is an interesting place where people mix to 'see and be seen'.

Security

Even though the concentration of people tend to provide safety, the addition of visible security presence, especially the quite morning hours, will ensure peace of mind.



Moving down Hilda Street in a southern direction, the facade edge opens up and thus offers the corner of the site an opportunity to become a feature point.

The site is a focal point for people moving along Park Street in a westerly direction.

Spatial experience

Overall the character of the spaces in and around the building should reflect a quality of public realm that is inviting and embracing. The public space forming within *The Fields* development needs to be more defined. Currently it is 'leaking out' towards the railway track, where it blends in with the space created along Hilda Street that is also 'leaking out' where it crosses the railway line. It faces the challenge of defining the eastern street edge while at the same time:

presenting an 'invitation' for the public to pass through to the plaza on the other side
allow northern light into the proposed neighbouring building

Landscaping

The site will endure a lot of pedestrian traffic and is thus not suited for lawns. Enough trees should be added to minimize MRT from the hard surfaces. Water features should be considered to utilize the benefits of evaporative cooling. Encourage the use of indigenous trees and plants that are water efficient. Robust street furniture to handle high intensity use and possible vandalism.

Green Open Space

There is a significant absence of a green recreational space within the immediate area of the high density residential component.