TRANSPORT INTERCHANGES – MODE OR NODE?

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ABSTRACT

This paper argues firstly that the success of major public transport initiatives will depend as much on the extent to which the station/interchange nodes are integrated with their surrounding urban environment and culture, as on any intrinsic efficiency in the transport mode. This point is developed by reference to arguments first articulated in the Gautrain Integration Report on which Andrew Marsay worked.

The paper goes on to argue that effective integration requires the creative blending of transport functionality with property development opportunities at public transport nodes. This objective, in turn, requires the development of institutional frameworks that articulate the aspirations of both public and private sector stakeholders at urban transport nodes. The point is made by reference to the Gauteng Transport Precincts Initiative to which both authors contributed. The institutional context of this initiative together with the design principles that it contains are described.

Finally, the theme is illustrated by reference to some projects in England in which Leszek Dobrovolsky was involved. These show how transport interchanges became catalysts for urban regeneration and successful commercial opportunity. Examples include stations on the Channel Tunnel Rail Link, Euston Station and St. Pancras Station. Relevant lessons are then referred back to South Africa.

1. BACKGROUND - THE GAUTRAIN INTEGRATION REPORT

When the Gautrain Rapid Rail project was first proposed, the case for the very large investment was developed mainly on the need to provide relief for the congested Pretoria-Johannesburg transport corridor and on the contribution that such a large project would make to economic growth in the Gauteng province generally. The efficiency of the rail mode in bypassing the sorts of congestion seen on Gauteng's freeways was also articulated.

It did not escape notice though, that however efficient this new transport mode might be, the number of direct beneficiaries was relatively small in the context of the whole of commuter activity in Gauteng. As the time approached for Government to make its final commitment to underwrite the project, the challenge to find a broader based framework of justification became increasingly urgent.

To justify the very substantial investment of public funds that the project would require, Government needed to ensure that the project would be fully integrated with other transport infrastructure in the Province and not a standalone or elitist project.

Accordingly, in July 2005, Government advised the Gauteng Province's Gautrain Project

Team that final clearance for the project would be subject to detailed report being presented on how Gautrain could integrate with the rest of the transport network. The report was also to identify and cost any additional interventions that might be needed to ensure that the integration objective would be realised.

Thus, what became known as the Gautrain Integration Report was born. A reference committee was established representing all national government departments with an interest in the project, the provincial Department of Public Transport Roads and Works, the Gautrain Project Team, national transport agencies such as the South African Rail Commuter Corporation (SARCC) and the South African Roads Agency Limited (SANRAL), and representatives of the three metropolitan authorities in the Province, Tshwane, Ekurhuleni and Johannesburg.

The committee was served by a secretariat of experts in transport planning, transport economics, land use planning and public finance whose job it was to articulate the reference group's contributions and produce the official report.

2. MAIN FINDINGS OF THE GAUTRAIN INTEGRATION REPORT

The Gautrain Integration Report was presented to Government in December 2005. Its main finding was that the Rapid Rail project did indeed have the potential to integrate with other transport systems in the Province. It also concluded that, subject to certain collateral actions being taken, that the project could act as a catalyst for significant improvement in all levels of transport provision in Gauteng.

2.1 Case for Gautrain supported by demographic and economic trends

Perhaps even more important than the general scope for integration with other transport initiatives was the evidence that the timing of the project complemented underlying demographic and economic trends in Gauteng. A 15-20 year projection of current property market trends produced in the report, and included as Figure 1 in this paper, showed that the spatial structure of the Gauteng economy was consolidating strongly around the existing CBDs.

In other words, by 2015 – 2020, the CBDs of Pretoria, Sandton, Johannesburg and the OR Tambo airport cluster would be even denser than they are now and also that they would be even more dominant features of the provincial economy than they are now. Further, the trends confirmed the expectation of a Midrand CBD emerging that would be even larger than the current Sandton Central area, and focused around the proposed Gautrain station.

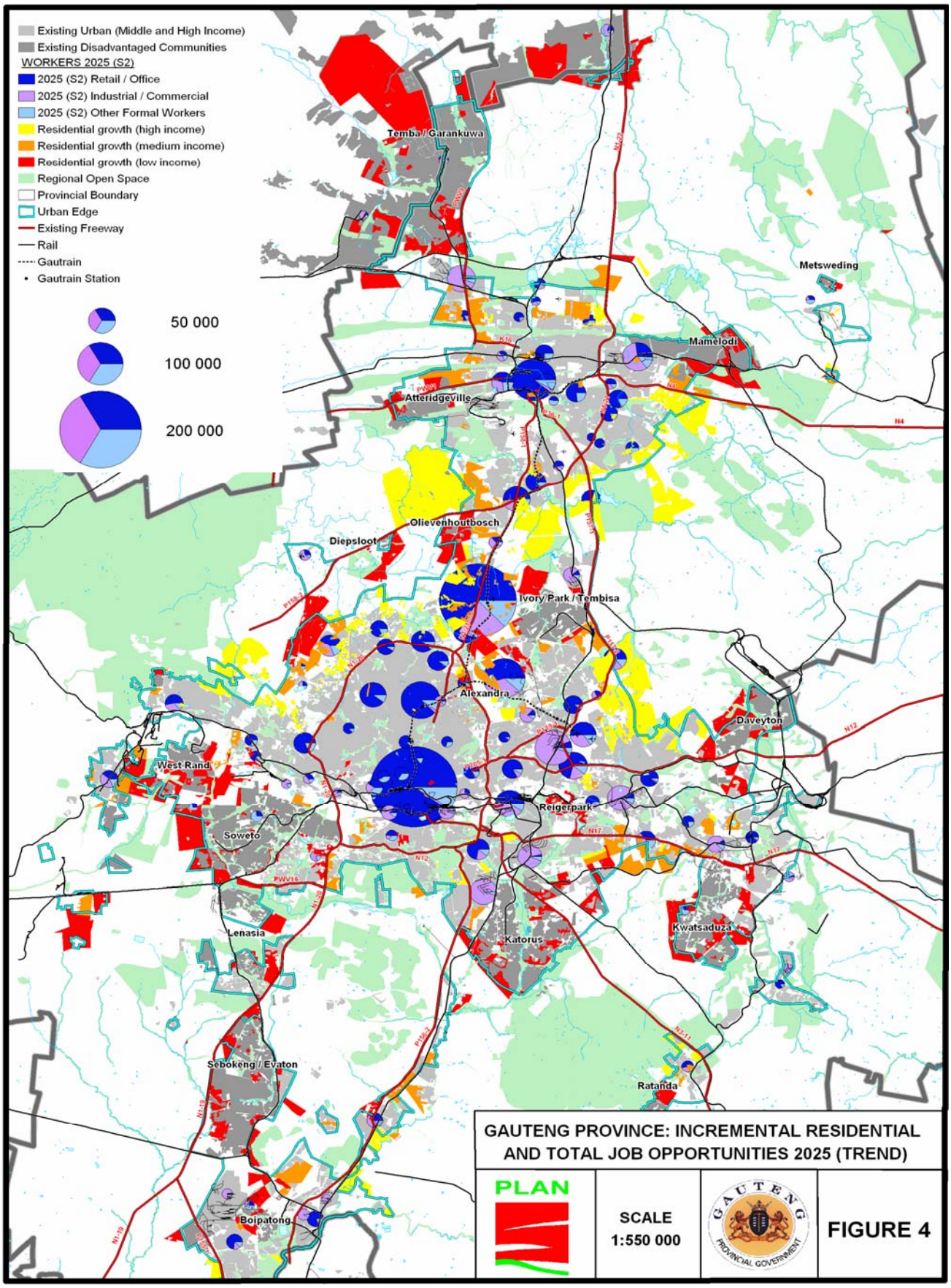

FIGURE 1 Residential and employment land use trends (2025 projection) show that the role of the CBDs is set to be more dominant in future than now

Source: Plan Associates research for Gauteng Province

These land use projections suggested that the main justification forthe Gautrain project may well turn out to be its alignment with long term ‘CBD consolidating’ trends rather than any transport decongesting impact it might have on the Johannesburg-Pretoria corridor. The trends also show that the route and its proposed stations are likely to complement the future urban form even better than they would the prevailing situation.

This indication of a growing alignment between the timing of Gautrain and the underlying trends in urban development is very important for the economic case for investment in urban transit systems generally. It reflects the conclusions of an ongoing debate in transport planning circles about the relationship that exists between urban transport investment and the structuring of urban form.

Public transport, and especially rail, investment is frequently motivated because of its expected effect on consolidating urban form and generating higher density in land uses. Arguments in favour of this position point to typically higher density European or North American cities as demonstrations of this urban densification impact of transit systems.

Although there is still no final consensus on this subject, much available evidence points to the fact while that while investment in transit systems may well support, and even strengthen pre-existing trends towards urban growth and CBD consolidation, it cannot create such trends where they do not already exist and certainly cannot reverse trends towards spatial dispersion.

The difference between the two views may appear at first to be merely a matter of emphasis. But on more careful consideration it can be seen that the implications for transit investment decisions are very dissimilar.

The first position leads to investment motivated by the desire to arrest unwanted trends towards lower density urban forms, or actively create denser forms of development. The latter view notes that the right time, and perhaps the only time to invest heavily in urban public transit systems is when underlying trends show that the urban form is already consolidating for reasons unrelated to transport.

In the present authors’ judgment one of the best statements of this position is that of Gakenheimer, 1990, who compares these two positions and concludes that there is no evidence anywhere in the world that investment in urban transit has arrested trends towards lower density, car supported land use patterns. The evidence, in his view at best indicates that where urban densification is happening anyway, transit investment can support and strengthen the trend.

A simple metaphor that illustrates the difference between the two perspectives is that while ‘many surfboards will not create a single wave, one good wave will support any number of enthusiastic surfers’.

The implications of this conclusion for Gautrain, and indeed for any further investment in public transit systems in Gauteng are encouraging. It means that the timing for strong investment in public transport is just right because the economic drivers land use conditions of which public transport systems are best able to take advantage, are actually prevailing in Gauteng right now.

2.2 Collateral support conditions needed for the success of the Gautrain

In concluding that the Gautrain project had the potential to integrate with other modes of transport, the Integration Report nevertheless pointed out that the effectiveness of this integration would be maximised, and the project risk greatly minimised, if a wide range of transport measures were undertaken in parallel with the implementation of Gautrain. The measures identified in the report were:

- A wide range of operational integration mechanisms such as ticketing, information systems, technical interaction between Gautrain and other rail operators, rolling stock branding and service advertising;
- Early implementation of he National Railplan's Priority Rail Corridors for the Wits and Tshwane regions were fully implemented so that Metrorail service levels would over time begin to approximate those offered on Gautrain;
- Accelerated investment in Johannesburg's top priority road-based public transport routes: the North-South Soweto to Sunninghill route and the East-West Roodepoort to Alexandra route as well as any similar initiatives in the other metropolitan authorities, (now changed to the proposed BRT routes);
- The development of further N-S public transport capacity because Gautrain itself offers relatively small additional capacity;
- The earliest possible expansion of the capacity of the Province's freeway network. This is because congestion on the freeways is spilling over onto lower order roads and worsening congestion there. Gautrain's success would be compromised if congestion on access routes to the stations interferes significantly with the operation of feeder and distribution services;
  Making sure that the main Gautrain stations are very high quality developments that are both attractive and safe to use by passengers and also attractive to property developers who should be encouraged to make investments that will integrate the stations into the urban environments of which they form a part.

2.3 Taking advantage of underlying trends to nodal consolidation

Taken in parallel, the evidence for CBD concentration in Gauteng and the requirement to strengthen the impact of the Gauteng project by collateral investments, suggest that collateral measures which directly support development in the CBDs may be the most important ones. In the reference committee discussions in the course of preparing the Gautrain Integration Report the point was made that the station nodes on the route are more important to the project's success than their purely operational functionality might suggest. It was stressed that 'the node' will be the key to the success of 'the mode'.

Accordingly the report stressed that in addition to operational integration transport modes at the main stations there would also need to be great emphasis on the physical integration of the stations within their urban environment. Unless this was done all the positive messages about an efficient, safe and attractive transport mode could be lost on potential users.

3. THE GAUTENG TRANSPORT PRECINCTS INITIATIVE

Very soon after the conclusion of the Gautrain Integration Report, Gautrans took action to follow up the point about integrating stations with their urban environment. A workshop was convened that brought together the Gauteng metropolitan and other local authorities, as well as the rail and highway authorities. The aim was mutual briefing on the importance of the Gautrain station nodes and transport interchanges generally. The specific objective was to review these nodes as opportunities for realising a wide range of urban development objectives.

A presentation was sought from an internationally experienced interchange design consultant, Leszek Dobrovolsky, on how transport functionality had been successfully blended with appropriate land use developments at station nodes around the world. Local authorities then presented their plans and aspirations for some of the larger stations in Gauteng including Johannesburg Park Station and Mabopane in Tshwane.

The context of the review was the perception that public transport facilities in South Africa have traditionally been regarded as, at best, rather austere and merely functional facilities and, at worst, as dangerous locations with negative impacts on urban quality. The overall aim of workshop was to show that an alternative, far more positive role could be achieved for transport interchanges; one that would enhance rather than detract from the quality of the urban environment.

A set of interchange development design principles was reviewed and adapted to South African circumstances. These were:

- Accessibility – of movement into and within an interchange
- Integration – amongst transport modes and other facilities at the interchange
- Sustainability – pitching style and scale appropriately to the location
- Development value – identifying opportunities for private development
- Constructability and phasing – working around physical and financial constraints
- Operations – recognising that an interchange has to be proactively managed
- Liveability – ensuring that the result enhances the urban experience for people

In preparing a document bringing together the international experience and locally applied design criteria it was also recognised that it was necessary to link this initiative with all relevant policy commitments in related areas. The final Transport Precincts Initiative document was circulated to all authorities for adoption and absorption where possible into each authority's own transport development policies.

Arising directly from this initiative the City of Johannesburg has recently invited proposals for explicit interchange precinct development frameworks at Rosebank, Sandton and Marlboro. This is aimed explicitly at optimising the operational success of the train and also steering strongly emerging private property development interests at these nodes in a way that will serve both public and private sector aspirations.

All the local authorities were invited to submit a list of locations within their jurisdiction which, in their judgement would be best suited for the application of the Transport Precinct Initiative development criteria. In time each of these will also have appropriately pitched development frameworks.

4. TRANSPORT INTERCHANGE DEVELOPMENTS IN ENGLAND

Because the United Kingdom, and England in particular, has had such a long heritage of rail transport, railway stations have for a long time been a focus of other urban developments. But it has only been in the past 10-15 years that there has been a deliberate policy focus on more effective use of land at and around transport interchanges.

One of the main factors behind the policy focus has been the desire to reduce the road transport impact of large property developments. Another factor has been the desire to minimise the amount of development taking place on 'greenfield' sites and especially outside of existing urban conurbations. A third factor was a growing focus on the need for regeneration of inner cities and the consequent need for creative utilisation of previously used or 'brownfield' sites.

A final factor, and one not yet widely acknowledged in England itself, was that the population of London and the surrounding parts of SE England began to grow again in the mid 1980s. From the start of the Second World war until about 1980, the population of London declined from nearly 10 million to 7 million, but since then has recovered to nearly 8.5 million in 2005 and it is still rising. The same period has also seen a major recovery in the economy of London with huge commercial developments taking place both within the City of London itself and of course at London Docklands that includes the Canary Wharf development.

This last factor is part of the essential context of the case studies about to be reviewed and it is also the most relevant issue in applying lessons from England to the present circumstances in Gauteng.

As pressure to find suitable regeneration sites began to mount during the 1980s and 1990s, it was realised that in many English cities land around railway stations and transport interchanges was either underutilised in any commercial sense or had been historically used for rail freight yards, industrial applications or for utilities functions such as gas storage. During the late 1980s and through the 1990s many such sites became the focus for creative urban redevelopments which have linked enhanced transport functionality with successful, high quality property developments.

Government sought to give expression to the constraints and opportunities presented by these trends. They did this through the establishment of local, and later regional, development agencies whose brief it was to identify synergies between problems and opportunities and set an institutional and public finance framework within which regeneration and transport projects could be implemented.

Early examples in London include the air rights development above Charing Cross station, the total modernisation of Liverpool station and its integration with surrounding prestigious developments such as Broadgate.

Government began to sponsor research on the relationship between urban economic development and the transport impacts that they typically generate. One such project was the four year ‘Transport Development Areas’ project initiated jointly by Government and the Royal Institution of Chartered Surveyors (RICS).

At first, the TDA project was simply an exploration of town planning mechanisms to give ‘teeth’ to policies designed to control the traffic generating impacts developments. Under the continued guidance of the RICS, the initiative grew to become a framework within which to identify and take forward developments where transport functionality and urban development opportunity coincided. In the published document a TDA was defined as:

“An integrated land/use planning approach operating around urban public transport interchanges or nodes well served by public transport in which a more specific relationship between development density and public transport service is instituted”.

Although a number of applications of these principles have since been implemented at transport interchanges in London, of particular relevance to illustrate this present paper are the opportunities for property developments that have been achieved in the context of the Channel Tunnel Rail Link.

This project was transformed from being simply a transport infrastructure project into one that has brought about complete transformations of at least two major precincts in London,

and the creation of a new large urban area associated with an international transport interchange at Ebbsfleet south of Thames.

These opportunities did not happen automatically. Our firm, Arup, in London had anticipated that the very large scale expenditure on a new railway presented an important opportunity to link the economic case for the railway with the urban regeneration polices of the government. But this required that a revised route be developed which took in all the locations with potential for urban redevelopment.

This next part of the paper briefly tells the story of nodes where this major transport infrastructure project has led to the creative redevelopment of Ebbsfleet outside London, and at Stratford and Kingscross/St Pancras in London. The successful development model was then applied to yet another transport interchange in London, Euston where a traditional 1970s station is currently being transformed and integrated into a new, and completely restyled, urban precinct.

The project descriptions in the text here are brief but are supplemented by the text and pictures in the accompanying presentation. These illustrate not only the development context at each location but also some of the principles by which operationally successful transport interchanges have been integrated with very successful commercial property developments. Attention is also drawn to ways in which potential conflicts in land use priorities between this approach to development at transport nodes and conventional, road access solutions have been addressed.

4.1 CTRL – Ebbsfleet

Ebbsfleet is in north Kent on the route of the Channel Tunnel Rail Link (CTRL), just prior to where the line crosses the River Thames. At this location the CTRL route aligns with a rail junction that connects two existing regional rail routes. Prior to construction of the CTRL, the area comprised deteriorating residential and industrial infrastructure and no rapid access to employment opportunities in Central London. A bright spot was the nearly adjacent and hugely successful Blue Water regional shopping centre, developed in a reclaimed quarry.

The dynamics of this situation at Ebbsfleet, have been capitalised on by the creation of a new urban precinct centred upon a station building that straddles the international and regional rail tracks and physically integrates with a new, high quality, mixed use development immediately adjacent to the station precinct.

Parking provision for the station and this development has been integrated with new bus links to the Blue Water development and to the older residential and industrial areas which are now recovering as a result of the impetus of the new node. The high speed, 20 minute Kent Link commuter rail service on the CTRL route now provide enhanced accessibility to employment in London. The consequent boost to local incomes is further boosting the regenerating impact on the existing land uses.

4.2 CTRL Stratford

Stratford is situated on the east London approaches of the CTRL. It is one of the many secondary town centres within the London metropolitan area. The CTRL route was separated from the current town centre by a complex web of road and regional rail routes as well as a derelict rail freight yard. The decline of the older rail functions have been paralleled by a lack of new investment in the old town centre.

The coming of the CTRL together with an international station has been grasped as an opportunity to weave together a total regeneration plan for the area. It has provided an opportunity to link the international (including Kent Link high speed commuting trains) with the rail transport routes serving the existing regional station, as well as across these lines into the existing town centre.

This has required a creative approach to the redevelopment of large derelict former rail lands. Spoil from the tunnelled approaches to Stratford has been used to create a new, much higher level land form on the site which facilities a wide range of retail office and residential development connected via a longitudinal pedestrian precinct through the site and bridging the regional rail lines across into the old town centre.

The awarding of the 2012 Olympic Games to London has provided further opportunity to create legacy development building on the new precinct. The Docklands Light Railway is to be extended around the main development site providing a local access station to the adjacent main Olympic site, as well as offering a public transport link between the regional and international stations for passengers unwilling or unable to utilise the pedestrian precinct that links the two.

Phasing of the project has been critical because construction of certain elements has prevented commencement on other aspects. Existing rail routes have had to be kept operational and road-based accessibility within the town centre maintained.

Potential land use tensions between pedestrian, public transport and road-based access and car parking have been mitigated substantially by the opportunity to create a new parking level afforded by the site raising exercise. Consequently, it has been possible to develop a precinct that creatively combines public transport, non motorised and private car modes of accessibility in a new and unique manner.

4.3 CTRL - London Kings Cross/St Pancras - above and below ground…

Kings Cross and particularly St Pancras mainline stations in London are testimony to the great Victorian era of industrial and population expansion in London. Although now integrated as part of the London's contemporary public transport network, the surrounding land uses bear testimony to a bygone era and comprise industrial dereliction, contaminated land and decaying urban form.

Two events have prompted the massive investment that is progressively transforming this area into a modern and vibrant precinct. These are the King Cross underground fire in 1987 and the decision to make St Pancras the central London terminal station for the CTRL.

The critical issue has been how to accommodate 21st century railway lines and services within an envelope set by 19th century infrastructure and at the same time facilitate the modernisation of the surrounding urban fabric. Other issues include:

- combining the preservation of the extraordinary Victorian Gothic architecture of St Pancras station with the creation contemporary building accommodation
- integrating the new international rail services with many existing surface and underground rail services, including relocation of one semi-underground station
- creation of modern specification ticketing halls underground and attractive, functional pedestrian circulation spaces at surface level

By including the derelict lands adjacent to the station in the deal to develop the CTRL, government has also enabled the levering of private sector development interest in the regeneration of the wider area. Although a very long term project, the result is going to be the comprehensive transformation of a 'sinkhole' of a location into a commercially viable mix of residential, commercial and transport land uses.

4.4 London Euston

Although state of the art when completed in the late 1960s, London's Euston Station has not benefited from any creative utilisation of available land packages in its immediate vicinity that might have led to ongoing renewal of both the station and its associated urban environment. As a consequence, the station has become something of an island site, isolated from other developments in this part of London.

Arup has developed some innovative ideas for integrating station redevelopment with the commercial utilisation of a range of small land packages around the station. These ideas were taken to private financiers, the local authorities and Network Rail, the infrastructure operator. A consortium has been developed that will direct funds levered from the commercial land use opportunities, together with both public and rail industry funds, into a joint station precinct redevelopment.

Transport for London has further enhanced the opportunity by the routing of a new tram route past the site and also by reconfiguring its Euston Station bus terminus so as to allow the integration of the station precinct with the wider urban environment.

The outcome is that the station will be transformed operationally and its isolation from other development initiatives in this quarter of the city will be overcome.

5. CONCLUSIONS AND APPLICATION TO SOUTH AFRICA

5.1 Conclusions

The art of creatively blending transport infrastructure and operations with urban development opportunities is one that has been developing over time in Britain. Arup has been at the forefront of this process by bringing together station architecture, urban design and transport planning into a single discipline and it is this experience that was deployed in the development of Gauteng's Transport Precincts Initiative.

The main lessons that have been learned in the process of developing this new discipline are:

- Large transport projects need all the economic help they can get and well located, successful property developments can make a major contribution to their operational success;
- Large urban development or regeneration opportunities often require something very significant such as a major transport infrastructure project to 'kickstart' a step change in the perception of opportunities;
- The identification of opportunities where transport functionality and commercial development coincide requires a willingness to think beyond conventional road transport accessibility solutions and may depend on on factors such as:
  - An underlying trend of economic and population growth feeding both public transport and urban property market demand;
  - The creative application of design skills developed from other contexts to the creation of modern urban precincts focused on transport nodes;

- The personal connections and institution building skills to start and sustain the stakeholder networks through which projects are delivered;
- An planning/development framework that can both articulate and sustain new initiatives within a prevailing institutional context
- Ability to manage timing constraints when private sector developers work alongside public authorities with their administrative and political cycles

5.2 Application to South Africa

In South Africa the Gautrain project is proving to be the occasion for the initiation of a similar cycle of learning to that which has taken place in Britain over the past 15 years. A transport project that had its origin in the simple need to address congestion on Gauteng's main north south corridor is already proving to be even more of a catalyst than was suggested in the Gautrain Integration Report.

Formerly sceptical property developers have begun to take a strong interest in opportunities for integrating future buildings at the nodes along the Gautrain route with the existing urban forms in especially at Johannesburg Park Station, Rosebank, Sandton, Marlboro and Midrand.

Opportunities are being perceived in connection with even newer public transport initiatives such as Johannesburg's proposed Bus Rapid Transit, which should be designed to operationally complement the Gautrain stations and further contribute to the urban consolidation of the urban nodes.

The opportunity for realising such developments arises in part as a result of the very strong economic growth in Gauteng combined with CBD consolidation and urbanisation trends. These trends were set in motion 20 years ago with the freedom of movement that resulted from the abolition of the Group Areas Act and the partial deregulation of transport provision.

Now, with 12 years of high and even accelerating economic growth in place, the disposable incomes to act on new found freedoms has resulted in a resurgent optimism about the future of the Province's CBDs. Added to this the potential for a change in South African perceptions of public transport, and we face opportunities for the transformation of perceptions of public transport in this country.

Instead of it being a peripheral necessity to link residential and work places, transport nodes have the potential to combine a major recovery in CBD property development with the boost to mixed income patronage that is essential to the long term success of public transport operations.

With imaginative rethinking of transport and land use priorities is needed in our very private car access culture. But the examples quoted show how good engineering, architecture and urban design can facilitate the changes in both mentality and skills that will be necessary to bring similar successes to transport nodes in South Africa. In summary, the experience shows that the key to increased reliance on public transport modes is the creative development of the associated interchange nodes.

6. REFERENCES

[1] Gauteng Department of Public Transport Roads and Works, ‘Transport Precincts Initiative’, GDPTRW, July 2006

[2] Gauteng Department of Public Transport Roads and Works/Department of Transport, ‘Gautrain Integration Report’, GDPTRW/DOT unpublished, January 2006 Gakenheimer, R, 1990. ‘The two analytic cultures of rail transit planning’. Keynote address in ‘Rail mass transit for developing countries’. Proceedings of the conference organized by the Institution of Civil Engineers, and held in London on 9-10 October 1989

[3] Hine, P, Marsay, A, Edge, J, and Gal, K 2002. ‘Transport development Areas – Guide to Good Practice’. Royal Institution of Chartered Surveyors. London Hine, P, Marsay, A, Edge, J, and Gal, K 2003. ‘TDAs – the London Dimension’. Royal Institution of Chartered Surveyors. London.