The Accra Pilot Bus-Rapid Transit Project: Transport-Land Use Research Study





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Abbreviations and Acronyms

AMA	Accra Metropolitan Assembly
APDA	Auto Part Dealers' Association
BRT	Bus-Rapid Transit
CBD	Central Business District
CUT	Centre for Urban Transportation
DUR	Department of Urban Roads
GAMA	Greater Accra Metropolitan Area
GOG	Government of Ghana
GUTP	Ghana Urban Transport Project
GPRTU	Ghana Private Road Transport Union
MCI	Millennium Cities Initiative
NMT	Non-Motorized Transport
UPTU	Urban Passenger Transport Unit

Executive Summary

The Government of Ghana (GOG), having long highlighted the critical importance of transport services and infrastructure in enabling economic growth and poverty reduction, initiated the Ghana Urban Transport Project (GUTP) in 2008, together with the World Bank, the French Development Agency (*l'Agence Française de Développement*) and the Global Environment Facility, in order to improve mass transport services within the Greater Accra Metro Area (GAMA). The Accra Bus-Rapid Transit (BRT) is a part of this effort, aiming to provide an efficient and affordable bus transit system that will be piloted in Ghana's two largest cities: Accra, the nation's capital, and Kumasi, capital of the central Ashanti region.

In January 2010 the Millennium Cities Initiative (MCI), a project of the Earth Institute, Columbia University, entered into a joint initiative with the Accra Metropolitan Assembly (AMA) to assist the city of Accra in their efforts to attain the Millennium Development Goals by 2015. In its research endeavours MCI is also collaborating with the University of Ghana, Legon.

This study employs an interdisciplinary approach to identify and quantify the various activities on urban passenger transport in Accra. The study uses a combination of primary and secondary data gathering including literature review, interviews with government officials and BRT pilot project representatives, stakeholder meetings, land use and economic activity analysis and non-participatory observation. The intent was to obtain a comprehensive understanding of the issues, the BRT pilot project and opportunities within Accra's urban transport system.

In order to better understand what kinds of interventions might best improve existing land use-transportation synergies, this study assesses transportation challenges along a key node of one of Accra's main transportation corridors, which will be used for the BRT. We augment existing data and analyses with interviews and site analyses, in support of a set of planning and policy recommendations that the GUTP might consider. This research project represents a consultative process between the MCI and the GUTP, with the Department of Urban Roads (DUR) and the Urban Passenger Transport Union (UPTU) hopefully benefiting from the data and urban planning analysis resulting from the study.

The pilot BRT project presents an opportunity to offer fast, comfortable and cost-effective urban mobility for everyone. Our study focuses on a key sector of the pilot BRT corridor. The study site around Kaneshie was chosen because it unlocks the potential of the BRT to alleviate major congestion, a general concern that permeates many areas in Accra. Furthermore, this location serves as the economic center that supports the city's overall economy, and as a pivotal transportation hub where all forms of transit converge.

When an inventory of economic activity had been conducted in each section of Kaneshie, a number of trends were revealed, including the amount of "heavy" commercial activity, such as the sales of spare parts and household goods. Two areas of Kaneshie stood out as the most densely concentrated commercial sections: Kaneshie and Abossey Okai markets, implying high customer traffic in those areas, both human and

vehicular. The concentration of commercial activity along the corridor of course has implications for land use, given that extensive commercial transport activity, including bus queuing and the loading and offloading of passengers, adds additional strains on the road space.

Land use analyses confirmed a medley of mixed-use commercial, stand-alone commercial, and combined residential and commercial activity, and particular relationships of these land-use activities with the area's transportation network. Commercial activity prevails in Kaneshie, as over time landlords have converted their properties from residential to commercial, so as to collect higher rents.

In general, informal land allocation and unplanned physical development have been major issues in Kaneshie. Unplanned development is further accentuated by encroachment on public spaces (e.g. pedestrian walkways and footbridges) and roadways. The combined effect limits pedestrian space along the corridor and the linked roads and impedes access to public transportation.

Stakeholder meetings supported our general observations from the land use analyses and inventories. In order to gauge stakeholder opinions on their unique transportation challenges and preferences, we interviewed the commercial and business stakeholders from the Winneba Road Corridor; the Society of the Physically Disabled, Ghana; the Market Traders at Kaneshie Market; the Abossey Okai Auto Part Dealers Association (APDA), senior officials and students at the Reverend Thomas Clegg Junior High School, and the Ghana Private Road Transport Union (GPRTU).

To address the stakeholder transport concerns and land use transportation challenges, this study proposes several recommendations for the GUTP:

- Explore mechanisms to increase public awareness;
- Strengthen the institutions that govern transport operations and land use;
- Provide incentives for mass transit and disincentives for private transit so that public transport is made more attractive;
- Integrate accessibility needs into the BRT design and operations;
- Integrate the BRT with the activities of local transport operators;
- Promote and safeguard non-motorized transport (NMT);
- Design terminal stations with customer comfort, safety and security in mind. Address the extensive informal sector commercial operations throughout Kaneshie Market.
- Utilize the Centre for Urban Transportation (CUT) to spearhead sustainable transport initiatives.

Introduction

This study focuses on the development of the Accra pilot BRT and its potential impact on wider transportation and land use planning. The pilot BRT is one of five pillars of a national urban transportation development project that aims to improve mass transport services within the Greater Accra Metropolitan Area (GAMA) through the development of an efficient and affordable bus transit system.

The City of Accra, Ghana's capital and by far its largest city, is the country's commercial and political centre. The city has an estimated residential population of 2.1 million people (2009 figure), but with an average annual growth rate of 4.4%, the city's population is expected to reach 2.6 million by 2015 and 4.18 million by the year 2025. Each day, an additional half a million commuters travel into the city to undertake professional, administrative, educational, commercial and industrial activity (World Bank, 2010).

Background

It is said that the lack of a good road system causes a country's "wheels of development [to be] mired in mud" (Ellison, 2002). Given Accra's current economic and political status and future growth potential, an effective multi-modal transportation system, which includes both motorised and non-motorised forms of transport, is essential to supporting continued accessibility and mobility, as well as economic development.

British colonial policy laid out the transport framework throughout present-day Ghana and the city of Accra (Songsore, 2003). In the coastal cities of British territories, transport investment prioritized development at industrial and port areas. Typically, the road network consisted of a major trunk road from the central business district (CBD), leading out of the city to the provinces, spurring development in the industrial and/or port area (Banjo and Dimitriou, 1983). Economic development thus led to the concentric and centripetal road network structure of Ghanaian cities, with a concentration of high-density activity at the hub, but limited road space. This road network structure is illustrated in and around Accra, where a series of radial routes converge at the city's CBD: A major deficiency is the lack of east-west corridors (Addo, 2002; Tamakloe, 1993).

Accra's urban growth has shifted away from what is known as "compact city growth" -- characterized by high population densities with mixed land use and highly concentrated residential patterns, such as in the area of Jamestown, where population density can approach as much as 1,000 persons/hectare -- to a "network city" development pattern, characterized by the decentralization of land use, with lower population densities and suburban residential development (Selase, 2004). When planned effectively, compact city growth can maximize land use with a concentrated mix of work, living places and infill development. Such planning can

also reduce dependence on the automobile and support non-motorised transport, such as biking and walking. Presently, Accra's lower-density urban growth expansion continues to encourage automobile dependence. Obeng-Odoom (2010) demonstrates that the government, at both the national and local level, has encouraged car ownership through large road infrastructure investments, economic liberalisation policies that make it relatively easy to import cars and by consistently under-investing in public transport. These issues have contributed to the perception of the private car as a more attractive travel mode, particularly in urban areas such as Accra.

Linking Transportation, Land Use and Urban Development

Transportation and land use are closely linked aspects of urban development. Urban development, growth and infrastructure influence travel patterns and transport mode; for example, the spatial match of home and work, shopping and recreational activities determine travel patterns. These patterns are also affected by the quality of supporting infrastructure. The contours as well as the inner workings of urban transportation systems impact growth patterns, economic activity and performance, the environment and quality of life. Transportation is the means for making a city accessible for its residents; a well-maintained, multi-modal, efficient transportation system is essential to a healthy, sustainable city.

A recent World Bank report (2010) included a breakdown of city residents' primary transportation mode choice to and from shopping and work. *Tro-tro* (jitney minibuses that operate informally along specified routes) are overwhelmingly the most popular mode of motorised transport, followed by private cars, taxis and Metro Mass Transit (MMT) buses (see Figure 1). The report found that 11% utilize walking as a means of transport, but few individuals opt for biking (whether in motorised or non-motorised forms). An earlier study by the Accra-based Centre for Cycling Expertise found an even higher proportion of pedestrians and bicyclists, with 34% and 8.4% respectively (Quarshie, 2004). The transportation mode breakdown according to both reports is provided in the bar chart below.



Figure 1. Breakdown of transportation use in Accra by mode. Sources: Centre for Cycling Expertise (2004), World Bank (2010).

Studies of people's perceptions of public transport reveal that the quality of *tro-tros*, taxis and buses is rated as 'satisfactory' or 'good' (rather than 'poor'). However the majority of passengers (in particular, women) expressed concern as to the reliability of *tro-tros* and buses, particularly with regard to comfort, waiting time and access times. The main reasons for dissatisfaction were long delays and unpredictable schedules (Abane, 1993).

In a recently conducted 2010 World Bank study on Accra, residents ranked their major transportation and land use concerns, including traffic congestion (the most common complaint, voiced by 55% of survey respondents), the encroachment of vendors on roads and streets (41%) and illegal parking on and alongside roads (33%) (World Bank, 2010).

Transportation, Accessibility and Mobility in Accra

Traffic congestion, road safety concerns and mobility are all key issues regarding the provision of transport within the city of Accra. Congestion, manifested in the bottlenecks which characterize central Accra's major and arterial roads, is a major constraint to economic and social development and has detrimental environmental impacts, such as noise and air pollution.

African countries have among the highest rates of transport-related accidents in the world (Afukaar et al, 2003; Porter, 2010). In Accra, driver aggression, low literacy levels among drivers (particularly commercial taxi and *tro-tro* operators) and disregard for safety measures have contributed to safety concerns and road accidents. Unfortunately young men and children are the most common victims (Porter, 2010).

Transport is a salient issue for the mobility of women and children. Since women typically earn lower incomes than men and usually bear responsibility for childcare and household tasks, they often face the greatest spatial constraints on their mobility and travel mode options (Porter, 2008). In Accra, market trading is a key livelihood strategy for women, who must depend on informal transport, taxis and non-motorized transport (usually walking) for their travel to support this work (Greico, Turner and Kwakye, 1995). Additionally, women's and children's mobility is often correlated with domestic support at the household level: mothers of school-age children must act as "domestic anchors" who either remain in the home due to security concerns, or who use the home for trading. The sharing of domestic responsibilities also means that other family members' activities, including transportation, are arranged from home (Greico, Turner and Kwakye, 1995; Porter, 2010).

Studies relating young people's accessibility to key institutions, including educational and health facilities, demonstrate that while proximity to such institutions is important, so too is available, affordable and safe transport, particularly for children and young women. For example, studies from around Ghana demonstrate that the lack of transport and high transport costs often encourage truancy and/or early dropout rates for youths (Porter, 2010, citing Avotri et al., 1999).

The Accra Bus-Rapid Transit (BRT) Pilot Project

In its *Growth and Poverty Reduction Strategy* (2003), the Government of Ghana has highlighted the importance of transport services and infrastructure in enabling economic growth and poverty reduction.⁴ A key initiative for achieving improved transport infrastructure is through the Ghana Urban Transport project (GUTP), a five-year (2008–2012), US \$95 million investment aimed at reforming road-based mass transit service delivery and infrastructure in Ghana's urban areas.

There are five components to the GUTP:

- Institutional development within the transport sector,
- Traffic engineering, management and safety,
- A bus rapid transit (BRT) project to be piloted in the cities of Accra and Kumasi,
- Integrated transport and urban development planning and policy, and
- Project monitoring and evaluation.

The Government of Ghana is engaged in the GUTP along with the World Bank, the French Development Agency *(l'Agence Française de Développement)* and the Global Environment Facility. At the national level, the implementing agency is the Interim Management Consultants' Office (IMCO), under the Ministry of Roads and Highways' Department of Urban Roads (DUR). At the local level, the Urban Passenger Transport Units (UPTUs) operate within the participating assemblies of Accra, Tema and Ga West (DUR, March 2010). IMCO manages the activities of the GUTP, including infrastructure design and organizational design; locally, each UPTU is responsible for regulation and land use-transport planning in each assembly.

Current Passenger Transport Usage Along the Proposed Accra BRT Corridor

The main corridor for the Accra BRT design plan extends between Kasoa along Winneba and Graphic Roads to the city's central business district (CBD). The Winneba-Graphic Road corridor is one of the most heaviest heavily used routes in the Accra metropolitan area; daily traffic volume along the entire Winneba Road is estimated to reach 50,000, while along Graphic Road, daily traffic volume has reached 40,000 (DUR, 2010). Population projections predict the growth of Kasoa and other communities to the west of Accra, which will put additional pressure on these roads (DUR, 2010).

A consultative infrastructure operation and design report for the Accra BRT outlines travel demand figures for the BRT corridor and a target market for BRT ridership (Mott McDonald, 2010). Along the main BRT corridor (Winneba and Graphic Roads), public transport vehicles (*tro-tros* and buses) account for about one-

⁴ The government identified transportation and infrastructure as key to promoting interregional trade, as well as access to health, educational and market facilities in both rural and urban areas. In terms of agricultural trade, transport infrastructure is key for connecting rural-based production to markets and distribution activities. Transportation infrastructure and services provide access from homes to needed social services and economic activities. This access has direct and indirect effects on poverty indicators, including income , health access and rural population's vulnerability. Poor road conditions and road accidents were identified as major threats to the country's working population (Ghana Poverty Reduction Strategy, 2003).

third share of vehicles on the road space, but carry the majority share of passengers. Moving toward Accra, *tro-tros* and buses account for 35% of vehicular traffic, but they account for 84% of passenger ridership. In the direction toward Kasoa, the numbers are slightly higher: *Tro-tros* and buses record 43% of vehicular traffic flow, accommodating 86% of passengers. Conversely, cars and taxis take up the majority of space on the road (58% heading toward Accra, 48% heading away from Accra) but carry far fewer passengers (19% heading toward Accra, 11% heading away from Accra). These travel demand factors illustrate that public transport is already a key component for the majority of travellers on this corridor. The report identifies ridership transfers from *tro-tro* and bus to the BRT as an opportunity for decongestion along the corridor; the research team envisions the additional opportunity to reduce the dependence on private auto ridership along this same corridor.

The BRT network design will provide services via four major aspects (see Figure 2):

- A main trunk corridor will run from Kasoa to the CBD along Winneba and Graphic Road.
- Several *tributary routes* will be designed and integrated into the network, to address travel demands originating outside this corridor. These tributary routes originate from the suburban areas of Kasoa, Gbawe, Awoshie, Sowutuom/Santa Maria and Nyamekye; a tributary route from Kwame Nkrumah Circle will also link into the main trunk corridor.
- Several *feeder routes* will provide transit access from more local areas within the city.
- Two *distribution routes* at the city's CBD will provide service within this area. These two routes will provide the links to the city's business center: One distributor route will exist from Kwame Nkrumah Avenue to Okaishie (UTC), and the second distributor route from Liberia Road will form a loop as it runs along Independence Avenue and Barnes Road (Department of Urban Roads et al, 2010).



Figure 2. Map of Accra pilot BRT network. Source: DUR, 2010.

The pilot BRT infrastructure design will include a segregated right-of-way for BRT buses along only a portion of the trunk corridor. Along the portion of the main pilot BRT corridor extending from Mallam to First Light, BRT buses will stop at curbside stations to pick up and drop off passengers. To address traffic congestion between First Light and Kwame Nkrumah Circle while avoiding unwanted negative impacts on the existing commercial activity on Graphic Road, the BRT will run in the innermost lane, with stations located at the median (Department of Urban Roads et al, 2010).

Objectives

This research project has emerged out of a partnership between the Accra Metropolitan Assembly (AMA) and the Millennium Cities Initiative (MCI) at Columbia University's Earth Institute, as well as with the University of Ghana, Legon. As specified by the MCI, this research project aims to:

- Develop an in-depth understanding of the structure of road transport service delivery in the city of Accra,
- Assist the Ministry of Roads and Highways, DUR and UPTU by conducting land use inventories and analyses in a specified area for study,
- Determine appropriate land use and transportation interventions along this section of the BRT corridor, and
- Develop concrete recommendations on the implementation of these interventions.

Methods

The research for this project was conducted from mid-June to early August 2010. The objective was to obtain a comprehensive understanding of the BRT project and opportunities within Accra's urban transport system. The research team employed a participatory analysis approach. The team explored how individuals' livelihood strategies were influenced by transport service and, in turn, how transport services influence individuals' livelihoods. Participatory research was applied to form a direct link between the sharing of knowledge about transport and land use and how that knowledge might be put to use by local governments, operators, regulators and others. This type of analysis was conducted primarily through the use of one-on-one interviews and group meetings.

Research Instruments

Semi-structured interviews with national and municipal government representatives provided an in-depth understanding of the conceptual and physical design of the BRT infrastructure, service operations and land use planning in Accra.

Collection and analysis of data from official documents provided by municipal and national government offices, published and non-published reports and scholarly journal articles on urban passenger transport issues in Accra.

Land use analysis of the study areas was conducted using a land use classification system provided by the AMA Town and Country Planning office (see the full list of classifications in the Annex).

The *economic activity inventory* was based on storefront observations and the research team's best judgment on goods and services provided. Twenty-three different types of economic activity were identified, and the different types were tallied throughout the study area to identify trends and frequencies (see the Appendix for the full inventory). A simple but effective method was introduced to explore and quantify the types of economic activity. Due to the fact that individual commercial developments and structures often contain many different types of land uses, each individual store has been counted as a separate economic activity.

This inventory also accounts for informal stores, many of which are housed in iron containers cemented to the ground or in temporary wooden structures. Hawkers and pedestrians who engage in business transactions on walkways and shoulders of roads were not included.

Non-participant observation, documented here with the use of photographs, was employed to determine and compare land use and transportation activities within the study area.

Stakeholder meetings were conducted with six interest groups located in the study area: commercial representatives who own and operate businesses, market women traders, a national representative

organization for disabled individuals, school children and school administrators, spare parts dealers and *trotro* union representation. The UPTU at Kaneshie facilitated these discussions, in order to obtain a representative sample of perspectives on transport issues in the area.

Limitations

This research was completed within a seven-week period. The short time frame limited the scope of the project, in terms of area size, data collection and subsequent analysis.

Technological constraints, including the lack of access to Geographic Information Systems (GIS) software, Geographic Position Systems (GPS) tools and an up-to-date map placed a major limit on the mapping capacity for this project. The economic activity inventory and land use analysis are based on the smallest unit available for analysis (that is, a semblance of city blocks were created, using the street layout of the area). Additionally, the map provided for this analysis did not have up-to-date representations of either minor streets or buildings. In many cases, building structures indicated on the map no longer reflected the existing landscape. In some cases, particularly in the area of Abossey Okai, minor roadways were not represented on the map. To overcome this obstacle, the study area was divided into 25 sections, using roadways as boundaries for division. This method allowed for analysis based upon current land use activity. However, throughout the study area, city block sections were not uniform in size or shape.

An additional limitation is that the subjective classification of economic activity is based on what is visible from the street. As such this data does not record income or property tax information. In addition, in some heavily commercial areas in Abossey Okai and the Kaneshie Market, precise enumerations of numbers of shops was impossible and shared spaces are common; in these cases, estimates were sought from relevant authorities, or best-judgment estimates were made by the research team.

Lack of public education and awareness regarding the BRT project at the time of this research was a constraint on the efficacy of stakeholder meetings, which required a thorough educational component introducing the Accra BRT system before the research team could proceed with focused questions. This was particularly true of the first stakeholder meeting with commercial representatives. During this and subsequent stakeholder meetings, UPTU officials provided a short presentation on the BRT plan and its design and goals -- the questions and discussions that emerged over the course of these educational sessions indicated stakeholders' concerns and challenges.

Finally, at the time of this study, the Ghana Private Road Transport Union (GPRTU), Ghana's largest private mass transit union, with approximately 80% of *tro-tro* operators in its membership, was embroiled in a standoff with the government over the BRT project. The GPRTU, which has viewed the BRT as an attempt to usurp its presence in the private transport industry, had called on the Ministry of Transport to suspend the implementation of the GUTP until all affected stakeholders were able to reach a common understanding as to the project's fundamental objectives and benefits. The GPRTU accordingly advised its members (this

includes *tro-tro* operators) to exercise great restraint in engaging with anyone affiliated with the GUTP during the impasse. This series of actions prevented an extensive stakeholder discussion on the part of the study team with *tro-tro* operators. However, the team was able to meet with a representative of the GPRTU, who relayed the union's objections to the overall project.

The Study Area: Kaneshie Market

Kaneshie is a commercial hub in central Accra. A major landmark within the area is Kaneshie Market, a multi-storey market that attracts shoppers from throughout the city. The market is located on Winneba Road, approximately equidistant between First Light and Obetsebi Lamptey Circle. The Abossey Okai Spare Parts Market, located on the opposite side of Winneba Road from Kaneshie Market near Obetsebi Lamptey Circle, is a cluster of economic activity focused on sales of spare vehicle parts and repairs. The Kaneshie area is also a central transport hub; adjacent to Kaneshie Market is a sizeable car park that serves as a *tro-tro* bus terminal for both inter-city and intra-city travel. Opposite Kaneshie Market is a car park mainly for long-haul buses and taxis services. In addition, the outer lanes of Winneba Road informally serve as loading and offload passengers and goods.

As part of the Accra pilot BRT design, Kaneshie has been sited as a major terminal. In collaboration with Accra Metro Roads Unit at Kaneshie and the UPTU, the Kaneshie Market area was identified as the project focus, with the stretch of the pilot BRT corridor on Winneba Road between First Light and Obetsebi Lamptey Circle (approximately 1.6 km, or 1 mile) outlined. The study area was chosen because of the diversity and vibrancy of economic activity, the existence of vehicular and human congestion and the density of people and buildings. This is a key area along the BRT corridor with land use and transportation challenges.



Figure 3. Study area, with Kaneshie Market (yellow box) and future BRT bus stop (blue star) indicated.

For the purposes of this study, a defined section of Kaneshie was identified for use in the transportation, economic and land use analysis (see Figure 5). The study area for this research project is focused on the Winneba Road commercial corridor and on the areas surrounding the Kaneshie Market on both sides of the road. This section includes the dominant economic activity and areas that would be immediately affected by the pilot BRT. All boundary lines have been set along existing roadways. Figure 5 indicates the study area boundaries, Winneba Road and the future location for the Kaneshie Market BRT terminal. The total size of the study area is approximately 0.35 square km (0.14 square miles).

Kaneshie was initially planned and developed as a residential zone, but in the 1960s, the introduction of the Kaneshie Market, a space for thousands of commercial sales, became a strong commercial force serving as both an anchor for existing commercial activity, as well as a magnet drawing new commerce to the area over time (AMA Town and Country Planning, 30 July 2010).

With the emergence of the market's commercial presence, the Kaneshie area has become a highly visible and attractive location for both informal and formal commercial services. Over the past two decades, the area has transitioned from what was once predominantly residential to a commercial orientation. In addition, in many areas along the main Winneba corridor and in the streets that link with Winneba Road, available public spaces (pedestrian walkways) have been appropriated by informal commerce. High rental prices due to high property values and government's inability to enforce land use and transportation planning controls

contribute to the difficulty of containing and regulating this issue (AMA Town and Country Planning, 30 July 2010).

Kaneshie today is a vibrant commercial hub of diverse activity, including the sale of a wide range of goods: vehicle spare parts, housing and construction materials, electronics, groceries, beauty supplies and food and drink and so forth. With the growth of Kaneshie as a commercial area, congestion has become a major issue affecting transit through the area and commercial access and distribution. The congestion is particularly heavy during peak periods in the morning and afternoon. Although the stretch of the road along this corridor includes three lanes on either side, at any given point in time, only two lanes are realistically available for traffic flow given other activities in the area.

Within the study area, sidewalk traders and commercial transport operators who utilize the street space were identified as those who will be primarily affected by the BRT, particularly during the construction phase. A 2010 Mott McDonald study for the DUR on the impacts of the BRT on these stakeholders identified nearly 900 sidewalk traders along this stretch of the corridor and 180 commercial shops. The study predicts that residential households, permanent commercial structures and building properties would not be affected. The current BRT design also intends to make use of the present space along the road, which would cause no loss of land to these commercial businesses and their owners. One expected impact is temporary road diversion during the construction period (Department of Urban Roads, 2010).

The Kaneshie Market BRT Station in the Accra BRT Plan

The section of Winneba Road between the First Light junction and Obetsebi Lamptey Circle is a dual threelane arterial road that allows for two-way traffic. Along portions of Winneba Road there are service roads, however within the portion of the corridor included in the study area, there are no service roads, except for a small outer road in front of the lorry park adjacent to Kaneshie Market extending approximately 200 meters (0.13 miles). The First Light junction is a signal-controlled full intersection, and there is a signal-controlled T-junction at the Accra Metro Roads/MMT location. Obetsebi Lamptey Circle is a roundabout.

As part of the BRT plan, a section of the roadway extending from the First Light junction to Obetsebi Lamptey Circle will be designed as a two-way dual carriageway, with the BRT station located on the central median. BRT design plans include one major station at the eastern end of the multi-story Kaneshie Market structure. The two existing pedestrian footbridges located at the west and east ends of the market will be replaced, with the eastern footbridge to be replaced with a new structure that will serve as both a footbridge to cross the street and as an access point to the BRT station (DUR, 2010, p. 10). Along the entire BRT network, the Kaneshie Market terminal is the only location designed with a pedestrian footbridge to provide access to the BRT (DUR, 2010, p. 3).

Key Findings

The study findings provide insight on the urban and transportation dynamics in Kaneshie with regard to physical space, the built environment and local users.

Economic Activity Inventory

The analysis enumerated 10,374 separate types of economic activity and 244 residences within the entire study area. The inventory also indicates the relative density of certain sections. Higher density signifies high customer traffic in terms of human and vehicular flows. Kaneshie Market and Abossey Okai hold the most shops and stand out as the most densely concentrated commercial sections of Kaneshie (see Figure 7).



Figure 4. The map above depicts the density of economic activity throughout Kaneshie.

Figure 5 below provides a breakdown of economic activity in the Kaneshie study area. Nearly half of the area's commercial activity is in sales of vehicle spare parts, taking place largely in the Abossey Okai area. Throughout the study area, but especially there, the research team enumerated more than 5,000 spare parts shops displaying a variety of vehicle-related items. 1554 stores (15% of those enumerated) sell household goods, and 1048 stores (10%) deal in grocery sales or food services, the latter including small restaurants

(known as chop bars) and bars. Building and construction sales occupy a smaller but still significant niche, with a total of 58 such shops. It should be noted, however, that these activities are most often located along Winneba Road.

Informal shops are located throughout the Kaneshie area. The study enumerated 196 containerized structures, in addition to the more common sidewalk trading or street hawking.



Figure 5. Most common forms of economic activity in the study area.

Of note are the sales of "heavy" products, such as vehicle spare parts (engines, dashboards etc.); household appliances; and building and construction supplies (including iron rods, marble tiles etc.). These items are sold most commonly in both Kaneshie Market and Abossey Okai Spare Parts Market, which are also the two most dense areas for commercial activity overall. Figure 6 below demonstrates a typical view of sales in Abossey Okai and Figure 10 is a map demonstrating the density of heavy commercial sales.

The Kaneshie Market is the central commercial hub; within its four-storey structure, there are more than 4,500 stalls and shops. Commercial activity within Kaneshie Market alone accounted for nearly half of all commercial activity in the area. The most common retailing is household supplies, beauty supplies and services, grocery and food services (including food restaurants and bars) and clothing.

Most spare parts outlets are concentrated in the Abossey Okai area, where 5,000 spare parts shops clearly create a specialized district for this kind of commercial activity. The only other shops that stand out are informal; their locations indicate their operators' preference for proximity to the roadways and foot traffic. In some cases, shops have extended their operating space by erecting containers directly in front of their storefronts.

Outside of Abossey Okai, multi-storey commercial and mixed-use buildings along Winneba Road deal in non-spare parts businesses activity, including electronics and building and construction sales. Shops selling household goods are ubiquitous as well.

The research team identified three different forms of residences: low-density single dwellings, mediumdensity multi-dwelling houses, and mixed-use buildings, which combine residential and commercial activity. Mixed-use commercial residences are by far the most common residential structure in the study area. The research team identified 244 residences, 158 of which are part of mixed-use buildings where commercial and residential activity is combined. These numbers demonstrate that nearly two-thirds of residences in this area are mixed-use combinations.

This finding (see Figure 6) confirms that residential-to-commercial transformations have occurred in Kaneshie.



Figure 6. Residential activity for study area.

Land Use Analysis

Through land use analysis the research team documented a number of trends, such as the predominance of mixed-use and stand-alone commercial activity comingled with residence, and the relationship of this activity with the area's transportation network (specifically, with Winneba Road and linked residential streets).

The research team also identified a number of transport and land use issues. In addition to selling their items within their stores, many storeowners make use of the space in front of their store, including the pedestrian walkway, to showcase their stock. There is also extensive informal commercial activity throughout Kaneshie, which often encroaches on pedestrian walkways and at the bases of footbridges and along their elevated walkways. Both forms of activity limit pedestrian space along Winneba Road and on the linked roads.

The gradual shift toward commercial land use activity (much of it in "heavy" commercial activity) has increased the demand on the road infrastructure network in the area in terms of distribution, customer access and parking needs. Since this area was initially planned as a residential zone, it is rare to find separate service roads behind the frontage buildings that might serve for distribution or even customer parking and access.

Distribution (e.g., off-loading goods) takes place on the outer lanes of the road, contributing to congestion. Although this area is highly commercial, the research team did not observe any specific areas set aside for customer parking. Based on the extraordinary volume of vehicles accessing the area, the lack of such an amenity strains the available space, forcing drivers to park their vehicles on the sides of roads or on sidewalks. Extensive commercial transport activities, including bus queuing, loading and passenger off-loading, adds an additional strain. All of this activity takes place along Winneba Road or, because of lack of space, on neighborhood streets. Figures 12 and 13 (below) demonstrate these and other key land use challenges along Winneba Road.

The Abossey Okai Spare Parts Market is an area in which residential buildings have been almost completely transformed into commercial space. Building structures have been gutted to free up retail space for, on average, four to six stores per building. In some cases, buildings are two-storeys, so that in one building there could be as many as 12 separate retail outlets, each with its own storefront.

As the market became more formalized, new building structures were raised to accommodate spare vehicle parts imports from Western and Asian countries. The spare parts market grew in part due to this demand, as consumers flocked to this central location in Accra.

Over time, the market expanded, necessitating new roads and footpaths to connect it to existing throughways. The area has consequently become very congested with narrow, usually unpaved, roadways that are packed with people and street hawkers. Street hawkers overtake the sidewalks, so people need to navigate the streets

around these sellers, vehicles and potholes. To add to the congestion, some individuals use the sides of the roadways to service vehicles, even though the Auto Part Dealers Association (APDA) in Abossey Okai prohibits this. One side effect of the difficult road conditions is that dealers often use small portions of the roadway to transport spare parts via push cart or vehicle to and from the market. While most of the operations of the Abossey Okai Spare Parts Market are behind Winneba Road, some of this activity nevertheless spills onto the roadway.

Informal commercial activity, including roadside vending, is ubiquitous throughout the Kaneshie area, extending from Obetsebi Lamptey Circle to First Light. The majority of this activity is concentrated around Kaneshie Market and along Winneba Road to the First Light junction. This activity also spreads into the neighbourhood areas behind the immediate Winneba commercial corridor. In some parts of the study area, informal commerce has completely taken over neighbourhood streets and junctions.

The numerous land use and economic activities and lack of organization contribute to the inaccessibility of the Kaneshie area, presenting particular challenges to cars, bicyclists and pedestrians. For motorists, the numerous cars on the road, the misuse of the road space by informal vendors, buses and *tro-tros* and the high level of commercial activity result in almost constant road congestion. For bicyclists, the lack of segregated bicycle lanes means bicyclists must share the roadway with motorists; the lack of bike racks means there are no safe areas to park bikes for those using this form of transport, contributing to an unsafe experience for these travellers. According to a 2004 study on bicycling in Accra, it is these same factors that contribute to low levels of bicycling citywide (Quarshie, 2004). For pedestrians, informal and formal commercial activity has appropriated space on the walkway, and the lack of safe zebra crossings makes it difficult for pedestrian cross-street access.

Stakeholder Meetings

Stakeholder meetings provided instruments to engage with the public and to discuss different stakeholders' transportation challenges and preferences as regards the BRT system. Participants' responses are synthesized below.

Commercial & Business Owners and Operators

This meeting was the first stakeholder meeting to gauge the level of interest and support for the BRT and to gain insight regarding stakeholders' current land use and transportation challenges. Commercial representatives who own and operate businesses along Winneba Road within our study area attended, including representatives of banks and other financial services institutions, health services, service stations, small and medium-scale shop owners, and drivers' association representatives.

As stated earlier, this meeting revealed the glaring lack of awareness and knowledge among these representatives about the BRT project at this point in time. At the outset, few participants had an understanding of the BRT project, and in particular, its structure along Winneba Road. Participants expressed

frustration at their exclusion from the planning and design process and at the lack of opportunity to participate in or contribute to the proposed changes slated to be a part of the BRT project. To address both of these issues within the context of the meeting, the session evolved into more of an educational session, with the opportunity to dialogue and express concerns.

Participants highlighted five major concerns: parking; pedestrian access, the design of the flyover bridge in terms of the needs of the physically challenged; the impact of the BRT on the area's commercial activity; and customers' access to business along the corridor. Although the Kaneshie area is vibrantly commercial, adequate parking for shop owners to off-load goods and for customers to cart goods has been a source of concern, both for city managers and for business operators.

Participants also expressed their concern as to whether their customers would be able to park and access their shops and services, as well as to whether meeting the parking needs for distribution would be worked into the BRT project.

Pedestrian access for customers is a key concern for the business community. One difficulty at present is the inadequate number of zebra crossings (pedestrian street crosswalks) at different points along Winneba Road. A planned pedestrian bridge to be located at the eastern end of Winneba Road would provide access to the other side of the road and to the BRT station; participants' concerns centered on increasing customers' pedestrian access to their shops. They proposed building an underground tunnel instead of the overhead pedestrian footbridge. In their view, the tunnel could also provide the desired access but would protect pedestrians from car traffic.

The design of the flyover and its capacity to accommodate the needs of physically challenged customers was another concern, with a number of individuals complaining about the height and steepness of the footbridge steps, especially for the elderly and physically disabled.

Participants also voiced concern about the impact of the BRT on local commercial activity, both during the construction phase and once the BRT becomes fully operational. For example, during the construction period, vehicular traffic would have to be re-routed to the area using residential roads for access. This would limit the access of commercial operators, distributors and customers to the area. One long-haul bus service operator expressed concern about the use of the remaining two lanes on either side, one of which has customarily been used for boarding and disembarking passengers. The use of these two lanes and the impact upon commercial bus operations are therefore important concerns for bus operators, particularly those whose operations would not be subsumed under the BRT project. The UPTU plans to prohibit parking, loading and off-loading on the road, so as to efficiently move traffic along the remaining two lanes.

Society of the Physically Disabled, Ghana

The Society of the Physically Disabled is a national organization that represents the concerns and interests of the physically disabled, including those with hearing, visual and other physical impairments. This organization advocates for more than 8,500 members across the country (Ghana Society of the Physically Disabled, 2010). The stakeholder meeting with the Society of the Disabled included seven participants, ranging from its members to administrative officials of the representative organization.

Disability Act 715 (2006) stipulates that public transport vehicles, including road transport, ensure that the needs of the disabled are taken into account in the design, construction and operation of the transportation network. In addition, commercial buses are required to reserve at minimum two seats for persons with disabilities. Other individuals could use these seats in the event that no person with a disability is present and if the bus is full (Persons with Disability Act 715, Sections 23-30, 2006).

Although the same modes of transit and para-transit are theoretically available to disabled and able-bodied individuals in Accra, there is a lack of sensitization towards disabled individuals' transport needs in terms of boarding, riding and exiting transit, and regarding the physical design of transit and city transport infrastructure, which present major accessibility challenges.

Discussion of participants' experiences in riding public transit in Accra provided key insights into disabled people's challenges with regards to urban transport. Of the various forms of mass transit and para-transit operating in Accra, all participants were in agreement that the *tro-tro* system generally proves to be the most accessible. Individual cases, however, do vary: participants related that disabled individuals are given priority in boarding only at the discretion of the *tro-tro* operators: when forced to queue alongside other riders, it is a challenge to compete with able-bodied people in the rush to board, putting the disabled passenger at a major disadvantage.

All participants considered the MMT to be the least accessible form of mass transit, due both to apathy on the part of bus conductors (apparently a widespread issue) and the unaccommodating bus design. From their experience, conductors are often unwilling to provide assistance in boarding. Inside buses, the large steps at the front and back entrances present real hurdles to the boarding process. In addition, able-bodied passengers often occupy seats reserved for the disabled and do not always cooperate,

Disabled participants, particularly those with walking aids such as wheelchairs pay a high toll for their ridership on some forms of transit, in that they often find that they must pay more than other riders, simply because of their disabilities and their consequent lack of access to affordable transport services. For example, although the *tro-tro* may be the most accessible in terms of boarding and off-loading, in most cases wheelchair riders are forced to pay for not just one, but often two or three seats on the *tro-tro* – theirs as well as the extra space that their wheelchair requires.

For group participants, the Kaneshie area currently represented a "no-go zone," due the utter lack of spatial accommodations for their needs. One participant recounted: "With the rushing – the human traffic, the vehicular traffic – and the built environment, we just won't travel there." The immense human traffic on the street, with street hawkers, informal sellers and Kaneshie area customers allows little sidewalk space or even an opportunity for a wheelchair-bound individual to easily navigate the area. The physical structure of the location, particularly the curbs, street crossings and flyover bridges, are also not disability-friendly: most curbs in the area are denoted only with steps, not with ramps, making it next to impossible for those in wheelchairs to manoeuvre easily from sidewalk to street and vice versa.⁵ As a result, none of the participants venture into the Kaneshie market area, sending someone instead to collect whatever product or good they need.

The concerns raised by this interest group highlight a number of issues that must be addressed within the transport system and infrastructure. The attitudes of mass transit vehicle operators toward disabled people's needs must be addressed, to which end participants suggested sensitization campaigns or other types of educational programs. In addition, the physical space of the Kaneshie area, including the road layout, street crossings, bridges, curbs and sidewalks, are currently not seen as spaces to which both able-bodied and disabled or physically challenged individuals have access – particularly as customers. Equally important is improving the bus design, so that buses are prepared to ensure accessibility for physically disabled passengers.

With regard to the BRT project, participants were supportive and believed the pilot project is an opportunity to address their transport challenges and concerns, to participate in dialogue on design issues and to promote more disability-friendly planning in general throughout Accra. Participants said they would patronize the BRT if it accommodates for their needs; such accommodations would be key in making the Kaneshie area newly accessible to them.

Market Traders at Kaneshie Market

The Kaneshie Market is one of the largest formal markets within the AMA, with a capacity of more than 4,500 stalls and an estimated daily customer count of more than 10,000 clients per day (Accra Markets Ltd., 2010). The hierarchical structure of market sales includes the Queen Mother, at the top, who supervises 45 sectional heads, or Market Queens. Each sectional head supervises traders within her product area. The Queen Mother and sectional heads also work with market managers, to oversee activity within and around

⁵ One participant underscored the issue by reviewing the layout of roads in the area: the high wall at the median between the T-junction where the DUR is located and Kaneshie Market, the use of medians with curbs (even at area crossings) and the two flyover bridges' lack of ramps, all mean that crossing the street is an obstacle. Wheelchair-bound individuals would either have to cross at one end of the area (at the T-junction located near the Accra Metro Department of Urban Roads) or at the First Light junction – a distance of 1.3 kilometers (0.8 miles) to access shops and buildings located just on the opposite side of the street. In addition, at both of these junctions, the waiting time on a red light is often too short for a physically disabled person to make it across the street in time to avoid oncoming traffic.

the market. The stakeholder group with the market representatives included the Queen Mother and approximately 20 sectional heads.

The market area and the adjacent car park draw an enormous level of customer- and commuter-related activity. In light of this, participants voiced their concerns regarding the congestion of the current passenger transport system and the need to improve public passenger transportation to aid the area's economic growth and development. The participants' key concerns included the need for pedestrian-friendly flyovers to aid in crossing with goods; the impact of the BRT construction and operations on the traders' commercial activity; the need for cargo space in buses to hold their goods and the provision of assistance to market women while loading and offloading their goods.

The women discussed the challenges they faced in climbing the overhead bridges located at Kaneshie and the need for shorter and gentler, more gradual steps to support their crossing to and from the market. Of particular concern were the needs of aging women who have difficulty climbing the existing flyover bridge steps, as well as the needs of those bearing heavy loads to and from the market.

Market trading takes place formally inside the Kaneshie Market but has also spread onto the sidewalk areas in a more informal fashion. An additional concern of the traders was the impact the BRT construction and operation would have on those operating sidewalk stalls and trading. In particular, the Queen Mother stressed the need to maintain the current arrangement, achieved after a long process of consultation, which allows for the traders to operate in these areas.

The provision of a platform to give access to the buses for the market women was a major concern. The women's main contention was that a transport system must address the needs of those for whom it is intended. As a result, they hope for accessible facilities that will assist market women load and off-load their goods to and from the buses, as well as carry the goods during their ride. The women were also interested in specialized bus service with elevated buses at a height to meet that of the bus platform, to serve the traders and their customers as they cart their goods into and out of the buses.

Abossey Okai Auto Part Dealers Association

A meeting was held with representatives from the Abossey Okai Auto Part Dealers Association (APDA) as well as with the organization's spokesman. The initial meeting was arranged to gain general information about APDA and its membership, the second one-on-one meeting, to better understand their transportation challenges, support and interest in the BRT.

For 28 years, APDA has represented the welfare and rights of the spare parts dealers in this community by providing assistance in clearing goods, negotiating contracts and obtaining financing, along with other forms of support. According to the APDA's spokesman, the association has more than 3,000 shops in its membership, although the Abossey Okai market itself accommodates more than 5,000 shops. Each shop

employs a minimum of three people, and each shop can earn up to 20,000 Ghana cedis (approximately US \$14,185) monthly.

Car mechanics, sprayers, welders, petty traders, spare parts dealers, hawkers, market women and the general public buy and sell vehicle parts in the area. In particular, customers purchasing spare parts, business owners operating shops along Winneba Road and Abossey Okai spare parts dealers travelling from Mallam, Weija and Kasoa all use Winneba Road to transport their goods.

The spokesman explained that Ghana does not manufacture spare parts; hence, they have to be imported. The market, therefore, is set up to fill demands for every kind of new and/or used spare part, including oil, fuel and air filters, brake parts, spark plugs, engine gaskets, shock absorbers, pistons and pins, cylinder liners, piston rings, car batteries and tires for cars and light trucks.

Within the spare parts market, the roadways are narrow, and the area is heavily packed with people and stores. Due to these space constraints, the APDA discourages servicing vehicles within the market. However, some individuals still do so on the sides of the roadways, which further aggravates the congestion.

In terms of moving spare parts to the market, a major finding was that Winneba Road between Mallam and Kaneshie, the road along the proposed BRT route, is not utilized for that purpose. Goods are transported to the market along the Tema Road, from the Tema Port. Every day six or seven containers are delivered from Tema Port to the spare parts market on lorry trucks. Once goods arrive at the market, storeowners appear to have little difficulty distributing them to individual shops. In sum, it does not appear that the proposed BRT would directly affect the modes of transport on Tema Road or the supply of goods to this area.

The APDA highlighted that roads feeding into Winneba Road need to be improved, given the high density of commercial activity in the market. Participants expressed their concerns that their customers would have difficulty parking and accessing their shops and that this problem would be made worse by increased economic activity brought to the market by the BRT. The participants suggested that the BRT could accommodate the spare parts market by providing parking needed for distribution.

The APDA was also concerned that during construction of the BRT, the mobility of customers and shop owners could be significantly disrupted. The APDA suggested working on the BRT during the weekend and weekday evening hours, so as to minimize the potentially adverse economic impact on the area.

Reverend Thomas Clegg Junior High School, Kaneshie Area

As part of the series of stakeholder group sessions, the research team met with junior high school administrators and students attending a school located near the study area. The interaction consisted of an educational session on the BRT, followed by a discussion with about a dozen students who reside along the planned BRT route. During the discussion with the student participants, the students voiced the following

transportation concerns: traffic congestion, long travel time to school, insufficient money for transport to school and personal safety.

Although these students attend junior high school within the Kaneshie area, few of them live within the Kaneshie area. Many had moved to outer areas of the city since beginning their studies at the junior high school but prefer to remain enrolled there. Only one student actually resides in the Kaneshie area and is able to walk to school; others live as far away as Weija, La Paz and Awoshie.

Traffic congestion and long travel times were the major concerns expressed by the student participants. About half of the students identified traffic congestion as a major source of concern. Coupled with the long waiting time, most identified long travel times to and from school. Two students sometimes came to school accompanied by parents, and many went to school unaccompanied.

Out of the group of students, four reside along Winneba Road. Due to congestion on this particular stretch of road, the students wake up between 4 and 5am in order not to be late to school. Similarly, these students arrive home very late in the evening and are usually tired.

Many of the students said they found it very difficult to commute to school daily in Accra, in view of the heavy traffic, long waiting times in buses and the long queues at terminals. In addition, the children spend between 5- 40 minutes waiting until a *tro-tro* is filled to capacity before leaving the station or *tro-tro* stop.

In addition to the above difficulties, several students identified 'insufficient money for transport' as a major issue, followed by long construction periods (attendant dust and road blocks). One paid about 1 cedi (approximately US \$.71), while the rest did not pay anything for their transport. Few regularly used their own savings. Another challenge schoolchildren experience in Accra is the frequent breakdown of cars. A handful of these children said that they experience this once or twice a month.

The students have grown accustomed to the non-observance of traffic regulations by drivers with regards to the zebra crossings. Some were able to cross the street without any difficulty; however others said they found it difficult to cross. Another challenge the children had to contend with was the difficulty of boarding the buses, either due to steep steps or to the rusty, sometimes poorly maintained seats that tear their clothing.

Ghana Private Road Transport Union (GPRTU)

There are several transport unions operating in Accra. However, the most dominant private passenger transport union among them is the GPRTU of the Trade Unions Congress. The GPRTU is the umbrella body for both operators and drivers. In Accra, there are a number of recognized stations from where they operate: Kaneshie, Odawna, Tema Station, Neoplan at Nkrumah Circle, Achimota, 37 station, Madina, Agbogloshie, Salaga, CMB, Odorkor.

Although the actual number of operators is not known, it is estimated that about 90% of private transport operators in Ghana are GPRTU members. In Accra alone, the membership of GPRTU is about 26,000 operators with each branch in charge of a specific route. The activities of commercial private passenger transport operations (*tro-tro*) in Accra have been in tandem with urban development especially in the establishment of new routes to meet the transportation needs at new residential areas. Despite the extent of the *tro-tro* operations in Accra and widespread use, the union faces numerous challenges, including high interest rates on bank loans, deregulation in the supply of spare parts and other lubricants, political interference and the lack of an even playing field for *tro-tro* operators within passenger transport operations.

A key constraint to this study was the inability to meet with *tro-tro* operators themselves to discuss the challenges they faced and their expectations and concerns about the BRT system. Fortunately, the team was able to meet with and discuss such issues with the Chairman of the Greater Accra Branch of the GPRTU.

According to the GPRTU representative, the current high interest rates for bank loans have crippled the operations of the transport operators and limited their ability to break even financially. Additionally, maintenance costs are a key concern. The supply and prices of spare parts are not regulated; this situation is a source of worry to the transport operators. This situation is complicated further when they find that they cannot increase lorry fares to match their higher operational costs.

As voiced by the GPRTU representative, operators and union management are worried that the BRT system will impact their operations negatively as one lane is going to be dedicated to one passenger operator (BRT) while within the remaining two lanes they will be forced to compete with other road users. Already, discrimination in terms of an uneven playing field for trade is of concern to the transport operators. For example, sometimes city authorities have taken to implementing policies that benefit the operations of Metro Mass Transit (MMT) while *tro-tro* operators are denied that same privilege. One example cited by the representative was issues with parking and loading or offloading. Often their members are arrested for offences though both of them are culpable. This is so because the city has not made enough provision for parking, and sometimes operators have to use their discretion in picking up and offloading passengers.

According to the Chairman, the GPRTU attempts to institute vehicle and driving standards to promote service quality. The vehicle is to be roadworthy as per the standards of the Driver and Vehicle Licensing Authority. Vehicles are also periodically inspected at every branch, in fulfillment of the mandatory sixmonth vehicle inspection by the Licensing Authority.

The GPRTU maintains that the role of the government is to empower individuals to operate with some level of control or initiative. The organization perceives the BRT initiative as an attempt to push the *tro-tro* operators out of the mass transit sector by indirectly asking those who operate on the BRT to relocate. A

major question of the Chairmain was on the issue of employment: As the Chairman opined: "How many jobs [will the pilot BRT project] create as an alternative?"

When asked for his perspective on ways to integrate the *tro-tro* system with the BRT system, the Chairman provided a number of recommendations. First, the government could support current operators by helping them access financing to support the construction of new lorry stations to meet demand. Second, he was not supportive of the plan to integrate *tro-tro* operators into the BRT along feeder routes. In his view, this was unfair treatment. Issues with quality of the road (which is often unpaved, or has potholes) would negatively impinge on their operations. He therefore recommended increased investment in developing these roads before *tro-tros* would undertake formal operations as part of the pilot BRT network plan. In fact, if the quality of these feeder routes were improved, the representative said this would be a workable solution for bringing them on board to the BRT system. Additionally, financing would be required to assist the union in purchasing higher-quality buses to operate along feeder and other routes.

Social Impacts of the Accra Pilot BRT

The outcome of the Accra pilot BRT depends on the buy-in of a diverse set of stakeholders who must understand its inherent trade-offs. This section identifies potential impacts which could be created by the BRT and the associated social costs and benefits for interest groups and stakeholders within the Kaneshie area.⁶ The study team recommends that both the benefits and costs enumerated here (among others) be fully vetted and discussed with key stakeholders as part of the final decision-making process.

Potential Positive Impacts (Benefits) for Stakeholders

Diverting current passenger traffic to the BRT from other transport modes.

This immediate impact of the BRT would provide widespread benefits, such as reduction of air pollution, travel time, road accidents and traffic congestion. The pilot BRT could contribute to the diversion of a very high proportion of current passenger ridership from *tro-tro*, taxi, bus and private vehicle to the BRT, which would accommodate the growing passenger traffic demand in Accra. The potential of this effect through mass transit has been demonstrated in Delhi, India, with the introduction of metro service (Murty, Dhavla, Ghosh and Singh, 2008).

The public stands to gain significantly from the pilot BRT service. It would save passengers travel time due

⁶ Some of these benefits can be quantified into economic terms; however, such form of analysis was outside of our study so we have listed these costs and benefits qualitatively.

to a reduction of congestion along the pilot BRT corridor, as buses would be allowed to operate at increased average speeds. As the public becomes aware of the benefits of the pilot BRT service, it could offer increased choice to commuters and eventually increase the total public transportation ridership on the corridor.

Reducing environmental impact of vehicular travel along the pilot BRT corridor.

The environmental benefits of the pilot BRT to the public cannot be overemphasized. When people switch from driving their automobiles to riding the BRT, a number of environmental costs, most notably air pollution, would decrease. This positive effect would also come about as commuters switch to the BRT from *tro-tros*, which are commonly secondhand, unregulated vehicles with poor emissions standards. The net benefit would be improved air quality along the pilot BRT corridor. In addition, decongestion along the corridor would improve the urban landscape.

The pilot BRT serving as part of the urban mass transit sector reforms.

The route registration and relocation process requires performance-driven standards that would reward topperforming operators. The GPRTU would be well positioned to continue service along many of the routes within the corridor. A *tro-tro* operator who becomes a BRT bus driver could enjoy fewer hours driving and more secure employment, while the increased number of drivers needed per vehicle would increase the total number of jobs available.

For the *tro-tro* drivers and mates, this would reduce the aggressiveness associated with their operations. It would also reduce maintenance and other operational requirements such as vehicle service costs, parking costs and insurance savings.

Promoting increased accessibility for the physically disabled, market women and customers transporting heavy goods to/from Kaneshie Market.

The BRT could benefit children, women, the physically disabled and the elderly by responding to their mobility needs and providing them improved access to basic social services. The BRT buses could support the market women by including cargo hold space on buses, to more easily transport their goods.

The BRT can support disability access to Kaneshie by converting it from a "no-go zone" into an accessible and disability-friendly area in terms of transport access. The Department of Urban Roads (DUR) is currently making provisions for the disabled in its plans for the pilot BRT development, including in bus selection, and the provision of high-level buses and elevated station platforms (which would allow at-level entrance onto buses), as well as a special bus service for those with special needs. In addition, the use of intelligent transportation systems for the buses will provide route information for those with hearing and sight disabilities. Finally, the pedestrian footbridge into Kaneshie Station will include a ramp for wheelchair access (DUR, undated).

Increasing the attractiveness of Kaneshie for commercial, residential, and office development.

The BRT corridor network plan could induce transit-oriented planning, whereby clustered commercial, residential and office development would take place at the bus stations along the network. Property owners would gain from the increased valuation of house prices. In addition, storeowners would see more economic activity from people's enhanced mobility. Furthermore, already thriving areas, such as Kaneshie Market and Abossey Okai, could receive economic boosts from increased customer accessibility.

The GOG would benefit from the increased tax revenue generated by new development. This revenue could in turn support infrastructure construction costs (e.g. roadway improvements, bus shelters, information technology needs), capital costs for new buses, operations and maintenance costs, overhead expenses and enforcement costs to prohibit the use of dedicated lanes by other traffic.

Potential Negative Impacts (Costs) for Stakeholders

Passengers likely paying higher fares for the BRT than for existing modes of mass transit.

The BRT will promote efficient, safe and reliable service, but passengers will likely have to pay higher fare levels vis-à-vis other forms of mass transit (e.g. *tro-tros*). One proposed fare schedule for the BRT is the use of fare levels by zones, at the levels of 2, 3 and 4 Ghana cedis (US \$1.39, \$2.09 and \$2.79 respectively) (Mott McDonald, 2010). Given these relatively high costs, potential passengers would have to weigh the benefits of riding the BRT (e.g. reduced travel time, comfortable travel, safety), against the monetary fare value. An additional cost is that passengers on the pilot BRT could lose the flexibility that *tro-tros* provide by enabling them to board and alight at numerous points between the more formal *tro-tro* stops.

Increasing congestion at Kaneshie can result if land use and transport misuses continue unabated. Introducing dedicated BRT lanes will reduce the number of lanes available for mixed automobile traffic from three to two, on both sides of the road. If the current mismanagement of land use and transport in Kaneshie is not addressed, this could increase congestion and accessibility challenges as available road space is reduced. Commercial business owners already experience substantial challenges in their distribution activity, and commercial buses queue and board passengers, resulting in the misuse of an entire lane on each side of Winneba Road. If these activities are not planned for within the scheme of the BRT development, they could place further strain on the road space.

The pilot BRT serving as part of the urban mass transit sector reforms.

At present, the GPRTU commands authority and makes decisions on behalf of its members. The new regulation system would take over the current regulatory powers that the GPRTU now possesses, meaning the union would lose its current regulatory authority within the urban transport system.

Additionally, GPRTU members are vulnerable toward the implementation of the pilot BRT because their

livelihood is at stake. The pilot project presents costs to their level of employment, operations and profits, given that it does not appear feasible that all *tro-tro* operators currently operating on Winneba Road would be included in the BRT plan. A major cost to the unions would be that the BRT system would displace a number of current *tro-tro* operators from Winneba Road, in the processing of improving operating standards.

Displacing street hawkers and other commercial operations along the corridor.

An independent consultant's report regarding the impacts of the BRT on existing economic activity along the corridor projects the expected displacement of street hawkers who presently use the center median as a selling point (Mott McDonald, 2010). It is important to note that these traders are not authorized to engage in commercial activity on the pavement. The report also projects that during the construction phase of the road median for the BRT nearly 900 temporary structures (e.g., metalized containers, wooden kiosks) will be affected.

The report projects the displacement of commercial transport operators who currently operate from the road carriageway (including the MMT and long-distance commuter buses) and approximately 180 commercial vehicles which operate in Kaneshie on a daily basis. During the reconstruction phase, the expected average daily displacement of commercial vehicles from the road is estimated to be 1,200.

Once the BRT is in place, street hawkers would not be able to sell their wares to passengers at strategic locations, depriving passengers of some of the convenience that hawkers provide. Persons and businesses that suffer loss of or damage to their building, trade or business would be considered eligible for compensation and/or resettlement assistance (Mott McDonald, 2010).

Workers at Abossey Okai transport auto parts by pushcart on a section of Winneba Road outside the market. With the inception of the pilot BRT, workers will try to continue to use Winneba Road for that purpose until the deplorable conditions of the roads inside Abossey Okai are improved.

Conclusion

Accra is a rapidly growing city; as it expands, land use and transportation measures need to be utilized as planning tools in order to ensure managed urban development and growth. Making Accra a more liveable, human-oriented city can start by: first, recognizing the essential accessibility needs of the cities' residents and workforce; second, identifying interventions to complement the city's positive development, and in harnessing the strong economic and commercial activity to better support the city's residents and efficiently manage flow throughout the city.

This report has focused on transportation and land use issues at the Kaneshie area, which will continue to play a key role in the city's development, both as an economic center supporting the city's overall economy and as a pivotal transportation hub. Within Kaneshie and in Accra more widely, congestion has emerged as a serious issue; it can also be seen as a symptom of shortcomings in planning for the area's development and needs. The Accra BRT has enormous potential to address major congestion concerns. That said, this report's findings demonstrate that there are essential transportation and land use issues that must be faced head-on, in addition to building support for the BRT pilot project. The perspectives of various stakeholders', land use and economic analysis and other supporting research have highlighted a number of key challenges regarding transportation and land use in the Kaneshie area. The lack of safeguarded pedestrian space on sidewalks and other areas, informal and formal traders' encroachment on public space, the dynamic use of the road system for distribution, bus loading and off-loading, as well as for through-traffic, the inaccessibility of the Kaneshie area for market women, children, customers and especially the physically challenged, the need for extensive public education and consultation as to how best to improve transportation within the area and the links to the BRT project all stand out as some of the major points.

An additional issue which, though not highlighted during any stakeholder interactions or interviews, nonetheless remains a key concern for the research team, is that the introduction of the BRT terminal could, and most likely will, serve as a major drive for economic activity, with new commercial entities springing up and clustering around key transportation nodes. This form of transit-oriented development could have serious effects on an area such as Kaneshie, where severe crowding and obstruction already exist and contribute to congestion. It could intensify competition for limited space in the area.

At present, Kaneshie Market generates traffic by attracting thousands of clients each day. In addition, Winneba Road is a highly used arterial road within Accra because it serves two areas – both central Accra, including the CBD, and westward, toward Mallam and other areas. In addition, the lorry station, adjacent to the market, is also a key stop for transport. As a result, this area attracts high levels of human interaction and flow (human and vehicular traffic). The introduction of a major BRT network, which is expected to provide highly efficient and affordable service to Kaneshie and its market, to the spare parts area of Abossey Okai,

the financial institutions, and the thousands of shops and stores selling a range of products, should *increase* the level of traffic at its BRT terminals, including at Kaneshie.

The Accra BRT will not be a "magic bullet" to solve all of the city's transportation issues, but it can have a powerful effect if it is integrated with wider transportation and land-use planning interventions that address congestion and related urban transport issues. Moving forward, the local agencies managing land and transport issues in the Kaneshie area (as well as in the rest of Accra) must adopt a mind-set that recognizes the key linkages between transportation and land use planning and integrates the city's BRT into its planning interventions. If the BRT is implemented on Winneba Road, and the land use and transportation concerns identified in this study are not adequately addressed, congestion in the area will remain an issue or increase, which could weaken Kaneshie's overall contribution to the city's economy. This would also weaken the potentially positive influences the BRT. For example, the reduction of usable lanes for the majority of traffic from three to two, without effective regulation and management of these two lanes, would only increase congestion on the remaining lanes and on residential roads.

The BRT provides a key opportunity to invigorate support for transportation and land use planning in Accra. The following section provides recommendations for planning interventions to support the BRT and transportation and land use more widely in Accra.

Recommendations

This final section addresses the stakeholders' transport concerns and those land use and transportation challenges evidenced by the analysis undertaken in the course of this study. It also identifies urban planning and transportation planning interventions that can be adopted, implemented and enforced along with the BRT to support greater accessibility and managed development in the Kaneshie area.

UPTUs, the AMA and the Department of Roads must collaborate to build public awareness of and dialogue regarding the BRT, to increase public support.

Public support and ridership of the BRT will be the measure of the system's success. Engaging with the public on this in the BRT planning stages is key to stimulating good will and support for this initiative. However, the lack of public awareness and consultation regarding the BRT initiative was a key theme throughout the stakeholder meetings. It also signalled the need for increased publicity within the project planning process. The section outlining the social implications of the pilot BRT to stakeholders lists the benefits and costs that we consider most important at this juncture. Ideally, this list could be used as a starting point for continuing public discussions on the public's transport issues in Greater Accra and supporting a pilot BRT that is best responsive to the public's needs.

The GUTP Project Advisory Office has already outlined a comprehensive strategy to build awareness and support for the BRT so as to inform the public, including stakeholders and operators, about the urban transport project, to begin in the coming weeks. Measures for the BRT include:

- Radio jingles about the GUTP, to be aired on 13 FM stations within Accra and Kumasi over a twomonth period;
- A televised documentary on the BRT will describe and show the new transport reforms;
- Newspaper articles with updates and information on the BRT project have already begun to be published and will continue to be published to provide updates;
- Billboards with the BRT design to be erected at key points along the BRT corridor, including at Kasoa, and also at First Light in Kaneshie;
- Posters to be displayed throughout the city;
- A masquerade campaign to be enacted on roads with heavy traffic;
- The introductory sod-cutting ceremony to be covered by television, radio and print media;
- The Centre for Urban Transportation (CUT) to stand as a centre for scholarship, research and dissemination of information on sustainable transport practices.

The above items can be particularly powerful in spreading education and awareness about the BRT project, especially if communicated in numerous local languages in addition to English.

Internet access and use within Ghana is on the rise. There is a key opportunity to leverage this trend by creating a website dedicated to the BRT development that would serve as a resource for the internet-savvy public. In addition to making the above information and communications messages available, in-depth

information on the BRT, including its use in cities around the world such as Lagos, Nigeria; Johannesburg, South Africa; Curitiba, Brazil and Bogota, Colombia, should be included on the website, to demonstrate the positive impacts the BRT has made in sustainable transportation and its potential for Accra.

An agenda for public engagement through dialogue and consultation should also be a priority for the BRT project at the planning stage, as well as in the monitoring and evaluation of its progress and impact. Stakeholder consultation will be key in measuring the overall effectiveness of the BRT and its success in addressing local needs.

Working with the UPTU in Accra demonstrated the unit's potential to engage and work with community stakeholders. Its location at Kaneshie is also one if its strengths, since it is proximally located to stops on the BRT terminal, and its officers can be key contacts with the public. Given these strengths, the UPTUs can be central to this strategy.

Strengthen the institutions governing transport operations and land use.

- Increase the capacity of such agencies as AMA Town and Country Planning, Driver and Vehicle Licensing Authority and the motor traffic unit of the Ghana Police and Road Safety Commission to enforce existing transport and land-use planning measures that can efficiently manage traffic, especially along the BRT corridor.
- Establish rules for the authorization of routes, and ensure that the rules and process are transparent.
- Build collaboration between agencies to avoid overlapping responsibilities and to promote greater policy coordination.

Integrate accessibility needs into the BRT design and operations.

Within the BRT infrastructural and operational design, the DUR and other agencies responsible should accommodate the access needs of the elderly, disabled and otherwise physically challenged. The Accra Metro Department of Urban Roads has already identified disability-friendly provisions that can be made in the BRT infrastructure and services to address the needs of the physically challenged (DUR, January 2009):

- Elevated station platforms at BRT stops at 0.36 meters (1 foot) above the ground.
- An intelligent transport system (ITS) to provide route information to passengers with hearing and sight disabilities or challenges.

Additional opportunities can support accessibility needs:

- Utilizing ramps and walkways for the physically challenged or those carrying heavy loads and bicycles to connect pedestrian and bicycle traffic to the BRT.
- Employing bus attendants who could provide assistance to those in need.
- Considering a special bus service for market women that accommodates their travel times and their need to transport goods; considering another special service for the physically challenged that runs regularly (for example, at half-hour intervals).

- Reconsidering design plans for the overhead bridge at Kaneshie Market, given widespread concerns over accessibility and safety.
- Maintaining existing at-grade zebra crossings within Kaneshie, and building in accessibility-friendly measures (e.g. dipped curbs for wheelchair access, prolonged red lights to ensure those who progress more slowly can safely cross the street in time).

In addition, bus selection and local adaptations for the BRT are a key opportunity to address these concerns:

- Buses should visually display service routes (including stops) inside the buses in highly visible areas, such as at the head of the bus, at the sides and overhead.
- Bus operators or assistants should make use of loudspeakers to announce current stops as the bus approaches each destination, and upcoming stops as the bus loads passengers.
- Buses should provide an audio cue to warn passengers when bus doors will be closing, so as to prevent any unwanted accidents.
- Buses should include a sizeable cargo hold area, so that customers carrying their purchased goods, cyclists transporting their bicycles and market women carrying their goods can utilize the BRT.
- Separate services targeting market women and the times they travel to market should be considered; the market women in particular have a serious need for transporting their goods to and from market. Their patronage of the system depends upon the system's ability to accommodate this need.

To complement the BRT project, provide incentives for mass transit and disincentives for private transit that will encourage increased use of public transit.

Giving BRT buses the right-of-way in segregated lanes will provide a major incentive to support this form of mass transit by making it more efficient. These buses should also be comfortable, affordable and accessible.

Additional policies that can be implemented to promote public transport include:

- Making access to public transit easy, both physically and economically promoting access as outlined above, but also providing affordable fares.
- Reducing stoppage along the corridor, and promoting ease of traffic flow.
- Decreasing available parking spaces along the remaining two lanes of the Winneba Road at Kaneshie by instituting a "no parking" policy that is enforced with fines. For areas where parking is necessary, metered parking could be made available. Both of these measures would put parking at a premium.
- Assigning certain times of day for distribution/service activity to shops along the BRT corridor to promote a separation between commuter traffic flow and distribution activity.
- Considering the promotion of park-and-ride as an opportunity to draw private vehicle drivers toward riding the BRT.
- Developing an area-wide transportation plan that accommodates the needs of customers, distributors and businesses and that proposes alternative routes and parking areas to accommodate these needs.

Integrate BRT with the activity of local transport operations.

Bringing in union tro-tro operators requires addressing their concerns, namely:

- Addressing their misconceptions about the BRT and its potential negative impacts on *tro-tro* operations will be a long process of building trust, and this must begin with more transparency.
- Balancing potential job losses for *tro-tro* operators on the Winneba-Graphic Road corridor (as the BRT becomes more effective and ridership increases) with secure employment and equitable pay.

The UPTUs can play a central role in assist *tro-tro* operators interested in participating in the BRT system to improve their services. They can also assist them in securing government financial assistance to purchase buses and provide support, so they can complete the necessary requirements to operate BRT buses.

Kaneshie Market is already a key transportation hub for *tro-tros*, long-haul buses and taxis, but space within the area is a major issue. The lorry park adjacent to Kaneshie Market cannot at present contain all these operations. Developing a transportation plan that integrates the operations of these different forms of traffic and addresses space needs, to ensure that customers can readily access the BRT station from these other modes of transit, or vice versa, is highly important.

Promote and safeguard non-motorized transport (NMT).

Bicycling as a form of transport is environmentally friendly and relatively cheap compared with other forms of transport. It also promotes healthy exercise. Reports demonstrate that a sizeable portion of Accra's population utilize this form of transport. Ghana's *National Transport Policy* (2008) recognizes the need for a strong NMT component to the country's overall transportation development, highlighting these reasons. The City of Tema has outlined a comprehensive NMT plan, and Accra could follow this development to adapt a NMT plan that is appropriate and feasible. The lack of appropriate infrastructure (including separate rights-of-way, such as bicycle paths, free and open sidewalks), safety measures (including motorists' recognition and respect for pedestrians and bicyclists) and legal protections for NMT are existing deterrents to the use of this activity as a reliable form of transit.

As evidenced by the dialogue with junior high school students in the Kaneshie area and other data, there is strong interest in bicycling, but safety issues in particular preclude young students and other residents from taking advantage of this transit option. The BRT represents a major avenue for decreasing congestion and travel times within Accra, but in order to be successful, it must be recognized as part of an intermodal, integrated transport system that includes such transit alternatives as walking and biking, especially as these transit modes are particularly key for short-distance travel. Promoting wider NMT use would also serve to take people off the road, whether in *tro-tros*, automobiles, buses or motorcycles, further decreasing congestion issues.

• The AMA and Town and Country Planning should work with local agencies that promote NMT, such as the Centre for Cycling Expertise, to expand existing bicycle and pedestrian-friendly infrastructure and work toward a citywide NMT plan.

- The AMA and Town and Country Planning should protect the existing rights-of-way for pedestrians and bicyclists. For the Kaneshie area: identify sidewalks as rights-of-way for bicyclists and pedestrians; mark and protect these areas from cars, informal trading and other obstructions; and promote these areas as safe zones for these travellers.
- The AMA can lead the development of an NMT plan that identifies a network of paths and bikeable areas within the city, with key access points to the BRT, where people can safely park their bikes and join the buses.
- Promote driver training that includes sensitization and safeguarding for pedestrians and other road and sidewalk users.

The City of Kumasi, in collaboration with Columbia University's Earth Institute, has launched a successful pilot bamboo bike project in which local materials are used to make bikes for the local public. The project has been well-received by the city's residents, and the promotion of bamboo bikes, in addition to regular bikes, could be used to satisfy the demand for this form of transport in Greater Accra.

Design BRT stations with customer comfort, safety and security in mind.

With comfort identified as one of the complaints in the current public transportation system, stations should be user-friendly for the passengers.

- Position seats so that passengers are protected from weather conditions, especially since the Kaneshie area is prone to flooding.
- An anticipated problem is loitering and sleeping in stations after hours. To remedy this problem, benches in the station should be outfitted with armrests, to add passenger comfort and discourage sleeping on the benches.
- Most importantly, we also recommend the addition of rubbish disposal facilities (bins or receptacles).

Address the extensive informal-sector commercial operations throughout Kaneshie Market.

Street hawking is a common activity along most of Winneba Road at Kaneshie, and, being unregulated, it hinders optimal performance of the roadway. The Ministry of Roads and Highway's *Resettlement Action Plan* provides a relocation and compensation strategy for registered sellers along the Winneba Road corridor, but informal selling both in its current state, and once the BRT is implemented, must be addressed. At present, city planning does not effectively address the formation of these informal markets.

- Street hawkers along Winneba Road have located themselves at strategic points where there is heavy human traffic, such as around markets and bus terminals, and where motorists and passengers can access them, in and around congested areas. Improving traffic flow in these areas should reduce street hawking, and ensuring that traffic moves at a regular and faster pace will serve, in an unintended way, to drive them away from the streets.
- At the proposed BRT terminal in Kaneshie, street hawkers will position themselves on the sidewalk and road to take advantage of the foot traffic and idle vehicles, as they do now. The AMA should designate a "no-hawking zone" at the terminal and should fine or issue tickets to hawkers and/or

passengers in BRT buses who buy goods from hawkers in that zone. This zone could span the area of the bus terminal and extend past the sidewalk. Careful attention should be given to the constitutional rights that might be infringed upon by enforcing this policy.

• Another approach that could be taken in conjunction to the above would be to provide hawking zones with sufficient spaces, designated as "vendors' markets." On Winneba Road the anticipated markets for such vendors would be located at the BRT terminals. If aspirants to such locations exceed the number of spaces available, such excesses might be regulated by fees or lottery.

Utilize the Centre for Urban Transportation (CUT) to spearhead sustainable transport initiatives.

The CUT is currently being developed as part of the GUTP as a centre of excellence in research and policy that can and should seek to work with academic, research, government and international organizations for the purpose of stimulating discussion of transportation practices in Ghana's urban areas and of using policy research to promote sustainable practices. The CUT would be an excellent vehicle to:

- Spearhead a number of the above-mentioned interventions, conducting policy research that promotes sustainable, environmentally friendly transport.
- Build collaborations between different local, national and international organizations to leverage expertise in transportation, urban development and policy. This collaboration can also address any redundancy in government agency's efforts, and build shared goals and coordinated strategies.
- Support the evaluation and monitoring of the pilot project, in order to provide key recommendations for the BRT's further development.
- Work with city agencies to identify further transport and urban planning interventions that promote transit-oriented development throughout Accra.

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Stakeholder meetings with the following organizations/representatives:

Society of the Disabled, Ghana; Students and Administrators of Bishop John Clegg Junior High School, Kaneshie; Market Women and Queen, Kaneshie Market; Association of Spare Parts Dealers; Kaneshie /First Light Area Commercial and Business Representatives; and Chairman of the GPRTU.

Appendices

Literature Review on Urban Passenger Transport in Accra, Ghana

Introduction

Transport is part of the daily rhythm of life (Hoyle & Knowles, 1992; Addo, 2005). An efficient transportation system promotes access to amenities and services that are central to the lives of all individuals, like employment, education, health services and leisure (Intikhab et al. 2008). However, myriad challenges confront the urban transport sector in the Ghanaian capital of Accra, thus making transport services inefficient. This study reviews the city's transport challenges over time and the interventions to address the challenges.

Evolution of Accra's Transport System

The year 1927 marks the genesis of urban passenger transportation in Accra with the operation of 10 Dennis buses by the Municipal authorities of Ghana, then known as the Gold Coast (Boahen, 1975; Addo, 2006). The *Road Traffic Ordinance of 1952* (No.55) was then enacted, among others, to establish a licensing authority to register and license drivers and vehicles, and manage and control traffic and cater to other general regulations that relate to motor vehicle usage in the Gold Coast. In post-independent Ghana, this ordinance was replaced by the *Local Government Act of 1961* (Act 54) which led to the establishment of the Omnibus Service Authority (OSA) to provide requisite infrastructural facilities such as bus terminals, enclosed workshops and rolling stocks for the movement of passengers and freight in the city (OSA, 1994).

The OSA began rendering transport services to the city in 1965 with the use of high-capacity, comfortable, safe, and reliable buses. The buses moved at designated times and stopped at bus stops fitted with sheds to provide passengers some weather protection. Destination signs were embossed on all buses plying on the roads. The OSA's workforce was made up of graduates of the National Technical Training Institute at Kaneshie. In the 1980s, the City Express Services (CES) was also set up by the government to provide a complementary service to the public. One unique aspect of CES was the use of colours to indicate function and destination of buses. For instance, red line buses were for city service while blue line and green line buses travelled the center/city periphery and urban-rural/rural-urban service respectively. All buses moved on schedule and fares were generally affordable. Qualified staff (technicians) regional training institutes from across the country administered the services. Buses shared stops with OSA Transport Ltd., and management of the buses was by the State Transport Corporation.

According to Finn (2008), a broadly similar model to that of Accra emerged in cities all over Europe, North and South America, Africa, Australia, the Soviet Union and much of Asia during the first half of the 20th

century. The omnibus emerged as a leading form of motorised urban transport, even in cities, which had extensive rail, metro and tram networks.

The omnibus service was characterised by large buses, which operated on networks of scheduled routes centred on the urban core with harmonised fares. Operations were based on the efficiency of production, including standardised vehicle types and parts, depot-based maintenance, organised trained labour and hierarchical management. The underlying fact is that large-scale centralised bus operations provided an efficient, effective, profitable means of transportation in cities that did not yet experience high levels of car ownership and its associated congestion (Finn, 2008).

Presently, public transport supply in the city is dominated by the private sector which runs the famous minibus public transportation vehicles (locally referred to as *tro-tro*) and taxis whose operations gained prominence under Ghana's Economic Recovery Programme (ERP) in the early 1980s, when the state divested its public investment in bus operations to the private sector (Fouracre et al., 1994). In 1989, due to a legal restriction that banned all minibuses (up to 23 seats) from operating on routes beyond 50 km from the city, an estimated 10,800 minibuses were converted to urban operations, further increasing transport provision in the city (Ofosu-Dorte, 1992).

The dominant entity is the Ghana Private Road Transport Union (GPRTU), which organises more than 80% of the *tro-tro* sector, as well as being very active in taxi and shared taxi provision. Thanks to alignment with the prevailing political faction in the 1980s, GPRTU was granted permissions in organising terminals and services. The balance of the sector consists of a mix of associations (Cooperative, PROTOA) and some bus companies (e.g. Agate) which are affiliated under the Ghana Road Transport Coordinating Council (GRTCC) (Finn, 2008). There is no entry limit into the transport market. The Transport Operations Unit of the AMA is responsible for the management and control of parking, and operation of lorry parks and bus terminals. Of late, in practice, the management of lorry parks and terminals has been delegated to the transport operator unions (GIMSR, 1996).

The emergence and scale of private sector transport providers to Accra's transport supply is significant. At the time when the state-owned OSA was crumbling against the backdrop of rising economic losses and overwhelming operational difficulties and stiff competition from the private sector, the contribution of the City Express Service (CES) was abysmal. In January 1992, for instance, the CES' urban mileage was less than 10 % of the entire city (Fouracre et al., 1994). Added to the preceding point is the inability of the OSA and CES buses to raise the quality of their services to levels that would enable them to compete with the private sector in spite of huge government subsidies received over the years (OSA, 1990; Abane, 1992).

In view of the disparities between the huge levels of demand and limited supply of transport service during this era, the private sector transport providers revamped the transport service delivery and made it readily available, accessible and affordable Available figures indicate that in 2004 alone, 1.3 million passengers

commuted the central business district of Accra on a daily basis. Out of this figure, 1 million used a *tro-tro* or taxi (GhIE, 2008).

Challenges Associated with Accra's Transport System

The Road Network

Songsore (2003) is of the view that one cannot fully understand the spatial configuration of the development surface of Ghana, and by extension Accra, without examining British colonial policy. In British colonial cities in Africa and the Indian sub-continent, transport investment priority was accorded to the industrial and port areas of the cities (where such settlements were port cities). Typically, the urban form pattern of such colonial settlements were dominated by a major trunk road, commencing from the business and commercial sector, leading out of the city to the provinces, with a spur to the industrial and/or port area (Banjo & Dimitriou, 1983). Meanwhile, the residential areas of the indigenous population were left to be developed on either side of the major arterial systems.

This development policy has led to the creation of concentric and centripetal structure of Ghanaian cities with the resultant concentration of high-density activities at the hub and limited amount of road space. Consequently, Addo (2002) and Tamakloe (1993) are of the opinion that the road network in and around the city of Accra is based on a system of radial routes converging at the hub. A major weakness in the network, as identified by these authors, is the lack of adequate east-west corridors. It is said that the lack of a good road system causes a country's "wheels of development [to be] mired in mud" (Ellison 2002).

As such, the relevant government authority is undertaking infrastructural developments in the transport sector with the hope that this identified weakness may be resolved in the near future. The Department of Urban Roads (DUR) notes for instance, that the designs for 106 km of arterial roads, 60 km of local roads and 3 Interchanges have been completed for the Accra East corridor and the first 2.7 km of the proposed 15 km main arterial link to the west of Accra has been built already. Presently, however, there are only four radials, three of which are heavily used and experience considerable traffic congestion. Following extensive studies on these arteries, Segbefia (2000, cited in Addo, 2002) notes that flows of vehicles per minute ranged from 10 to 14 in morning peak hours and 8 to 12 in evening peak hours.

The road network of Accra, on the whole, is generally fairly extensive. According to the Statistical and Analytical Report (2006) issued by the Ministry of Transportation and the Ghana Statistical Service, the Greater Accra Region has the highest road network size of 5,123 km. Accra Metropolitan Area has the longest length of asphaltic concrete roads, about 151 km. Unpaved dirt roads constituted about 48% of the network as at the end of 2006. Compared with the national averages, Accra Metropolitan Area has the highest share of the total national urban road network with 19%, followed by Tema with 12%. The road condition mix for the Greater Accra region currently is 2 % good; 8% fair; and 70% poor (DUR, 2007).

In addition to the above, Addo (2002) identifies what is considered as local roads whose primary function is to provide access to residential areas. In his opinion, the structure of the road network in Accra as a whole is, however, weakened by the haphazard location and management of most terminal and transit points. It is not uncommon to identify terminals that are built either near streets or on privately owned land, which inhibits the development of permanent structures. Hence, it is estimated that whereas approximately 56% of all terminals are between 1,000 and 3,000 square metres in size, only 5% are of the size above 12,000 square metres. This unfortunate situation comes against realisation that there is a positive correlation between the size of a terminal and the number of vehicles handled within the hour (Addo, 2002; Oppong, 2000; cited in Agyemang, 2009).

Transport Supply in Accra

As said previously, the collapse of Accra's state-owned public transport system paved the way for private transport operators. However, after decades of service delivery to the public, it appears that the private transport operators' sustainable means of public transport has declined. The majority of the *tro-tros* are old and badly maintained, and their carrying capacities are between 12-15 and 22-33 passengers. Transportation experts estimate that *tro-tros* carry 52% of the travelling public while they use 27% of road space. Besides *tro-tros*, taxis, which are legally allowed a carrying capacity of 4 passengers, serve 9% of the travelling public even though they use 18% of road space. These numbers indicated an inefficient use of the existing road space and consequent traffic congestion and pollution (GhIE, 2008).

Transport services offered by the private operators are typically fixed route, with high dependence on the customer base understanding the routes and network from experience and word of mouth. However, discipline is often poor and drivers may deviate from the stated route (Finn, 2008).

Coupled with the above, more than 80 % of commuters in the city are forced to make two or more journeys, instead of a single continuous ride before getting to their final destinations, especially at night when commuters are at the mercy of *tro-tro* drivers who exploit the situation for profit . Again, when it rains or when there is the slightest hike in the price of fuel, it is common for *tro-tro* drivers to increase their fares.

In a study on peoples' perception of public transport supply, a relatively high percentage of the respondents (61%) perceived the quality of *tro-tros*, taxis and the buses generally to be 'satisfactory' to 'good' rather than 'poor'. However, quite a substantial percentage of the sample (43%), especially the female workers (58%), expressed serious concern about the reliability of *tro-tros* and buses, length of waiting and access times, and comfort. Reasons for dissatisfaction with transport availability were primarily long delays and unpredictable schedules (Abane, 1993). The socio-economic levels of households are increasing and so too are the numbers of cars for private use (currently near 10% in the Greater Accra Metropolitan Area). As the public transportation system deteriorates, urban transportation issues will only increase (Republic of Ghana Ministry of Transportation, 2009).

Consequently, many passengers are prepared to pay more for a better service by using shared taxis, which

may charge two or three times the bus fare (Addo, 2002). There are currently more than 30,000 taxis within the city of Accra, which add substantially to serious congestion and pollution in the city (Armstrong-Wright, 1989; Fouracre et al., 1994).

Traffic Congestion

Traffic congestion is defined as a phenomenon of increased disruption of traffic movement on an element of the transport system, which is most visible when the level of demand for movement approaches or exceeds the present capacity of the element (Taylor 1992). In recent times, residents of the city have had to wrestle with the baleful effects of the phenomenon of traffic congestion. According to a study by Affum and others (2008), cited in Armah (2010), air quality in Accra is a health risk. The levels of pollutants emitted from exhausts of motor vehicles along roads in Accra are relatively high compared to other roads where traffic volume is low. Aside from the environmental deterioration noted above, the socio-economic impacts of traffic congestion have been well documented (see Prud'homme, 1997; Schrank & Lomax, 1999; Palma & Lindsey, 2002; Carisma & Lowder, 2008; Intikhab et al., 2008; Agyemang, 2009) albeit such studies have been concentrated solely on the high-income and middle-income countries of the world.

For instance, it is believed that in the US alone, traffic congestion resulted in a loss of \$72 billion to some sixty-eight large urban areas in 1997 (Schrank & Lomax, 1999). This figure includes time delay valued at \$12 per hour (88 % of the total) and extra fuel consumption. In another study conducted by the Texas Transportation Institute (2004), it came to light that congestion had caused the US economy 3.7 billion hours of travel delay and 8.7 billion litres of wasted fuel. These figures represent an increase of 79 million hours and 262 million litres from 2002 to a total cost of more than \$63 billion for the year 2003.

In the UK, the Commission for Integrated Transport notes that while drivers in Central London spend up to about 50 % of their time crawling in jammed traffic, businesses in the city are also losing about £2 million a week. Against this backdrop, it is safe to conclude that the economic implication of congestion in Accra is very severe even though empirical studies are yet to confirm this assertion.

Traffic Safety

Drawing on police-reported accident data and published transport surveys, a majority of road traffic injuries in Ghana (around 42 %) involve pedestrians in the 26-35 year age group who inhabit the cities, like Accra and Kumasi (London et al, 2002; Afukaar et al, 2003; Republic of Ghana, 2007; WHO, 2009; cited in Agyemang & Jørgensen, 2010). Abane's (1994) study of driver behaviour in Accra and its relationship to road traffic examined roadside observations for four main roads in Accra. His study showed that commercial drivers who operate taxis and *tro-tros* in the city appear to cause the majority of driving offenses, as they resort to aggression as a tactic to meander their way through traffic due to the pressure on drivers to complete as many trips as possible in order to maximize their profits. Additional factors such as illiteracy present an issue, as close to half of respondents (about 46%) said they could neither read nor write, a challenge which prevents them from refreshing their knowledge on Ghana's driving code handbook and following on-the-spot traffic regulations. Additionally, few drivers had fulfilled the required testing to obtain drivers licenses. Therefore it is necessary to strengthen traffic policing and management so as to improve drivers' compliance with road regulations besides.

Young people's mobility appears to be on the increase, and inevitably, so too is their involvement in transport-related accidents. Motor accident rates in African countries appear to be among the highest in the world (Porter, 2010). At 20 per 100,000 youngsters (i.e. 0-14 years), road traffic accidents involving children in sub-Saharan Africa were the highest globally in 2002 (Porter 2010). Afukaar et al (2003) more recent study for the whole of Ghana shows that children continue to comprise a significant number of both road injuries and fatalities. Throughout sub-Saharan Africa, young men are twice as likely as their female counterparts to be involved in accidents, as illustrated in a study of adolescents 19 years and younger (Porter, 2010 citing Hyder et al, 2006).

Transportation and Land Use in Accra

Kenworthy (2006) measures a city's urban form by its urban density and the centralization of employment, and closely links urban form to transportation patterns, including car dependence and the effectiveness of public transport. In a study of urban density and private automobile travel in 58 higher-income cities, urban density was found to be highly correlated with private automobile use, with urban density explaining 84 percent of the variance in such car travel (Kenworthy, 2006).

However, in order to attain a sustainable city development, one must consider what Vuchic (1999) describes as a "balanced transportation system": This is an intermodal system that is designed in such a way that all transport modes are coordinated and each mode performs where it is most physically and operationally efficient so as to provide passengers with the most convenient and economically-efficient means of transport. As such, a sustainable city should de-emphasize highway and road infrastructure and the predominance of private automobile and motorcycle use and instead promote public transit and non-motorized transport including walking and cycling (Kenworthy, 2006).

Selase (2004) draws a historical sketch of the city's growth and expansion with time. According to him, Accra's urban growth trend has shifted from its erstwhile compact city growth characterized by high population density per unit area, mixed land use and highly concentrated residential patterns (a case in point being the indigenous Ga communities like Jamestown, where population density can approach as much as 1,000 persons/hectare) to a network city development, characterized by decentralization aimed at decongesting the city center, lowering population density per unit area , and giving residents the desire to live in planned residential areas. While the former promotes more vertical expansion with a mix of work and living places, thereby reducing the dependence on automobile, the latter settlement pattern encourages automobile dependence with the lateral expansion of residential areas and other necessary land uses.

Selase (2004) asserts that in order for Accra to develop a sustainable transport system, it must increase its use of public transit (metro buses), and NMT (walkways for pedestrians and cycling ways for bicyclists).

However an extensive study on bicycle use among the urban poor in Nima and Jamestown of Accra (Turner et al, 1995) highlighted the general negative attitudes within certain communities toward cyclists. Healthy transport, as described by Banister (2008), requires separating people and traffic, with separate routes and space for pedestrians and cyclists. Investment in separate, dedicated infrastructure for cyclists could reduce these negative attitudes and the risk environment for cyclists. As well, promoting bicycle use as a transport mode requires addressing the cultural and community perceptions of bicycling use in different ethnic communities (Turner et al, 1995).

Again, medium-density linear development along corridors or "fingers" is another urban transportation and land use strategy that could encourage sustainable development of the city. This "finger" development approach promotes urban development as a central activities core, or the "palm" at the central business district with radiating corridors of strong infrastructure and activities which is built on Accra's existing infrastructure and development. The strategy would provide a guide for the city's future population growth and provide a cost-effective means of supporting the population with improved transportation, potable water, proper waste management and other infrastructure. It would also integrate transportation with regional hubs of industry, retail and office development. A potentially complementary framework is the urban field satellite concept of a low-density city such as Accra, which is supported by a network of major roads that connect activity nodes. The city would be surrounded by satellite cities at the periphery and all cities would be linked through a comprehensive transportation network (Columbia University Planning Studio, 2003; Kofi, 2004).

Gender and Youth- Related Transport and Mobility Issues

Gender is a key consideration for urban mobility in Accra. Porter (2008) highlights strong relationships between gendered social constructs and transportation networks in Sub-Saharan Africa, which ultimately impacts women's access to mobility and transport. For example, while both men and women serve as owners of motorized and non-motorized transport, including taxis, hand-pulled trucks and trolleys, women are either non-existent or greatly under-represented as operators of both commercial motorized transport and non-motorized transport.

Since high-income earners and female workers are more likely to use faster and more comfortable modes such as taxis and private cars, incentivizing them to use public transportation would dramatically reduce the number of vehicles on the roads (Turner & Kwakye, 1996; Porter, 2008). Women are also found to rely more often on pedestrian transport (Porter, 2008). In addition, women, who typically earn lower incomes than their male counterparts and bear the responsibility for childcare and the household, face greater constraints in their mobility and travel mode options (Porter, 2008).

In urban areas in Ghana such as in Accra, market trading – a key survival strategy for numerous low-income households –is a predominantly female economic activity. Women comprise the majority of the trading sector in Ghana, and the concomitant activities in purchasing, transporting and selling goods fall within their domain (Greico, Turner, Kwakye (1995). These authors assert that market women strongly depend on informal public transportation, taxis and other non-motorized transport for their trading activities. These

women, usually unable to purchase goods in bulk due to their low capital base and small turnover, must make regular journeys to the markets with smaller, more manageable load sizes.

Women's mobility must be coordinated with support at the household level. For women traders, re-stocking journeys and journeys to the market to sell goods require coordination with other female members in the household, especially girls of school-going age serve as substitutes for mothers or older female relatives in trading activities in instances where the older individuals are at the mercy of travel and transport delays (Turner and Kwakye, 1996; Greico, Turner and Kwakye, 1995). Women or school-age children may also be forced to act as "domestic anchors" to either remain in the home for security concerns or to use the home as a selling and trading point; it is often around this domestic anchor that other members' activities, including transport, are arranged (Greico, Turner and Kwakye, 1995; Porter, 2010).

A major study on children's mobility in urban Accra (Greico et al, 1995; Turner and Kwakye, 1996) demonstrated children's high level of mobility, associated with their responsibility for household domestic tasks (e.g. supporting trading activities, as mentioned above, as well as fetching water, fuel collection and refuse disposal).

Porter's (2010) examination of studies relating young people's accessibility to key institutions, including educational and health facilities, demonstrates that while proximity to such institutions is important, so too is available, affordable and safe transport, particularly for children and young women. For example, in the area of education, studies from around Ghana (Porter, 2010, citing Avotri et al., 1999), demonstrate that constraints such as the lack of transport or high transport costs often encourage truancy and early drop-out for youths.

Aside the above-mentioned major studies, it appears that the literature on transportation in Africa has not paid much attention to children and young people's transport and mobility needs even though more than half of the population in African countries is less than 18 years of age (Porter, 2010).

Addressing the Challenges Associated with Accra's Transport System

Given the enormity of the problems associated with Accra's transport system, notably congestion, accidents and inefficiency in service delivery, various interventions to salvage the sector have been put in place by the government and other major stakeholders. These interventions have included frequent maintenance of the existing road network; construction of new roads, bridges, and non-highway infrastructure; encouraging an appropriate balance between different public transportation suppliers (for instance the metro mass transit).

In more recent times, the government of Ghana has adopted a new transportation policy known as the Urban Transport Project (UTP) with the financial support of the World Bank (i.e. US\$45.0 million); the Global Environment Facility (i.e. US\$ 7.0 million); the French Development Agency (i.e. US\$ 27.0 million) and the government of Ghana (i.e.US\$16.0 million). The UTP's policy direction will, among other things, see to the

introduction of a US\$46 high capacity, scheduled Bus Rapid Transit (BRT) system, to be piloted on the Graphic Road all the way to Kaneshie, Odorkor, Mallam and finally to Kasoa in the central region of Accra (Finn, 2008).

The Accra Bus-Rapid Transit: Characteristics and Geography of BRT system

Basically, the BRT system is a transport system that emphasizes priority for rapid movement of buses by securing segregated bus ways (IEA (2002). This may also be referred to as 'high-capacity bus systems', 'high-quality bus systems', 'metro-bus' or 'express bus systems' (Wright, 2002). In cities with well-developed BRT system, vehicles usually operate in their own right-of-way (ROW), thus greatly increasing speed and reducing travel time; bus stations are very convenient and easily accessible and can range from enhanced bus shelters to complete subway-like facilities; and usually employ Intelligent Transportation Systems (ITS) to track vehicle locations, control traffic signals, and update passengers on travel times to ensure better traffic flow and enhance safety and security on the vehicle and in the station.

Examination of previous studies of bus-rapid transit systems (Nuworsoo, 2006) note its advantages and indicate that the bus-based transit systems are capable of transporting large volumes of passengers at reasonable speeds for relatively low capital and operational costs, and can provide equivalent capacity to light rail transit (LRT) at a fraction of the capital cost under comparable levels of guide-way segregation and station spacing.

Commenting on the Lagos transit system, Olufemi (2008) opines that the BRT has helped create a regime of modern public transportation era for the people in the area, creating ease of mobility access to public transport for the metropolitan residents. Again, the BRT has helped create a streamlined, affordable and efficient public transport regime.

Similarly, it is estimated that the pilot BRT system in Accra will attract 10,000 passengers during the peak hour, reduce travel time from 60 to 25 minutes, , increase productivity of bus service (passenger share of large buses) and lead to a reduction in CO_2 emissions along the selected corridor (Hesse, 2008). Again, it will lead to the creation of employment for drivers, bus conductors, service inspectors, mechanics and ticket vendors, just to mention a few potential benefits.

However, Onifade et al (2010) paints a gloomy picture of the BRT system by observing that instead of reducing traffic deadlock in Lagos as intended, BRT is now creating traffic problems such as increased waiting time and the unavailability of buses leading to commuters getting stranded at bus terminals. In the light of this, planners of the Accra pilot BRT system will do well to take into account some of these operational constraints so as make the new transit system more efficient.

Upon completion and implementation of the new BRT system in Accra, the city will join the league of BRT system implementing cities all over the globe from Curitiba (Brazil), Bogota (Colombia) and Quito

(Ecuador) on the South American continent to Ottawa (Canada), Pittsburgh, Los Angeles, and Honolulu (the United States) on the North American continent. Other cities employing this system include Brisbane and Adelaide on the Australian continent; Leeds, London, Reading and Ipswich in the United Kingdom and Nagoya (Japan), Taipei (China), Jakarta (Indonesia), Seoul (Korea), Beijing (China), Bangkok (Thailand), Delhi, Pune, Hyderabad (India) and Dhaka (Bangladesh) in Asia. In Africa, Lagos (Nigeria) has had a functioning BRT system since March 2008 along with Cape Town and Johannesburg (South Africa) whose BRT system kicked off in March, 2010 (Fjellstrom 2003a; 2003b; IEA, 2002, ITDP, 2003; Wright 2002; Agyemang, 2009).

BRT Success Factors

Based on the experiences of cities that have successfully implemented the BRT system, the system only succeeded when implementation was integrated with all the stakeholders participating in the implementation in a sort of systemised approach. Evidence from Africa's first BRT scheme which became operational on 17th March 2008 in Lagos, Nigeria, shows that the success of the transit system necessitates a holistic approach that involves re-organisation of the bus industry, financing of new bus purchase, creating a new institutional structure and regulatory framework (ITP, 2009). Again, Rose (1993) opines that BRT systems in Asian countries were successful largely due to the active involvement of governments.

Against this backdrop, there must be institutional reforms to empower the Assemblies to plan, register, license and pass bye-laws to ensure utmost protection for use of the right-of-way (ROW) solely by licensed operators of the BRT system. Closely tied to this point is the need to adequately resource the MTTU (traffic police) to enforce strict compliance of the ROW by licensed operators so that recalcitrant drivers will be dissuaded from competing for space with the BRT system buses especially when the other lanes are clogged due to traffic congestion.

It will be recalled that the Metro Mass Transit Limited in September, 2005 added to its existing service delivery, an express bus service which it conveniently labelled as a BRT and even requested the authorities to demarcate certain lanes on the Kimbu-Adenta highway as 'Bus Only'. Without the backing of any legislative instrument with which to prosecute offending motorists, the service existed only in name (Agyemang, 2009).

The actual day-to-day running of the buses must be in the hands of private operators while the Assemblies should play a supervisory role. The private bus companies, which will operate the BRT system, must be paid by distance travelled rather than passenger volume to allow a balanced distribution of bus routes and eliminate clogging of main roads. While the bus companies earn an operating profit, the city authorities could also pay the companies a percentage of the bus value per month. This will assist the companies in making profit while maintaining a low fare for commuters.

In addition, it is necessary to create a multimodal system of main and feeder lines that would serve both densely settled districts and more dispersed areas so that the remaining *tro-tros* could be re-routed through residential neighbourhoods to feed passengers to the conventional transit buses in a dovetail fashion. This will provide a versatile form of public transportation with the added flexibility of catering to a variety of access needs and unlimited range of locations throughout the city of Accra.

A 35-member Ghanaian delegation made up of some members of the GPRTU, Progressive Transport Owners Association (PROTOA) and other officials drawn from the Department of Urban Roads and heads of the Urban Transport Project for the Accra, Kumasi and Ga West/Weija Metropolitan and Municipal assemblies paid a working visit to the Lagos Metropolitan Area Transport Authority (LAMATA) on two occasions to learn about the success story of the Lagos transit system. Given the fact that Lagos and Accra have similar transportation challenges, it is hoped that such technical support will be sustained so as to ensure transfer of knowledge and subsequent improvement of the transit system in the latter.

Finally, in order to attract more commuters to patronise the service, beyond the sustained and massive media coverage and advertisements, the implementers of the transit system could borrow from the success of city of Ahmedabad, where the government piloted its *Janmarg* BRT system with free bus rides to allow time for solving technical hitches as well as easing opposition sentiments (Kadri, 2010).

In Curitiba, passengers are charged a single fare for travel throughout the system, with unlimited transfers between buses at terminals where different services intersect. Transfers occur within the prepaid sections of the terminals, so transfer tickets are not needed (Goodman et al, 2006). Also, conveniences such as public telephones, post offices, newspaper stands and small retail facilities must be located within these terminals. Voice announcements and LED displays concerning travel information in both English and another major local Ghanaian language will be most ideal for passengers in Accra. The essence of a BRT is to improve bus operating speed and reliability on arterial streets by reducing or eliminating the various types of delay. As such, the traffic lights should also be reengineered to offer priority passage for the BRT buses.

It is expected that when the above policies are implemented, Accra will have a smooth transition from a *trotro* culture to a more sustainable BRT system.

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Study Area: Division into 25 Sections

In order to conduct the land use analysis and economic activity inventory, the study area was divided into 25 sections using the street layout as the boundaries.



Economic and Residential Activity Inventory

	STUDY AREA SECTIONS																									
ECONOMIC ACTIVITY	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	TOTAL
Beauty Services	0	3	0	0	3	0	3	1	3	1	0	0	0	0	0	6	3	2	3	2	1	1157	2	0	0	1190
Beauty Supply	3	7	3	3	0	1	2	0	1	1	0	0	1	0	0	2	0	1	3	5	1	463	12	0	5	514
Bookshop	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	2	0	46	3	0	0	55
Building Supply/Construction	1	7	4	4	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	4	16	3	58
Business Center	1	3	2	2	1	1	0	0	0	1	0	1	0	0	0	0	1	0	3	1	3	0	2	0	0	22
Clothing	2	2	0	4	6	1	8	1	2	6	2	3	0	0	0	1	1	0	2	1	0	463	4	1	0	510
Electronic/Electric Supply	9	2	4	3	2	2	0	0	0	10	3	1	0	0	0	3	6	2	0	2	3	0	25	8	1	86
Entertainment	0	0	0	0	2	0	1	1	0	1	0	0	1	0	0	3	3	0	1	0	0	0	0	0	0	13
Financial Services	0	1	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	1	0	23	2	6	0	38
Food Restaurant/Bar	1	1	1	1	4	1	2	1	0	2	1	3	1	1	0	1	0	0	7	9	6	231	4	2	5	285
Furniture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Grocery Shop	3	2	3	3	2	3	15	1	4	6	1	0	3	0	0	14	6	2	0	0	0	694	0	1	0	763
Household	13	6	10	10	3	6	4	0	0	18	0	0	0	0	2	3	1	0	1	7	7	1389	11	46	7	1544
Informal Shop	8	12	0	9	15	2	6	2	4	5	0	0	8	10	0	20	13	10	12	25	5	0	7	0	23	196
Office (Work)	0	0	0	0	0	0	0	1	0	2	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	9
Pharmacy/Health Services	0	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0	1	0	0	0	2	19	0	8	1	37
Phone Vendor	0	0	0	0	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	3	2	14	1	1	0	25
Public Facility	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	4
School	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6
Service Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spare Parts	0	0	0	0	0	0	0	0	0	1	2000	2000	500	500	0	0	0	0	0	0	0	0	11	0	0	5012
Toys	3	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Vacant/Not Utilized	2	2	3	0	1	2	0	0	0	4	0	0	0	0	0	0	0	0	13	13	0	0	28	6	0	74
TOTAL ECONOMIC ACTIVITY	44	47	28	40	39	17	46	9	15	86	2009	2009	514	511	7	53	36	18	34	58	31	4499	88	89	47	10374
	STU SEC	DY AI	REA S																							
RESIDENTIAL ACTIVITY	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>TOTAL</u>
Residence (Single)	2	7	12	0	4	2	1	3	1	2	1	2	1	0	0	13	12	0	0	1	0	0	2	0	0	66
Residence (Multi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	6	0	0	0	0	0	14
Mixed Use: Commercial + Residence	3	8	5	5	15	3	8	3	0	10	4	7	4	3	0	5	7	3	17	11	0	1	12	16	8	158
Mixed Use: Commercial + Office	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	6

9 5 3 0 18 19 3 25 18 0 1 15 16 9

244

5 15 18 6 19 5 10 6 1 13 5

TOTAL RESIDENTIAL

ACTIVITY

Land Use Classification Scheme

The Town and Country Planning Office provided a comprehensive land use classification scheme to use for this project. Density, height and use were the major factors impacting the classification scheme, which included the following categories: residential, commercial, pure civic, light and major industrial services and transportation (see full list in Annex).

- Residential Class
 - High in density, height
 - Medium in density, height
 - Low in density, height
- Commercial Class
 - Commerce
 - Mixed use commercial
 - Mixed residential/commercial
 - Mixed residential/industrial
 - Mixed residential/office
- Pure Civic Class
 - Pure Civic (Government use)
 - Civic commercial
 - Civic cultural/religious
 - Educational
 - Recreational
- Light and Major Industrial Services
- Transportation
 - o Rail
 - o Road
 - Parking



Section-by-Section Land Use Analysis

Section 11 is purely civic. The Kaneshie police station serves as the residence as well as offices for the administration of the Okaikoi sub-metro area. In front of the police station are numerous informal trading activities as well as hawking. The Accra Pilot BRT: Transport-Land Use Research Study Millennium Cities Initiative and Accra Metropolitan Assembly

Section 19 is predominantly mixed-use commercial. Multi-story building structures along Winneba Road house diverse commercial activity. Shop owners sell building and construction materials, electronics and groceries. Residences are located behind the commercial activity. This section faces Sections 1,2,3 and 4 and there is much interaction between these sections in the form of pedestrian cross-street traffic, despite the lack of any zebra crossings or bridges for cross-street access. Formal pedestrian street crossings exist at the First Light Junction or via the pedestrian bridge at the western end of Kaneshie Market. The distance between these two street crossings is approximately 500 meters (0.3 miles).

