INTRA URBAN PATTERN AND ACCEPTABILITY OF BUS STATION IN ILORIN, NIGERIA

***Akindele O. A, *Ogunleye J. S and *Muili A. B**
Urban and Regional Planning Department, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria.

ABSTRACT: *The study appraises the intra-urban pattern of bus-stops in Ilorin Metropolis, Nigeria. The inventory of existing bus-stops was taken, the spatial distribution analysis was evaluated, and adequacy and performance of bus-stops was also examined. Roads were stratified into three hierarchies (Trunks A, B and C). From each road category, 10% was sampled. A structured questionnaire was administered to 500 road users using the stratified random sampling techniques. Global positioning system (GPS) and google earth software were used to take coordinates and generate rasta images of the bus-stops. This study employed nearest neighbor analysis to determine the pattern of distribution of bus-stops in the study area. In this wise, the first order, second order and then order nearest neighbor analysis were compared to give the levels of distribution. Likert scaling was used to summarize the ordinal data. The study thus recommends a land use sensitive bus-stations and meaningful spacing of bus-stations.*

KEYWORDS: Intra-Urban, Spatial Distribution, Bus-Stops, Nigeria.

INTRODUCTION

The traffic situation in our cities today is best described as chaotic (Aderamo 2002). Indiscriminate boarding and alighting of passengers, along different routes causes traffic congestions; thereby causing monumental man-hour and economic losses and increased accident risks (Ogunleye, 2004, Adeniyi 1977). Traffic gets muddled up with different types of vehicles bikes and pedestrians struggling to move passengers and goods across major land use areas of the city. The resultant situation is one of noise, violence, accident and unnecessarily long queue which slows down or halt important social, economic, industrial and sometimes domestic activities to a standstill.

The major panacea to the urbanization borne and allied transportation problems has found expression in the intensification of public transport system above the private vehicles. At different times, park and ride, carpooling, odd and even number among others has been proffered to solving urban transportation problems (Abler *et al*, 1972). These particularly de-emphasize the use of private automobiles in favor of public transportation, this is because, compared to private vehicles, fewer resources like vehicles, road capacities and monetary investment are required to serve same amount of population. Public transport is of great benefit when the avoidance of severe environment problems as well as alleviation of traffic congestion and other related externalities are desired (Okpala, 1981; Adeniji, 1986). However, the organization of public transportation is as imperative as its accentuation. Unorganized public transportation may create more traffic

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

problems than when more vehicles are allowed within a better organized system. Against this background, there is need to develop and improve the way of organizing public transportation.

Among the component or factors that needed to be considered for proper implementation of public transport system are bus stops or bus stations (Olowosegun and Okoko, 2012). Proper spacing of stops can significantly enhance the quality of transit services and reduce travel time (Alterkawi, 2006). In other words, the performance of a transit system can be significantly improved if the spacing of bus stops is optimized (Chien and Yang, 2004). Bus stop design and location is recognized as a crucial element in the drive to improve the quality of bus services and public transport in general. The concept of 'Total Journey Quality' recognizes that bus passengers are also pedestrians at each end of the bus trip and requires that all aspects of the journey are considered. The convenience and comfort of bus stops must therefore not be overlooked (Bus priority team, 2006).

Bus stop spacing has a major impact on transit performance. It affects both access time and line-haul time, and therefore affects the demand for transit service (Church, 1984). The use of spatial optimization and optimal location of bus stations can support strategic planning by selecting new service/bus stops that provide access to areas currently without sufficient access (Matisziw et al. 2006). While consideration was not given to the optimal location of bus stop in our urban centers, considerations were equally not given to the parking spaces and facilities at the few existing bus stops. This magnifies the absence and inadequacies of bus stops. The few functional bus stops in cities are generally being reduced to stand alone structure without human, aesthetic or integrative considerations. This has given bus stop a poor public perception and has affected its usage in the negative way. The few bus stations around have been infiltrated by informal sector activities as they have been virtually taken over by hawkers, vagrants and street people. They also serve as abode of criminals and vagabonds.

Scholars have blamed urban traffic situation on the high incidence of auto ownership driver's behavior, road capacity and poor land use planning among others (Ogunsanya, 1993). The discourses have either been silent or have made only elusive statements about the role that correct planning of bus stations can play in the organization of public transportation; and with the view to forestall the appalling traffic situation in our cities, much more remains to learn. Is the lack or improper organization of bus tops significant enough in the organization of public transportation? when can we say that bus tops in cities are planned? For instance what is the acceptable spacing? Design? space standard? etc. if bus stations are constructed, would drivers and passengers use it or would they all be taken over by vagabonds, vagrant and touts? what measures would make bus station planning sustainable in the overall goal of traffic management?. The aim of this study therefore is to examine the spatial distribution of bus stops in Ilorin with a view to suggesting a functional and effective method for the location of bus stops on the study area.

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

Bus Stop Selection and Location

Since proper spacing of stops can significantly enhance the quality of transit services and reduce travel time (Alterkawi 2006), bus stop selection and location becomes an important objective of bus system optimization. Optimal locations of stops will be affected by users' value of time, access speed and demand (Chien and Yang 2000). The covering model is a location model which determines a minimal subset of facilities that every customer can be reached within a given maximal distance from one of the given depots (Klose and Drexl 2005). Bus stop optimization has the goal of achieving a maximal covering of given demand points with a minimal number of stops (Bowers *et al* 1996). Optimization of bus stop locations is based on maximizing potential demand coverage and minimizing route length extension (Xiong *et al*, 1998). He addressed the so called LSCP (location set covering problem) model and MCLP (maximal covering location problem) model to optimize bus stop locations and to minimize the number of transport stops needed in the bus system this would also reduce the stop redundancy and maximize the total passengers to be covered by a continuous service coverage (Chien *et al* 2003) A mathematical model to optimize the number and locations of bus stops that achieve the minimum total cost has been formulated by Ibeas (2005). This was developed as a bi-level optimization model to locate bus locations for minimizing the social cost of transport system (Ibeas, *et al*, 2005.). A combined Mode Choice Assignment Model was used to represent the traffic congestion and the effect of bus location changing initially, and the equilibrium between passengers, number of bus stops and fleet size and social cost had been reached finally.

Moreover, the development in bus-stop location optimization has found expression in public bus system planning, school bus routing problems (SBRP). This has been addressed to reach such goals that related to efficiency (capital cost and incremental cost), effectiveness (traffic demand and service quality) and equity (equality or fairness of bus services for each student). Another method has been introduced. The student were located on the road segments and then were subsequently assigned to an incident road intersection that was selected as a potential stop location. Those potential locations assigned with largest students within walking distance are selected as bus stops. Bowerman et al (1994) addressed an improved method that grouped the road nodes into clusters as potential stop locations and then allocated the students in clusters which can be serviced by a single bus route generated consequently (Bowenman, et al, 1994). In sum, it can be concluded that bus stop optimization mainly aims at distributing a set of bus stop locations that can mostly satisfy public transport demand, maintain adequate walking accessibility and cover sufficient service areas with minimal number of stops.

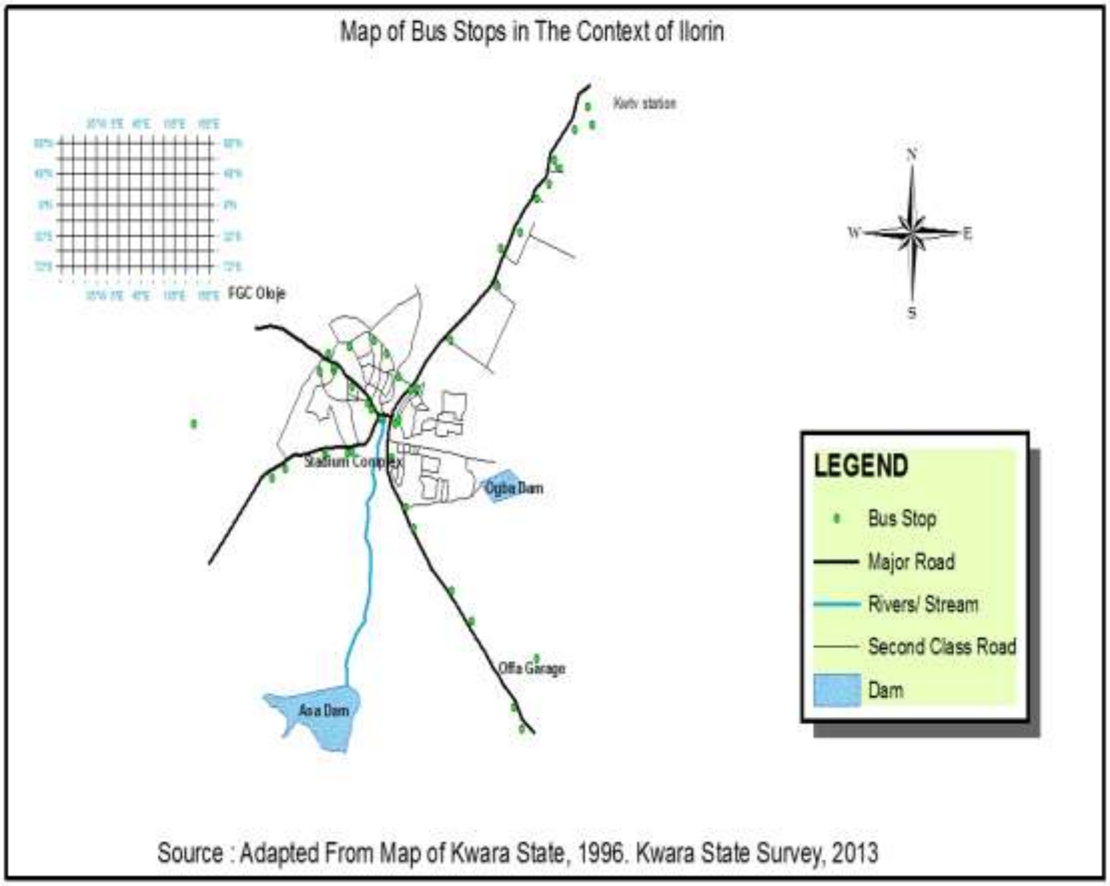
RESEARCH METHODOLOGY

The study necessarily relies on quantitative as well as qualitative primary and secondary data. Roads were captured using the rasta image of Ilorin city. These roads were grouped into trunks A,B and C and 10% sample were taken from each. Enumeration of existing bus stations was done using the global positioning system (GPS) and rasta images to geo-reference each bus station points. This enabled the measurement of distances between points and sizes of each bus stations.

A structured questionnaire was also administered to 500 respondents across the sampled zones. This study employed nearest neighbor analysis to determine the pattern of distribution of bus-stops in the study area. Likert scaling was also used to summarize ordinal data and with the aid of standard deviation about the mean ranking and comparison were done.

DISCUSSION OF FINDINGS

Distribution Pattern of Bus Stops in the Study Area



Characteristics of Bus-Stops in the Area

It was observed that there were designated bus-stops almost only along trunks A (37%) and B (63%) roads of the city; 72.8% of respondents who live along the roads attested to this. However, almost all the respondents observed that vehicles stop in-between the designated points and indiscriminately. These inappropriate stops occur in six of five places between designated stops in most areas of the city. One reason for this is that there is a gross inconsistency in the spacing of the bus-stops (98.8%), the difference of which is significant at 95% confidence level. This is etched

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

in unnecessarily far distances (55.6%) between stops Majority (76.5%) of the bus-stops are layby, this explains why most of them (75.3%) are on the road. The rest are junctions, only 3.7% of the designated bus-stops are made with sheds. Most of the bus-stops (57.9%) have ridiculously small sizes of approximately $1m^2$ and in all, only 18.5% of the bus stops have sizes of $10m^2$ and above. To explain the discrepancies between these sizes and the acceptable space standard, $15m^2$ which is the acceptable standard was used as the test score and a one sample t-test was done. The result showed that there is a significant difference in the mean value of the bus stop sizes and the acceptable standard.

Many inferences may be drawn here: the most probable planning implication may be that the distances between the stops were not scientifically determined in the first place; making the location haphazard and inconvenient for users. Secondly, the forces of urbanization might have exert on the area in terms of physical development of roads, houses and diverse land uses which might have been physically expressed as junction, offices, commercial centers or other important activity centers which are currently serving as important destinations and where buses would stop for the pressure of passengers; but which are not originally designated bus stops.

It should be noted that the bus-stop inconsistencies is rampant on the busiest and major roads of the city. This may have serious implications on the ease of movement; directly tampering with travel time, travel convenience travel costs and associated consequences. The nearest neighbor analysis done produced 0.176 which tends to zero. This implies that the bus-stops are highly clustered. The practical enumeration and questionnaire survey also revealed that there are more bus-stops around the commercial centers (70%) than other land uses. This suggests that naturally, some activity areas need more attention in terms of organization than others; and due consideration should be given them for a better city organization. All these are pointing to a fact that the bus-stops studied must have emerged naturally as the need of commuters arose. There seem to be no organized effort in the determination and location of the stops. This explains why bus stops have no similarities in structure, type, distance, sizes and other characteristics. This begs serious attention. Location of bus-stops needs to be determined based on factors such as land uses, volume of traffic and type of vehicles among others. This will encourage optimal use of spaces, convenience, economy and beauty.

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

Table 1 Characteristics of Bus Stop In the Area

Characteristics of Bus stop	**VARIABLES**	**Area %**					**Total %**
		1	2	3	4	5	
Designated Bus-Stops On the road	Designated	30.9	7.4	17.3	9.9	7.4	72.8
	Not Designated	6.2	8.6	3.7	4.9	3.7	27.2
Frequency of bus stop in between	2	5.6	0.0	0.0	0.0	0.0	5.6
	3	0.0	0.0	5.6	5.6	0.0	11.1
	4	11.1	0.0	5.6	0.0	0.0	16.7
	5	22.2	0.0	0.0	0.0	0.0	22.2
	6	5.6	5.6	5.6	5.6	11.1	33.3
	7	5.6	0.0	0.0	0.0	0.0	5.6
	8	5.6	0.0	0.0	0.0	0.0	5.6
Form of bus stop	Shed	3.7	0.0	0.0	0.0	0.0	3.7
	Lay by	29.6	9.9	17.3	11.1	8.6	76.5
	Junction/mode	1.2	1.2	3.7	3.7	2.5	12.3
	Others	2.5	4.9	0.0	0.0	0.0	7.4
Boarding and alighting easy at the bus stops	Very okay	2.5	3.8	1.3	0.0	2.5	10.0
	Not okay	33.8	12.5	20.0	15.0	8.8	90.0
Size of the bus stop (m)	1m	9.9	6.2	17.3	9.9	8.6	51.9
	<4m	0.0	4.9	1.2	1.2	2.5	9.9
	<10m	13.6	3.7	2.5	0.0	0.0	19.8
	>10m	13.6	1.2	0.0	3.7	0.0	18.5
Road category	Trunk A	37.0	0.0	0.0	0.0	0.0	37.0
	Trunk B	0.0	16.0	21.0	14.8	11.1	63.0
Location of bus stop	Off the road	9.9	2.5	6.2	3.7	2.5	24.7
	On the road	27.2	13.6	14.8	11.1	8.6	75.3
Commercial drivers stops at other points other than the known bus stop	Yes	35.8	16.0	21.0	12.3	11.1	96.3
	No	1.2	0.0	0.0	2.5	0.0	3.7
Distance of the bus stop to each other	Far	27.2	8.6	11.1	6.2	2.5	55.6
	Very far	3.7	0.0	2.5	1.2	2.5	9.9
	Not far	6.2	7.4	7.4	7.4	6.2	34.6
The bus stop of equal distance from one another	Equal Distance	0.0	1.2	0.0	0.0	0.0	1.2
	Unequal Distance	37.0	14.8	21.0	14.8	11.1	98.8
The bus stop land use that is more pronounced	Residential areas	1.3	0.0	7.5	11.3	0.0	20.0
	Commercial areas	32.5	13.8	11.3	3.8	8.8	70.0
	Industrial areas	0.0	2.5	0.0	0.0	0.0	2.5
	Others	2.5	0.0	2.5	0.0	2.5	7.5

The areas are numbered 1 – 5, Ajase Muritala/Jebba main road – 1, Maraba/Ipata Amilegbe – 2, Taiwo road – 3, Pakata road – 4, and Emir's road – 5.

Source: Author's field work, 2013.

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

Table 2: Weighed Degree of Availability of the Bus-Stops among Land Uses

Bus-Stops Land use	AWV	AWV/f	$\overline{X}$	D	d^2	σ	σ^2
Residential	107	0.269	0.603	-0.334	0.111	0.062	0.250
Commercial	284	0.714		0.211	0.012		
Industrial	100	0.251		-0.352	0.123		
Densely populated area	440	1.109		0.506	0.256		
Low density area	278	0.699		0.057	0.009		
Core areas	260	0.660		0.096	0.003		
Peripheral areas	248	0.623		0.020	0.000		
Major roads	215	0.540		-0.063	0.003		
Other Roads	140	0.351		-0.252	0.063		
Total		5.216			0.580		

Source: Author's Computation, 2013.

Relative Availability and Usage of Bus-stops among Land Uses

Degree of availability of bus-stops among land uses was investigated. Densely populated area, low density area, core areas, peripheral areas, major and other roads were factored into the analysis. Likhert scale was used to summarize the perceived rate of bus-stops use among land uses in the study area. Respondents were made to rate the presence and usage of bus-stops using one of "very much pronounced", "pronounced", "not pronounced", and "absent". Weight values were attached to the ratings from 4 to 1 in the order that they have been listed. This was scaled.
From the scaling, a positive deviation indicates a high level of availability while when the deviation is negative it indicates a low level of availability.

Bus stations were observed to be clustered more around densely populated area with the availability index of 0.506. This implies that bus stop location in the area is freelance, and residents choose any convenient points for drivers to stop to take up or drop off passengers and the more the people the more the stopping points. This is closely followed in a descending order by commercial with 0.211, and core area (0.096). fewer bus stops seem to be at low density (0.057) and peripheral (0.020) areas. Bus stops seem to be non-existent at industrial (-0.352), residential (-0.334) and other roads (-0.252).

Inferring form the above, bus stations in the study area have emerged without due consideration for density, land use, population, road type and other spatial factors germane to transport convenience and city organization.

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

Table 3: Weighed Adequacy of bus-stops facility

Attribute of bus stops	**AWV**	**AWV/f**	$\overline{X}$	**D**	**d^2**	**Σ**	**σ^2**
Design	140	0.353	**0.651**	-0.298	0.088	**0.645**	**0.803**
Material Used	261	0.696		0.045	0.002		
Distance from one another	100	0.251		-0.400	0.160		
Size	456	1.147		0.495	0.245		
Landscape	281	0.707		0.055	0.003		
Safety	261	0.701		0.050	0.002		
Convenience	249	0.660		0.009	0.000		
Sanitation	231	0.580		-0.071	0.005		
Structural condition	210	0.529		-0.122	0.014		
Floor condition	401	1.008		0.356	0.126		
Roof condition	226	0.548		0.034	0.001		
Wall condition	219	0.530		0.016	0.000		
Connection pedestrian	190	0.478		-0.035	0.001		
Commensuration of price to distance	189	0.476		-0.038	0.001		
Total	6.513	6.510		1.901			

Source: Author's Computation, 2013.

Residents Perceived Adequacy of Bus-Stops Facilities.

Likhert scaling was employed to weigh the adequacy level of bus stops in the study area. The factors used in the rating include the design, quality of material used for building, equality of distance between. The stops, space allotted to each stops, incidence of landscape, safety perception, convenience, sanitation, general condition of the structure used, roof, wall, floor and fittings used, pedestrian connection and commensuration of fares with distance between the bus-stops and neighbouring ones. The data was obtained in ordinal form. Respondents were required to rank the adequacy of each factor which was later scaled.

Generally, the residents have a very poor perception of the bus stops in their area. Most of the ratings showed that bus stops were perceived to be inadequate in their areas Nevertheless, while some of the attributes of the bus-stop facilities were rated to be adequate by a relatively higher percentage of respondents; many other have been rated inadequate. One could observe that residents who regard the bus-stops facility adequate have been very used to what is available for boarding and alighting. For instance, The size of the space used for bus-stop has the highest adequacy index of 0.495 which implies that size is a little adequate. This is closely followed in a

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

decreasing order by floor condition with 0.356, landscape with 0.055, safety with 0.050, materials used with 0.045, roof condition with 0.034, wall condition with 0.016 and convenience with 0.009, indicating low level of adequacy of convenience in the various bus-stops.

Residents identified the attributes of bus-stops that contributes majorly to the inadequacy of the bus-stations. In decreasing order: equality of distance between neighboring bus-stops (-0.400) followed by quality of design (-0.298), structural condition (-0.122), sanitation (-0.071), commensuration of price to distance (-0.038) and lastly, pedestrian connection (-0.035). Inferring form the above, residents would perceive the bus-stops better if in the order of listing above, distance between neighboring bus stations, quality of design, structural condition, sanitation pricing consideration for spacing and pedestrian connection are highly encouraged and organized through comprehensive city design.

CONCLUSION AND RECOMMENDATION

The study has been able to appraise the spatial location of bus-stops in Ilorin metropolis. While most of the existing designated and improvised bus-stops were found to be clustered together, the clustering was found to be more around the commercial land uses. There were found in the study more improvised bus-stops than the designated ones perhaps because many of the improvised bus-stops emerged naturally as need arises and that bus-stop designation was not scientifically done in the first place. For this reason, many of the bus stops were layby and fewer bus-stops were sheltered. This speaks volume about usage, aesthetics and other qualities of bus-stops in the area. This has direct effects on city sustainability in terms of energy use, man-hour loss and total economic development

To this end, the study recommends aggressive town planning that would put into consideration all the fundamental issues raised in this study: to understand bus stop requirement for different land uses factoring issues such as the availability and size of parking spaces, distance-fare commensuration, *pedestrianization* networking, and adequate space for boarding and alighting among others. It is hoped that when all these and the rest highlighted in the study are put into consideration, city organization, easy intra-urban movement, city aesthetics, functionality and convenience shall be guaranteed.

REFERENCES

Abler, R, Adams and Gould (1972); Spatial Organization: The Geographer's View of the World. Prentice Hall International: USA.

Adefolalu A. A (1977); Towards a Realization of better transport services in Nigeria In Onakomaiya S. O and Ekanem N. F (eds) (1977); Transportation in Nigerian National Development, NISER: Ibadan, Nigeria.

Aderamo (2002) Spatial Pattern of Intra-Urban trips in Ilorin, Nigeria. Geo-Studies Forum. International Journal of Government Science.

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

Adeniji K (1985); Improved Urban Transportation system and the Rapidly Growing Towns and Cities in Nigeria, A Tme for Action" In: Adeniji and bello (Eds), Development and Environment, Ibadan: NISER.

Bowerman Robert L, Paul H Calamal, Hall Brent G (1994) the Spacefilling Curve with Optimal Partitioning Heuristic for the Vehicle Routing Problem. European Journal of Operational Research Vol 76 No 1 pp 128.

Bowers Melissa, Noon Charles E Thomas Benjamin (1996) A Parallel Implementation of the TSSP+1 decomposition for the Capacity-Constrained vehicle Routing Problem. Computers and Operations Research Vol 23 No 7 pp 723.

Bus Priority Team (2006) Accessible Bus-Stop Design Guidance. Bus Priority Team Technical Advice Note BPI/06 Transport for London Pp 2-10

Chien Steven Hy, Bramslav V, Dimitrijevic and Lazer N Spasovic (2003) Optimization of Bus Route planning in Urban Commuter Network. Journal of Public Transportation Vol 6 No 1.

Chien Steven and Yang Z (2000) Optimal Feeder Bus Routes with Irregular Street Networks. Journal of Advanced Transportation. Vol 34 No 2 pp 213-248.

Church R. I (1984) The Planar maximal covering Location problem. Journal of Regional Science. 24 (2): 185-200.

GMPTE, (2007); Design Guidelines for Bus-Stops in Greater Manchester Prepared by Greater Manchester Passengers Transport Executive (GMPTE) Available: http://www.tfgm.com/upload/library/07_0650_bus_stop_guidelines.pdf (March, 9, 2010).

Ibeas Angel, Jose L Moura, Luigi dell'Olio (2009) Planning School Transport Design of Route with Flexible School Opening Times' Transportation Planning and Technology Vol 32, No 6 Pp527

Independent Commission on Transport (1974) 'Changing Directions' Coronet Books, Pennsylvania, USA.

Klose Andreas, Drexl Andreas (2005) Facility Location Model for Distribution System Design. European Journal of Operational Research Vol 162 No 1 pp4.

KRW (1996); TCRP Report 12: Guidelines for Transit Facility signing and Graphics. National Academic Press: Washington D. C.

Matisziw T. C, Murray A. T and Changjoo K (2006). Discrete Optimization Strategic Route Extension in Transit Networks. European Journal of Operational Research 171 p661-673

Metro (2009) Guidelines for Bus-Stop Design, Information and Placement, Customer Service, Operation and Safety Committee, Washington Metropolitan Area Transit Authority.

Xiong Chen, Weishui Wan, Xinhe Xu (1998) Modeling Rolling Batch Planning as Vehicle Routing Problem with Time Windows. Computers and Operations Research Vol 25 No 12 pp1127

Appendix 1
Bus-stop Coordinates

No	Road Class	Road Name	Bus Stop Name	Longitude	Latitude	Shelter	Bus Stop Set Back	Status	Road
1	Truck A	Ajase – Muritala- Jebba main Road	Micheal Imodu	0675543	0932797	No	No	Good	Dual carriage
2	Truck A	Ajase – Muritala- Jebba main Road	CAC Alabakun	0675330	0933201	No	No	Good	Dual carriage
3	Truck A	Ajase – Muritala- Jebba main Road	Alagbede	0675997	0934099	No	No	Good	Dual carriage
4	Truck A	Ajase – Muritala- Jebba main Road	Offa Garage/Sawimill	0674142	0934714	No	Yes	Good	Dual carriage
5	Truck A	Ajase – Muritala- Jebba main Road	Pipe line Junction	0673633	0935294	No	No	Good	Dual carriage
6	Truck A	Ajase – Muritala- Jebba main Road	Ola-Olu Hospital	06072699	0936455	No	Yes	Good	Dual carriage

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

7	Truck A	Ajase – Muritala- Jebba main Road	UMCA	0672464	0936860	Yes	No	Good	Dual carriage
8	Truck A	Ajase – Muritala- Jebba main Road	Olak Petroleum Junction/A Division	0672140	0937694	No	No	Good	Dual carriage
9	Truck A	Ajase – Muritala- Jebba main Road	Challenge	0672193	0937986	No	No	Good	Dual carriage
10	Truck A	Ajase – Muritala- Jebba main Road	Post-Office	0672272	0938481	No	No	Good	Dual carriage
11	Truck A	Ajase – Muritala- Jebba main Road	Moraba-Agric/GSS	0672792	0939060	No	Yes	Good	Dual carriage
12	Truck A	Ajase – Muritala- Jebba main Road	Kunlede	0673668	0939998	No	No	Good	Dual carriage
13	Truck A	Ajase – Muritala- Jebba main Road	Sango	0674828	0941010	No	Yes	Good	Single carriage
14	Truck A	Ajase – Muritala- Jebba main Road	Oke – Andi Junction	0675425	0942008	No	No	Good	Single carriage

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

15	Truck A	Ajase – Muritala- Jebba main Road	Oyun	0675885	0942544	No	No	Good	Single carriage
16	Truck A	Ajase – Muritala- Jebba main Road	Onisumbare	0677275	0943505	No	No	Good	Single carriage
17	Truck A	Ajase – Muritala- Jebba main Road	Yakuba	0677535	0943101	No	No	Good	Single carriage
18	Truck A	Ajase – Muritala- Jebba main Road	Elekoyangan	0679510	0943999	Yes	Yes	Good	Single carriage
19	Truck A	Ajase – Muritala- Jebba main Road	Idi – Ori	0679910	0944059	No	No	Good	Single carriage
20	Truck A	Ajase – Muritala- Jebba main Road	Poly Gate	0680034	0944604	No	Yes	Good	Single carriage
21	Truck B	Moraba Oja Oba Axis	Maraba	0672635	0939076	No	No	Good	Dual carriage
22	Truck B	Moraba Oja Oba Axis	Amilegbe/Sabo line	0672320	0939325	No	No	Good	Dual carriage
23	Truck B	Moraba Oja Oba Axis	Ipata/Oja	0672012	0939733	No	No	Good	Dual carriage

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

24	Truck B	Moraba Oja Oba Axis	Oja gboro/Isale Ropo	0671662	0939993	No	Yes	Good	Dual carriage
25	Truck B	Moraba Oja Oba Axis	Iyana Sobi	0671027	0939818	No	No	Good	Dual carriage
26	Truck B	Moraba Oja Oba Axis	Oja Oba	0670624	0939461	No	Yes	Good	Dual carriage
27	Truck B	Emir/Oja Oba (to Post Office)	Oja Oba	0670638	0939445	No	No	Good	Dual carriage
28	Truck B	Emir/Oja Oba (to Post Office)	Oriyangi	0671115	0939147	No	No	Good	Dual carriage
29	Truck B	Emir/Oja Oba (to Post Office)	Iyana Centre Gboro	0671547	0938842	No	No	Good	Dual carriage
30	Truck B	Emir/Oja Oba (to Post Office)	Iyana Opo Malu	0671647	0938713	No	No	Good	Dual carriage
31	Truck B	Emir/Oja Oba (to Post Office)	Iyana Naija/ Taiwo	0671859	0938465	No	Yes	Good	Dual carriage
32	Truck B	Emir/Oja Oba (to Post Office)	Post Office	0672237	0938445	No	No	Good	Dual carriage
33	Truck B	Taiwo Road	Taiwo Isale	0671842	0938473	No	Yes	Good	Dual carriage
34	Truck B	Taiwo Road	Unity Junction	0671080	0937888	No	No	Good	Dual carriage

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)

35	Truck B	Taiwo Road	Ita Amodu	0671004	0937890	No	No	Good	Dual carriage
36	Truck B	Taiwo Road	Oja Iya	0670392	0937837	No	No	Good	Dual carriage
37	Truck B	Taiwo Road	Iyana Oko Erin	0669388	0937572	No	No	Good	Dual carriage
38	Truck B	Taiwo Road	General/Queen School	0669073	0937398	No	Yes	Good	Dual carriage
39	Truck B	Taiwo Road	Pakata/Oja Oba	0670274	0939385	No	No	Good	Dual carriage
40	Truck B	Taiwo Road	Adeta	0667039	0938417	No	Yes	Good	Dual carriage

The areas are numbered 1 – 5, Ajase Muritala/Jebba main road – 1, Maraba/Ipata Amilegbe – 2, Taiwo road – 3, Pakata road – 4, and Emir’s road – 5.

Source: Author’s field work, 2013.

ISSN: 2052-6350(Print), ISSN: 2052-6369(Online)