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IMPACT OF ROAD DUALIZATION ON MOBILITY OF RESIDENTS IN OGBOMOSO, NIGERIA

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ABSTRACT

This study, therefore, assessed the impacts of road dualization on mobility of residents' in Ogbomoso. Stratified sampling method was used to select eleven areas that fall within 100metre radius on both side of the dualized road in the study area. A structured questionnaire focusing on socio-economic characteristics of residents along road network, existing condition of road before and after dualization, residents' satisfaction with road dualization and impacts of road dualization on mobility of residents' was administered to 250 randomly selected household's heads.This shows that more than half of road attributes has improved after road dualization, while insignificant proportion of road attributes retained their existing status. On the issue of satisfaction with road dualization by residents, they are more satisfied with "pedestrian walkways"(0.375), "roundabout"(0.359), "central reservation (meridian)"(0.295), "carriageway width"(0.267),"road set-backs"(0.247), "asphalt thickness"(0.219), "covered drainage system"(0.155) and "fine grading"(0.119).The environmental related impacts of road dualization on residents' ,mobility includes "occurrence of road accidents"(-0.422), "traffic congestion"(-0.486), "delayed in movement"(-0.450), "obstructing street cleaning"(-0.326), "odour"(-0.198), "dust(-0.182)", "noise"(-0.118), "contamination of surface"(-0.326), "smoke"(-0.286), waste generated littering streets"(-0.142); Health impacts were also observed. Therefore, a lot of benefits derived from road dualization, majority of residents that fall victims of displacement and demolition were yet to be compensated. also, government should compensate residents whose buildings were demolished.

KEYWORDS: *Road Dualization, Residents' Mobility, Residents' Satisfaction, Improvement*

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1. INTRODUCTION

Transportation is a process that involves the movement of commuters, goods and services from a given point of origin to a specific destination. It is significant to the society in promoting national unity, social economic integration, generating sense of togetherness and mutual understanding in a diversified society (Agbola, 2004). It is an important aspect of human life, though it has both positive and negative impact, but the importance of it to a nation cannot be overemphasized as efficient transport infrastructure facilities act as a catalyst for development. Accessibility is a key transportation element and is a direct expression of mobility either in terms of people, freight or information (Rodrique, 2004). Transport has throughout in history been the gate to expansion, better transport allows more trade and spread of people. Transportation

helps shape an area's economic health and quality of life. Not only does the transportation system provide for the mobility of people and goods, it also influences patterns of growth and economic activity by providing access to land(The Transportation Planning Process(TTPP, 2007).

Road transport in Nigeria cities has been growing tremendously with increasing population economic activities with majority of urban dwellers heavily depend on road as a mode of transportation for the satisfaction of their basic social and economic needs. In spite of the inevitable role of transportation for urban development, road transportation is in chaotic stage. The high dependency ratio on urban development, road transportation and growth in motor vehicle ownership is an evident problem of road transportation in Nigeria cities. It is obvious that most of the roads in Nigeria, especially in Oyo State are in deteriorating state, in which this is indirectly affecting the economy of the country and there is need for the people residing in them particularly in Ogbomoso to make contribution towards development of the roads. The cities are expanding, urban population is increasing, the demand for transport also increases and effort to provide adequate transport infrastructural facilities is uncoordinated and poor (Badejo, 2000).

The rapid growth in Nigeria's road system and its attendant problems of maintenance and accidents constitute a quandary to transportation planners. Traffic congestion is a condition on networks that occurs as use increased, and is characterized by slower speeds, longer trip times and increased queuing due to the small width of the roads. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, congestion is incurred. As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in, when vehicles are fully stopped for periods of time due to road's inadequate capacity, this is known as a traffic jam (Okoko, 2006).Road constructionand traffic operations, if undertaken without a proper understanding of the relationships inherent in environmental function, can be accompanied by serious disruptions to the environment, from which it may take a long time to regain equilibrium.There is therefore, a strong need for a practical and functional transport system which will be enduring and as well as can stand the test of time. Arising from this, Oyo state government decided to widen the road so as to increase the traffic volume as well as smoothing the vehicle movement in the area of study (Olaniyi, 2012).

Road dualization provides mobility, access and other benefits such as facilitating the productivity of other sectors of the economy. At the same time, road dualization contributes to several major environmental pressure on residents' livability in the study area including loss of property such as land, house and shop, demolition of structures, loss of businesses and customers, resources depletion, traffic congestion, accidents, movement delays, reduction in right of way, noise from machine and equipment, atmospheric pollution, imposing difficulties on economic livelihoods of affected residents, relocation of people anddisplacement of residents among others which are significant and can lead to further impacts on the community. Residents displaced for the construction of a road may experience additional impacts such as economic impact resulting from acquiring new housing and shops at a new location; social relationships and establishing relationships in a new social environment; human health and safety; cultural heritage; land acquisition and change in type and tenure of housing. The influence of these negative effects on residents' livability and on property values, however, seems to largely depend on the distance between the road and the residential location (Bateman et al, 2001).

It is thus, against this background that this study evaluates the impacts of road dualization on residents' livability in Ogbomoso North Local Government Area, Oyo state, Nigeria.

2. CONCEPTUAL ISSUES

Akinbode (2003), defined transportation as the pivot on which the whole machinery for overall development of any society revolves. As a matter of fact, without transportation, communities would live in isolation from each other, while specialization of economic activities becomes very difficult to achieve. Oyesiku (2003) was equally of the opinion that to achieve a long term goal of sustainable city development, transport issues must take a central stage. Transportation is also described as the maker and breaker of cities and observed how transport had built and destroyed cities over the years in some urban areas in Nigeria (Ogunsanya et al, 2002). In other words, Transportation is the art and science of providing and managing transportation facilities in a manner that ensures an efficient movement of commuters and freights within a given spatial entity. It is also a science that seeks to study the problems that arise in providing transportation facilities in an urban, regional or national setting and to prepare a systematic basis for planning such facilities (kadiyali, 2002).

According to Makri and Folkesson (2007), accessibility is a slippery notion and one of those common terms that everyone uses until faced with problem of defining and measuring it. The import of this statement is that accessibility is a daily use amongst people of various backgrounds and inclinations giving way to many definitions. People in places that are highly accessible would reach many other activities or destinations quickly and people in inaccessible places can reach many fewer places in the same amount of time, so that nearer or less expensive places are weighted more than farther or more expensive places. Accessibility, in general terms, describes degree to which a system is usable by as many people as possible. It is the degree of ease with which to reach certain locations from other locations and viewed as the ability to access functionality and possible benefit.

In transportation, accessibility refers to ease of reaching destinations with people in places that are highly accessible reaching many other activities or destinations quickly, while people in inaccessible places can reach fewer places in the same amount of time. Accessibility as a property of location and may be grouped into general and special accessibility. General accessibility refers to nearness to rail termini, bus stations and motorways transport facilities, labour, customers and service facilities such as banks and post office, and special accessibility exists when complimentary uses are in close proximity to each other. In this case, the net economic cost of movement will be lower in terms of distance, time and convenience in addition to greater comparative advantages given greater accessibility of a location (Balchin et al, 2000).

Handy and Niemeier (1997) identified “place accessibility” which is derived from patterns of land use. Place accessibility implies spatial distribution of potential destinations, magnitude, quality and character of activities found there. It is derived from transportation system in terms of distance, time taken, and cost of reaching each destination by different modes of transport. The transportation element comprises the travel distance, time, or cost for one or more modes of transport, while the activity element comprises the amount and location of various activities. A number of studies have been carried out on the significance of accessibility. Banister and Berechman (2005) stated that possible explanation for small and variable impact of urban rail investment is “ubiquitous” accessibility found in urban areas with little impact on overall accessibility and additional infrastructure where network is already well developed.

3. THE STUDY AREA

Ogbomoso in 1891 was a walled city, the gates of which were closely watched by day and securely closed by night. There was little or no communication between it and Oyo and Ilorin which were only thirty miles to the north and south. The town, picture-square and well watered was isolated from the rest of the Yoruba towns. Political relations were maintained

with the Ibadan, for the country depended on its security on the warriors of Ogbomoso and Ikirun. Ogbomoso is a city in Oyo State, southwestern Nigeria. The majority of the people are Yorubas. Ogbomoso is the second largest town in Oyo state after Ibadan the state capital. It lies approximately on 80 071 North of the equator and 40 151 East of the Greenwich meridian. The town lies within the derived savannah region and it is a gateway to the Northern part of Nigeria from the south. Ogbomoso is 57 kilometers south west of Ilorin, (capital of Kwara state), 53 kilometers north east of Oyo, 58 kilometers North West of Osogbo (capital of Osun state) and about 105 kilometers North East of Ibadan (capital of Oyo state).

Ogbomoso North is a Local Government Area in Ogbomoso, Oyo State, Nigeria. It is located along Lautech – Ilorin road. Ladoke Akintola University of Technology (LAUTECH) and it teaching hospital, the Nigerian Baptist Medical Center and Bowen University Teaching hospital are situated there. The SOUN Palace is the major traditional home of the town. Ogbomoso North is the largest local government in the city, being the city's major economic nerve. It is the most populous local government in the city as at the 2006 census.

Ogbomoso North Local Government is bounded in the west, east, north and south by Orire local government, Surulere local government, Surulere local government and Ogbomoso south local government respectively.

This type of land use refers to road networks. This comprises major, minor as well as access roads. The only two "Trunk A" roads in Ogbomoso are Ibadan – Ilorin and Ikoyi – Ejigbo/Oshogbo roads. Other minor roads include Adeleke road, Garden city (now Lam Adesina) road, Alapata road, Stadium road and the likes link one another within the town. The total circulation land use in Ogbomoso covers 102 hectares of land which constitutes 2.89 percent of the total area.

4. MATERIALS AND METHODS

Questionnaires were administered to collect information from residents. Among the data that were collected are socio-economic attributes of residents, existing condition of road before and after dualization, residents' satisfaction with road dualization, impacts of road dualization on residents' mobility in the study area and improvement strategies. Sample frame that was utilized for the study constituted eleven areas that fall within 100metre radius on both side of the dualized road in the study area. This includes Owode, Isale-ora, Oja-igbo, G.B. Area, Oke-elerin, Sekoni, Takie, Idi-abebe, Odo-oru, Adiatu and federal government college (F.G.C) Area.

Population for this study was determined by counting the total number of buildings using Google Earth Software in the study area and the aggregate of all buildings in areas mentioned above is equivalent to one thousand, two hundred and fifty (1,250) buildings. 20% of the number of buildings in each area was used to determine the sample size which is two hundred and fifty (250) using systematic sampling techniques.Likhert scale was employed for the study in order to analyze the level of residents' satisfaction with road dualization, existing condition of road before and after dualization and impacts of road dualization on mobility of residents.

5. IMPACTS OF ROAD DUALIZATION ON MOBILITY OF RESIDENTS

The gender of respondents revealed that male respondents has the highest percentage (61.2%) of the populace, which implies that the information gathered will be more valid and accurate because male that do frequently travel from one location to another in order to meet the needs of the family and as a result feel the impact of road dualization both positively and negatively than their females counterparts. The study revealed that residents with higher education earned more than those with low level of education and the nature of their occupation also affect the amount they earned monthly.

This implied that residents with low income might not be financially involved in road maintenance and they are more affected during construction processes- demolition and relocation.

5.1: Road Condition Before and After Dualization

Likhert scale was employed to show differences between road condition before and after dualization As phalt paving has deviation value of -0.304 before dualization and -0.036 after dualization, road width has -0.064 before and 0.172 after dualization, road surface quality has -0.0.28 before and 0.068 after the road has been dualized, road design has 0.004 and -0.040 respectively before and after road dualization, street light has-0.028 before and -0.412 after dualization, covered drainage channels has 0.020 before dualization and -0.112 after the road has been dualized, fine grading has 0.176 and -0.072 respectively before and after dualization, carriageway width has 0.268 before and has 0.136 after road been dualized, central reservation (meridian) has 0.060 before and 0.088 after road dualization, parking space has deviation of 0.044 before and -0.948 after road dualization, road markings has 0.016 before dualization and has -1.020 after the road has been dualized, sight distance has 0.376 before and 1.188 after the road has been dualized, roundabout has -0.228 before and 0.320 after road dualization, road setbacks has deviation value of -0.152 before road dualization and 0.104 after dualization, pedestrian walkways has -0.212 before and 0.484 after the road has been dualized.

Having determined the deviation of all road attributes before and after dualization, D2-D1 in Table 4.9 was used to evaluate changes in the condition of road after dualization, positive sign in deviation signifies that there is a positive difference in road attributes while the negative sign in deviation indicates there is insignificant or no difference in road attributes even after the road has been dualized. Specifically, with 0.268, 0,236, 0.096, 0.028, 0.812, 0.548, 0.256 and 0.696, asphalt paving, road width, road surface quality, central reservation (meridian), sight distance, roundabout, road setbacks and pedestrian walkways respectively has improved in the study area. Meanwhile, with -0.044, -0.384, -0.132, -0.090, -0.132, -0.992,-1.036 indicates that road design, street light, covered drainage channels, fine grading, carriageway width, parking space and road markings respectively did not improve from the condition they were before the dualized road. This may be partly because of the sheer neglect of these elements during road designs, use of inferior materials during implementation among several others.

Also, paired sample T-test as shown in Table 4.10 was used to evaluate the difference in condition of road before and after dualization. From the T-table, it can be deduced that with T=0.547, there is difference in road condition of the study area, however, this is not statistically significant as the P-value of 0.593 is greater than the α-level of 0.05

Table 1: Condition of Road Before Dualization

S/n	Road Attributes	Before Dualization								
		VP	P	I	G	VG	∑f	∑fx	X	D1
1	Asphalt paving	173	110	36	40	---	250	359	1.436	-0.304
2	Road width	136	154	69	40	20	250	419	1.676	-0.064
3	Road surface quality	138	140	66	54	30	250	428	1.712	-0.028
4	Road design	122	184	51	54	25	250	436	1.744	0.004
5	Street light	131	158	75	44	20	250	428	1.712	-0.028
6	Covered drainage channels	116	194	63	52	15	250	440	1.760	0.020
7	Fine grading	106	174	93	96	10	250	479	1.916	0.176
8	Carriageway width	102	168	90	112	30	250	502	2.008	0.268

Table 1: Contd.,

9	Central reservation (meridian)	133	128	81	88	20	250	450	1.800	0.060
10	Parking space	126	160	72	48	40	250	446	1.784	0.044
11	Road markings	133	138	81	72	15	250	439	1.756	0.016
12	Sight distance	95	156	102	156	20	250	529	2.116	0.376
13	Rotary/Roundabout	169	104	48	32	25	250	378	1.512	-0.228
14	Road set-backs	151	132	69	20	25	250	397	1.588	-0.152
15	Pedestrian walkways	162	126	39	20	35	250	382	1.528	-0.212
TOTAL									**1.736**	

D (Strongly Disagree D(Disagree), U(Undecided) and A(Agree), SA (Strongly Agree).
Source: field survey, 2018

Table 2

After Dualization									
VP	**P**	**I**	**G**	**VG**	**∑f**	**∑fx**	**x̄**	**D2**	**D2-D1**
1	Asphalt paving	51	380	555	250	1,031	4.124	-0.036	0.268
2	Road width	63	296	700	250	1,083	4.332	0.172	0.236
3	Road surface quality	57	232	735	250	1,057	4.228	0.068	0.096
4	Road design	63	240	680	250	1,030	4.120	-0.040	-0.044
5	Street light	111	204	545	250	937	3.748	-0.412	-0.384
6	Covered drainage channels	81	356	525	250	1,012	4.048	-0.112	-0.132
7	Fine grading	78	348	560	250	1,022	4.088	-0.072	-0.090
8	Carriageway width	63	316	670	250	1,074	4.296	0.136	-0.132
9	Central reservation (meridian)	60	296	675	250	1,062	4.248	0.088	0.028
10	Parking space	90	160	410	250	803	3.212	-0.948	-0.992
11	Road markings	84	164	385	250	785	3.140	-1.020	-1.036
12	Sight distance	51	268	740	250	1,337	5.348	1.188	0.812
13	Rotary/Roundabout	57	312	745	250	1,120	4.480	0.320	0.548
14	Road set-backs	27	272	725	250	1,066	4.264	0.104	0.256
15	Pedestrian walkways	36	172	945	250	1,161	4.644	0.484	0.696
Total									**4.154**

D (Strongly Disagree D (Disagree), U (Undecided) and A (Agree), SA (Strongly Agree).
Source: field survey, 2018

5.2: Residents Satisfaction with Road Dualization

The procedure was used to calculate the level of satisfaction using road attributes as indicators of measurement. In analyzing the data, the mean of each road attribute was compared with the average mean of all road attributes. road markings has the lowest average mean of 2.900, parking space is followed in decreasing order by which has the mean value of 2.988, street light, road width, road surface quality, road design, fine grading, covered drainage system, sight distance, asphalt thickness, road setbacks, carriageway width, central reservation (meridian), roundabout has 3.248, 3.412, 3.492, 3.540, 3.748, 3.784, 3.796, 3.848, 3.876, 3.896, 3.924 and 3.988 respectively while pedestrian walkways have mean value of 4.004. As shown in Table 4.11; road width (-0.217), road surface quality (-0.137), road design (-0.089), street light (-0.381), parking space (-0.641) and road markings (-0.729) respectively has negative deviation which signifies that residents are very dissatisfied with those road attributes while covered drainage channels (0.155), fine grading (0.119), carriageway width (0.267), central reservation (meridian) (0.295), sight distance (0.167), roundabout (0.359), road set-backs (0.247), pedestrian walkways (0.375) and asphalt thickness (0.219) respectively has positive deviation which indicates that the level of satisfaction of road attributes are very high (i.e. residents are very satisfied with them). It can

therefore be deduced that majority of road attributes are very satisfied by residents in the study area as they have positive deviation and this may be because they are in good condition or they serve residents in the study area well.

Table 3: Residents' Satisfaction with Road Dualization

S/No	Indicators	Residents' Satisfaction								
		VD	D	I	S	VS	∑f	∑fx	$\bar{x}$	D
1	Road width	57	36	12	428	320	250	853	3.412	-0.217
2	Road surface quality	32	96	15	380	350	250	873	3.492	-0.137
3	Road design	31	70	78	336	370	250	885	3.540	-0.089
4	Street light	29	82	126	292	325	250	812	3.248	-0.381
5	Covered drainage channels	20	60	75	336	455	250	946	3.784	0.155
6	Fine grading	18	70	72	352	425	250	937	3.748	0.119
7	Carriageway width	16	48	60	400	450	250	974	3.896	0.267
8	Central reservation (meridian)	12	50	84	360	475	250	981	3.924	0.295
9	Parking space	64	100	66	212	305	250	747	2.988	-0.641
10	Road markings	62	120	84	164	295	250	725	2.900	-0.729
11	Sight distance	18	42	96	408	385	250	949	3.796	0.167
12	Rotary/Roundabout	13	22	99	408	455	250	997	3.988	0.359
13	Road set-backs	12	68	93	276	520	250	969	3.876	0.247
14	Pedestrian walkways	14	40	81	316	550	250	1,001	4.004	0.375
15	Asphalt thickness	25	40	75	312	510	250	962	3.848	0.219
TOTAL									3.629	

D (Strongly Disagree D(Disagree), U(Undecided) and A(Agree), SA (Strongly Agree).
Source: Field Survey, 2018.

5.3: Perceived Impacts of Road Dualization on Mobility of Residents

All environmental impacts indicators have negative deviation values, which implies that majority of residents in the study area strongly disagree that road dualization has environmental impacts on their livability, the health impacts indicators likewise has negative deviation values all through which signifies that road dualization has no health effects on the livability of respondents while majority of the socio-economic impacts indicators on the other hand has positive deviation values except for drudgery/smoking and security to neighborhood which has negative deviation values of -0.618 and -0.354 respectively and this implies that road dualization has impacts on the socio-economic of residents in the study area. Specifically, loss of artifacts (0.042), property loss (0.346), displacement of residents (0.406), population influx (0.110), increase in land use intensity (0.250), increase in street begging (0.074), damage to cultural heritage (0.210), reduction in travel time (0.306), demolition of buildings (0.418), loss of businesses(0.862), increase in informal activities (0.406), development of new buildings (0.309), enhancement of accessibility to residence (0.514), enhancement of property value (0.478), increase in commercial activities (0.362), increase in land value (0.510).

Table 4: Road Dualization Impacts on Residents

S/No	Indicators of Measurement		SD	D	U	A	SA	∑f	∑fx	$\bar{x}$	D
1	Environmental Impacts	Occurrence of road accidents	86	20	42	304	320	250	772	3.088	-0.422
		Traffic congestion	76	58	33	324	265	250	756	3.024	-0.486
		Delayed in movement	82	28	63	292	300	250	765	3.060	-0.450
		Obstructing street cleaning	67	48	51	320	310	250	796	3.184	-0.326
		Odour	65	34	54	300	375	250	828	3.312	-0.198
		Dust	59	48	45	320	360	250	832	3.328	-0.182
		Noise	52	54	54	308	380	250	848	3.392	-0.118
		Contamination of surface water	53	96	48	264	335	250	796	3.184	-0.326
		Smoke	62	56	54	300	335	250	806	3.224	-0.286
		Waste generated littering	53	54	42	348	345	250	842	3.368	-0.142

		streets									
2	Health Impacts	Headache from noise	45	68	54	364	310	250	841	3.364	-0.146
		Eye irritation from smoke	52	90	84	296	255	250	777	3.108	-0.402
		Stomach upset/vomiting	55	90	120	216	280	250	761	3.044	-0.466
		Asthma/catarrh	52	64	126	280	270	250	792	3.168	-0.342
		Sleeping disorder due to noise from engine/machine	50	52	135	224	360	250	821	3.284	-0.226
3	Socio-Economic Impacts	Drudgery/smoking	63	90	138	192	240	250	723	2.892	-0.618
		Security risk to neighborhood	55	68	111	260	295	250	789	3.156	-0.354
		Loss of artifacts	32	60	105	296	395	250	888	3.552	0.042
		Property loss	17	44	93	360	450	250	964	3.856	0.346
		Displacement of residents	19	42	60	368	490	250	979	3.916	0.406
		Population influx	30	64	72	324	415	250	905	3.620	0.110
		Increase in landuse intensity	17	66	90	332	435	250	940	3.760	0.250
		Increase in street begging	40	42	105	244	465	250	896	3.584	0.074
		Damage to cultural heritage	39	30	96	220	545	250	930	3.720	0.210
		Reduction in travel time	32	26	81	300	515	250	954	3.816	0.306
		Demolition of buildings	24	22	78	348	510	250	982	3.928	0.418
		Loss of businesses	17	30	78	328	550	250	1,003	4.012	0.862
		Increase in informal activities	24	26	96	288	545	250	979	3.916	0.406
		Development of new buildings	26	40	66	268	575	250	975	3.900	0.390
		Enhancement of accessibility to residence	20	34	72	260	620	250	1,006	4.024	0.514
		Enhancement of property value	22	28	69	308	570	250	997	3.988	0.478
		Increase in commercial activities	25	38	69	316	520	250	968	3.872	0.362
		Increase in land value	21	32	42	340	570	250	1,005	4.020	0.510
TOTAL										**3.51**	

D (Strongly Disagree D (Disagree), U (Undecided) and A(Agree), SA (Strongly Agree).
Source: Field Survey, 2018.

6. CONCLUSION AND RECOMMENDATIONS

The study assessed the socio-economic characteristics of residents, road condition before and after dualization, extent to which residents are satisfied with road dualization as well as the impacts of road dualization on residents' mobility. It was observed that there is strong effects of road dualization on socio-economic life of residents through springing up of and boosting of new and existing economic activities respectively, and that most residents build very close to road corridor and as a result fall victim of demolition during construction process.Compensation should hereby be given to residents whose buildings were demolished and finally, monitoring the progress of project implementation will go a long way in realizing the set objectives and goals of the project. In order to achieve a conducive and habitable environment, the following strategies are suggested:

- Compensation should be given to demolished building residents during construction process.
- Oyo State Government should complete and rehabilitate the dualized road along with immediate effect.
- Supplementary facilities such as traffic signs, terminals, parking space, relaxation centres, road signs among others should be provided to enhance accessibility.
- Adequate setbacks should be ensured by transportation planners guided by development control unit of Bureau of physical planning and urban development.

- Finally, there is need for developers to seek development permit from planning authority before encroaching on public open spaces.

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