

**Case Report**

Urban Sprawl Affects Urban Transportation Network in Phuoc Kien Commune, Nha Be Ward, Ho Chi Minh City

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Abstract: Urban sprawl or sprawl is phenomenon attached to urbanization, which increases corresponding to the speed of urbanization. Sprawl happens when city central facilities become overloaded and even stronger if there is implementation of the policy of decentralized development from urban planners and government. Ho Chi Minh city central facilities is overloaded because of high density of population, which is the reason Ho Chi Minh city government implements decentralized development policies and decentralized urban planning project. Even through, there are lots of decentralized urban planning and support policies but there is still lack of research about urban sprawl, especially about transportation network of sprawling area like Phuoc Kien Commune. Applying research, scientific observation and analysis, summary methods, this research main purpose is pointing out the change of transportation of Phuoc Kien Commune, which is the most affected by Ho Chi Minh city urbanization and urban sprawl. Moreover, this research is the framework research for further research about transportation network transition affected by urban sprawl and urbanization in future.

Keywords: Urban Development, Sustainable Development, South of Ho Chi Minh City, Nha Be Ward, Urban Sprawl, Transportation Network

1. Introduction

Urban sprawl is the phenomenon attached to urbanization, which is the spreading of urban developments on undeveloped land near a urban area. Urban sprawl can be known at the migration from high population density area (such as city center) to sub-urban areas surrounding city where population density is lower because of benefits from relocation decision, such as: lower house tax rates, cheaper price for real estate and construction.

Migration and urban sprawl is nothing new to human society, since those are the ways that urban area grows from the beginning. Moreover, urban sprawl phenomenon has lots of effects on urban form, including urban transportation network design.

In history of urban study, there were many studies that mentioned about the relationship between development of urban sprawl, urban form and its transportation network, such as: urban studies [6, 7], urban sprawl [1], human settlements in planning and design for sustainable urban mobility [2],

experience, state of the art and agenda for research and action in case of development in Philippines [3], Decision making on transport network planning and the impact on community, economy and the environment [4], designing walkable urban thoroughfares [5] etc. Especially, the idea of conducting research on the transformation of PKC urban design, transportation network development and modeling relationship between urban form and transportation is come from the statement “transportation and land use interact with each other” [5].

2. Phuoc Kien Commune (PKC) – Subject of the Study

Ho Chi Minh City (HCMC) has 24 administrative counties, divided into 19 urban (downtown) districts and 5 suburbs, including the subject of this study - Nha Be district.

Phuoc Kien Commune (PKC) located 11km away to the south of HCMC center, included in the area of Nha Be. In additional, PKC is also one of rural area of HCMC [8].

PKC is 1503.91 ha and has population about 24,765 people (in 2010), divided into 5 hamlet, numbered from 1 to 5. PKC area boundaries included (Figure 1):

- (a) North: Tan Phong ward of District 7;
- (b) East: Phu Thuan ward of District 7 and Nha-Be town of Nha Be;
- (c) South: Nhon Duc commune of Nha Be;
- (d) West: Phuoc Loc ward of Nha Be.

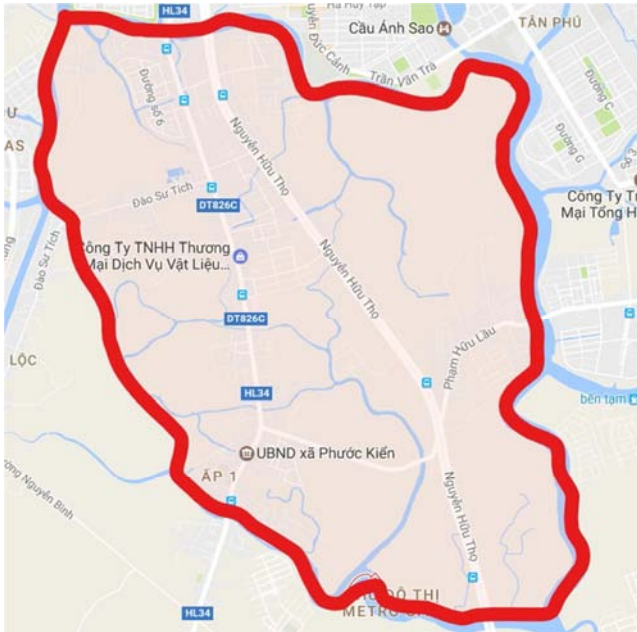


Figure 1. Phuoc Kien Commune area (Source: Google map).

PKC urbanization has occurred since the establish of District 7 and Phu My Hung urban area, including Nguyen Van Linh highway in 2000s. Moreover, PKC urbanization rate become faster and stronger year by year. The rapid urban sprawl has caused many changes on PKC urban form and its transportation network.

3. Traffic Development Potential of PKC

PKC located nearest to District 7 and Nguyen Van Linh highway, only 11km away from the Centre business districts of HCMC. Moreover, PKC located on the North of Nha Be, which is not only the highest but also the most stable ground in Nha Be area [11]. Because of special geographical location, PKC area is very suitable for new urban developing projects.

In additional, PKC is surrounded by rivers and such canals as Tac Ba Pho, Ong Lon, Cay Kho, Cong_Vinh, Long Kien and Kenh Doi, which will also a big advantage to develop traffic system for new urban area.

PKC not only has dense canal network but also has three main streets including Nguyen Huu Tho highway. This highway is not only the main axis route of Nha Be but also plays a very important role of the south regional traffic connection of HCMC. Moreover, Le Van Luong street is very important for linking PKC to other communes in Nha Be area. In additional, Pham Huu Lau is important street, which links

PKC and center of District 7 in the East – West direction.

4. PKC Traffic Network Before Rapid Urbanized



Figure 2. Ho Chi Minh city Southern wetlands 22 years ago (Source: dantri.com.vn).



Figure 3. Current Land Use map of PKC in 2005 (Source: PKC People's Committee).

- Notes:
- : Green area
 - : Reserved green area
 - : High-population density area
 - : Housing area
 - : Infrastructure area

Before 2000s, when the urbanization of District 7 and Phu My Hung urban area planning had not established, the three of District 7, Nha Be and Can Gio are wetlands and rural areas on the South of HCMC (Figure 2).

Since Nha Be (and PKC included) is rural area with low population and population density, the traffic network of this area is very foggy, mostly are land roads. In the current land use map of PKC presented in 2005 (Figure 3), there were only 4 main regional routes, 2 vertical and 2 horizontal routes, which have become Nguyen Huu Tho highway, Le Van Luong street and Pham Huu Lau street.

Moreover, there were many other small roads with lower level of infrastructure development.

5. PKC Transportation Network During Rapid Urbanized

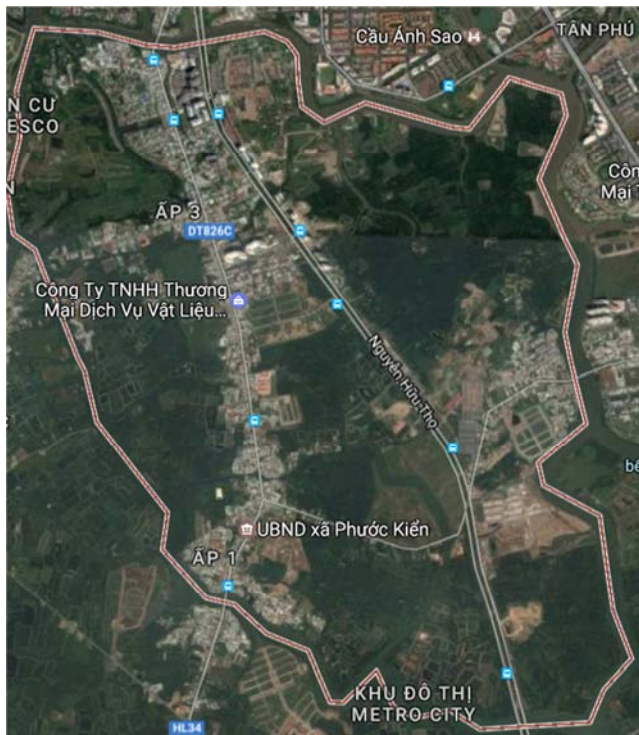


Figure 4. Satellite photo of Phuoc Kien area (Source: Google map).

New Rural Development Project at PKC was approved by Nha Be People's Committee in October, 2013 (Decision no. 370/QĐ-UBND). This project is established not only to set the technical framework for all other construction project in PKC area but also to build new urban transportation network for new urban projects in future.

First of all, in Summary table of indicators of land use planning in stages mentioned in Decision [8] total area for transportation network is increased through years, from 53.4 ha in 2015 to 185.26 ha in 2020. Moreover, in satellite photo of Phuoc Kien area, which was taken on May 23rd, 2017 (Figure 4), the transportation network is more complicated than Current Land use map of PKC in 2005 (Figure 3). Especially, transportation and housing networks have developed significantly through years at PKC area, in parallel with markedly population increase.

Secondly, in Decision [8], total area for transportation network is increased through years, since the total

transportation area is increased, the road amount and width also increased to meet the travel need of future resident (Table 1).

Table 1. Summary existing and upgrading transportation network planning, from 2013 to 2015.

	Road name	Length	Width (m)	
			2013	2015
A	External roads			
1	Le Van Luong	4,090	8	(40)
2	Nguyen Huu Tho	5,439	60	(60)
B	Rural roads			
1	Internal roads			
	Pham Huu Lau	3,733	10	(30)
	Dao Su Tich	1,216	8	(30)
2	Resident road			
	55 small roads	16,144	2	(5 to 8)
	New roads built in New Rural Development Project at PKC			
	7 (h3)	200		6
	11 (h3)	118		6
Alley	15 (h1)	663		6
	20 (h1)	325		6
	24 (h4)	219		6

Notes: h3: Hamlet 3, h1: Hamlet 1, h4: Hamlet 4

Thirdly, in the 1:5000 map of detailed urban construction planning to 2020 of Nha Be (Figure 5), PKC transportation network become more complicated.



Figure 5. Map of Nha Be in the Detailed urban construction planning [9].

One of the biggest and the most important urban development in Phuoc Kien area until 2020 is GS Metrocity¹ project in the South part of PKC, which also become the new central area of Nha Be in the future [9].

¹ GS Metrocity is an urban development project in Nha Be. GS Development Limited Company is located in Phuoc Kien and Nhon Duc communes, Nha Be.

To support the development of GS Metrocity project, new internal roads will be built to increase connecting ability of PKC to other communes in Nha Be area, especially Kho_B road, which connects the central area of GS Metrocity with Nha Be town (Administrative center of Nha Be) (Figure 6)



Figure 6. Kho_B road (Source: [9]).

Fourthly, not only road network is developed, but also public transportation network have been planned in Phuoc Kien area because of the total population increase and urban sprawl. The two main public transportation systems used in Phuoc Kien area are metro and bus systems. Moreover, they are deployed on main routes, which connect PKC to others area of Nha Be:

- Bus system: Nguyen Huu Tho, Kho_B, Le Van Luong, Dao Su Tich, Pham Huu Lau, Vinh Phuoc – Cay Kho, etc.;
- Metro system: HCMC's metro line No 4 runs through Nha Be area, alongside with Le Van Luong, Nguyen Huu Tho and Pham Huu Lau routes.

6. The Transition States of PKC Transportation Network

PKC in early of 2000s, is the rural area which had low urbanized rate. The transportation network is simple with low circulation ability and low quality, most of routes are land roads and road width are about 2 to 6 meters, only Huong_Lo_14 which is now become Nguyen Huu Tho are about 8 meters wide.

From 2010 to 2015, PKC has become the South sub-urban area of HCMC. Since the Detailed Urban Construction Planning to 2020 at scale of 1:5000 [9] and its adjusted version [10] of Nha Be, approved by Nha Be People's committee in 1998 and 2012 respectively, were deployed, PKC transportation network has invested, developed and transformed into sub-urban transportation network.

In near future, in 2020, Nha Be will officially become a new urban area, alongside with District 7 to be new centers of business – service, housing – estate, industry and education of HCMC. Therefore, transportation network will keep developed more and more and soon become urban transportation network with high quality and circulation ability, well-developed public transportation systems and routes system.

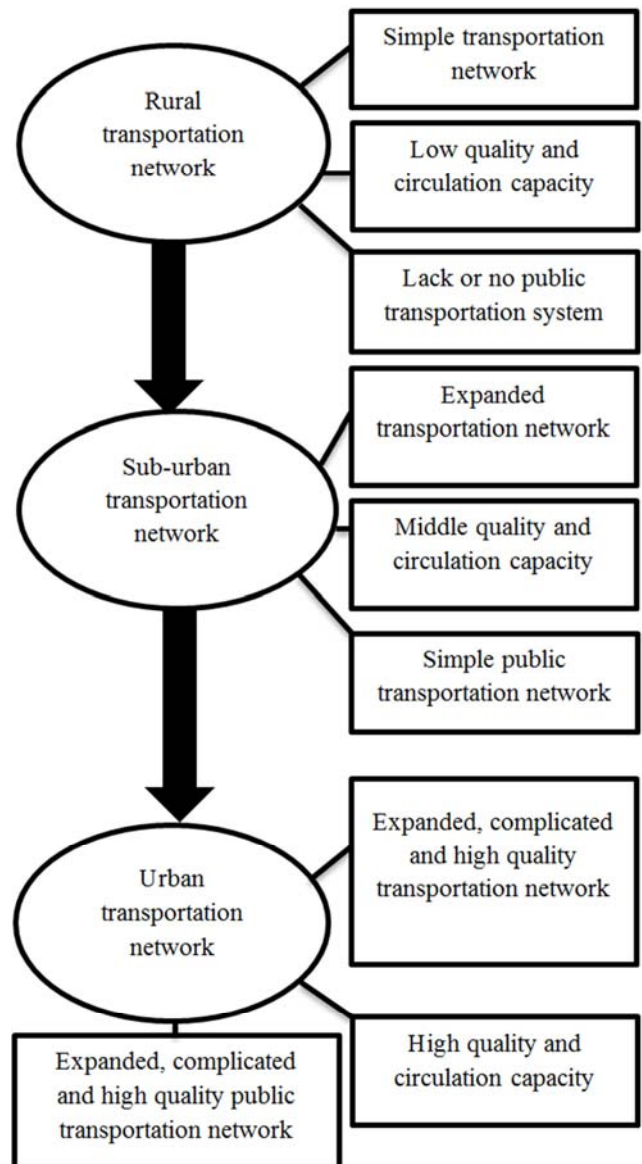


Figure 7. Transportation transition states corresponding to urbanization levels.

7. Conclusion

There are three states of transportation network revolution corresponding to urbanization levels, which are rural, sub-urban and urban transportation network. Since the rise of urbanization rate, urban sprawl and especially decentralization framework from the government of HCMC, PKC area is having transformed from swamp rural area into sub-urban area

and soon become urban area with corresponding transportation network form.

This paper is just framework research to point out the relationship between urban sprawl, urbanization levels and the transition of transportation network forms in one of most affected areas by urban sprawl and urbanization in Ho Chi Minh city, ie. Phuoc Kien Commune. In order to fully understand about urban sprawl and urbanization effects on the transportation network changes, there needs to be more resources to proceed more detailed researches in the future.

Appendix

Circulation capacity

According to “East Asia’s Changing Urban Landscape: Measuring a Decade of Spatial Growth” report of World Bank group, Vietnam is rapidly urbanizing in population and spatial. In 2000 – 2010 decade, urban area expansion rate is about 2.8%, higher than East Asia average (which is about 2.4%) and urban population growth annually about 4% (4th in Rate of urban population growth by country). Especially, Ho Chi Minh city is the fastest-growing city in Viet Nam, where the urbanization is strongest among Vietnamese cities (every year, Ho Chi Minh urban area expands 4% and Ha Noi urban area expands 3.8%). Because of Ho Chi Minh expansion rate, there are multiple bad effects and pressure on Ho Chi Minh masterplan and urban planners. Mentioned in Decision no. 24/QĐ-TTg of Viet Nam Prime Minister on January 6th, 2010, Ho Chi Minh city will mainly expand to East and South direction, which PKC included in. Due to the rapidly urbanization of district 7, PKC and Nha Be ward are being strongly affected, which also lead to the over-growth urbanization of Phuoc Kien area. Over-growth urbanization has caused many bad effects for Phuoc Kien area, such as: pollution, traffic jam, illegal housing, flooding, etc.

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