

Proposed Functional Concept for Sittwe City, Rakhine State, Myanmar

Mi Mi Aung

Ph.D Candidate , Department of Architecture
Yangon Technological University, Yangon, Myanmar
Email – mimiaung125@gmail.com

Abstract: Sittwe city, estuarial island, capital of Rakhine State, Western part of Myanmar, is located on the confluence of Kaladan River and Bay of Bengal. It is also the main trading center of the Rakhine state as this city is a port city. And there are many historical places to conserve and several places of attraction. Nowadays, port of Sittwe city has been promoted as Kaladan Multi-modal Transport Project which would have access from India Northeastern state via Kaladan River, has been executed since 2012 and it will be opened soon. According to these development plans, the areas adjacent to these projects' area and to Kaladan River will be expected to be developed firstly than the other area of the city. Therefore, Sittwe waterfront areas are needed to promote to suit with future development. The main focus of this paper is to analyze the existing problems of Sittwe city and its waterfront areas along Kaladan River and to give functional concepts for this waterfront area. In this paper, the physical background and the social situation of Sittwe City will be studied at first and secondly the existing conditions of Sittwe city's waterfront area will be analyzed by applying SWOT Analysis Method. And finally, redevelopment concepts for Sittwe Waterfront will be proposed.

Key Words: Sittwe, waterfront, Kaladan Multi Modal Transit Project, SWOT analysis

1. INTRODUCTION

Waterfront areas have always played an important role for urban environments. It has been recognized as one of humanity's most important natural resources and it is necessary to ensure human health and civilization. As Sittwe city is an island and almost all the sides are surrounded by water, there are many waterfront areas in it. Waterfront is a natural attraction of and economic focal point of Sittwe. Today, Kaladan Multi-modal transport project are being executed and many parts of project have been completed. After finishing this Kaladan Project, the areas along the Kaladan River will be faced with many problems to meet the challenge of foreign and local investments. More commercial areas, public areas and recreational areas will be needed to meet the future development. Therefore, it is needed to promote the waterfront areas of Sittwe as public active waterfront and attractive place for tourists. The author hopes this paper will bring about many advantages for social, economic, sectors of the city and the image and reputation of the city will be raised for its pleasant urban environment.

2. PHYSICAL BACKGROUND OF SITTWE CITY

Location, size and topography, climate and wind direction of Sittwe City are studied as the background.

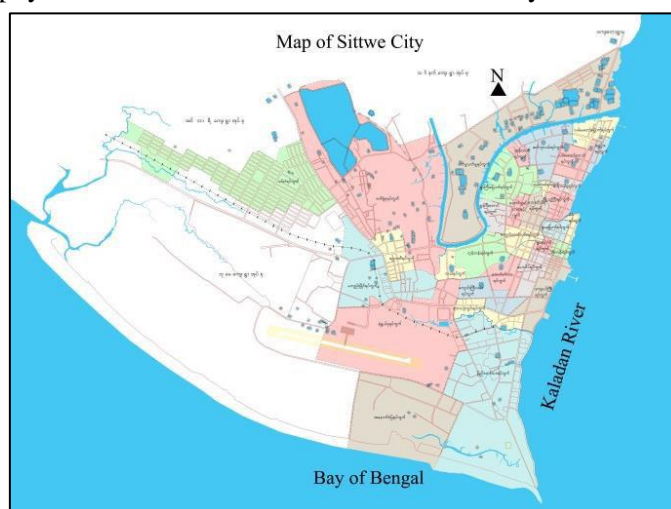


Fig.1 Map of Sittwe City [7]

A. Location

Locate in the Sittwe District, Rakhine State, western part of Myanmar. Located between 20° 17" and 20° 19" north latitude and 92° 45" and 92° 55" east longitude. Sittwe City is bounded on the northern side by Ponnakyun

Township, on the eastern side by Kaladan River, on the southern side by the Bay of Bengal and on the western side by Kwe Del River.

B. Size and Topography

The area of Sittwe city is 6.25 sq-miles, approximately 4000 acres. And it is composed of 33 wards. Sittwe City is located 15 feet above sea level and there is absence of mountainous areas. Sittwe City is a flat plain coastal area.

C. Climate

The weather of Sittwe city is Humid Tropical Climate. The yearly annual rainfall is range between 180 inches to 200 inches. Not only the level of rainfall is high, the heat is also extreme in summer. The weather of Sittwe city is Humid Tropical Climate. The yearly annual rainfall is range between 180 inches to 200 inches. Not only the level of rainfall is high, the heat is also extreme in summer.

D. Wind Direction and Velocity

The wind direction and velocity is different according to the season. The normal wind velocity ranges between 35 mph and 50 mph in rainy season. And in winter, the wind velocity ranges between 15 mph and 20 mph only. In rainy season, the highest frequency is south, south western and south eastern direction. In summer, the highest frequency is south, south western and north western direction. And in winter, the highest frequency is north and north eastern direction.

3. SOCIAL SITUATION OF SITTWE CITY:

In social situation, population of Sittwe city and its population density are studied as well as race and religion, recreational facilities and economy of the city. And infrastructure of the city is also studied.

A. Population

The urban population of sittwe city is 139030 with 1.7% growth rate. The population density of Sittwe City ranges from minimum 6.09 persons per acre to maximum 223.72 persons per acre. As a whole city, the average population density is 34.78 persons per acre.

B. Race and Religion

In Sittwe City, Rakhine, Kaman, Hindu, Burmese, Chinese and Bangali are lived. When studying the religion of Sittwe, Buddhism, Christian, Hindu and Islam can be found.

C. Recreational Facilities

There are only three parks can be found. They are U Ottama Park, KhineThazin Park and Mi Zan Park. But all of public recreational areas in these parks are applied for commercial uses.

D. Economy

Sittwe is the economic hub of Rakhine State, Myanmar. The staple product of Sittwe is rice. Fish, prawn, dried fish, fish paste, dried shrimp and salt are the other major products of Sittwe City.

E. Educational Facilities

In Sittwe, 93 numbers of primary school, 13 numbers of middle school and seven numbers of high school can be found. There are also Governmental Technological University, Governmental Computer University, Sittwe University, Nursing School and Technological Institute.

F. Health Facilities

There is one 200- bedded general hospital which is shown in Figures 4.10 and 4.11, one 16-bedded hospital, and three private hospitals, one traditional hospital and 38 numbers of private clinics.

G. Water Supply System

Kandawgyi, Kandaw Nge, Kandaw Kalay reservoir, Golden Triangle reservoir and Kan Paing reservoir are the main source of water supply for Sittwe City. Among 32 wards, water is distributed to 26 wards by gravity flow system. Use 20" pipe from the main source and use 16" and 10" pipe to distribute water to the consumers. Distribute 2.6 million gallons per day. Approximately 20% of city's population lack of water supply.

H. Drainage System

There are 14 number of drainage channels in Sittwe. Rainwater and waste water are disposed into the Set Yoe Kya crack by using these 14 numbers of drainage channels.

4. EXISTING LAND UTILISATION OF SITTWE CITY

Land utilization, road network and significant locations of Sittwe City are described in this part.

A. Land Utilisation

Nearly half of the city's areas are devoted for residential purpose. Institutional areas occupied about one fourth of the whole areas as Sittwe is administrative township. The recreational area and commercial area are too small to account. Land use percentage of Sittwe city is shown in Fig. 2.

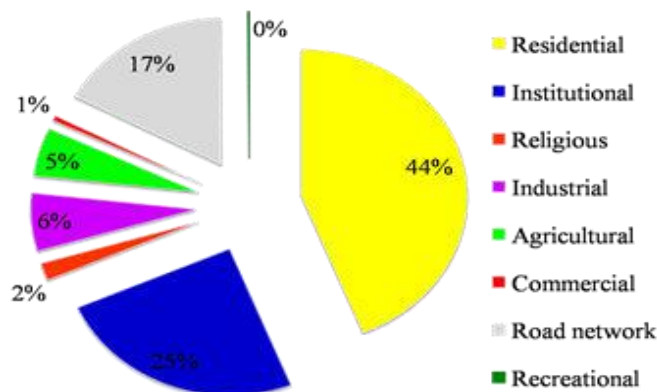


Fig.2 Land Utilisation Ratio of Sittwe City

B. Transportation System

Sittwe had road transportation system, waterway transportation system and airway transportation system. Railway transportation system is still constructing. For road transportation system, there are many numbers of express lines and all are private. There is no inner urban transportation system in Sittwe. Almost all the people use motor cycles, bicycle for transportation within the city. And the other uses for transportation within city are trishaw and tri motorcycle.

For waterway transportation system, Sittwe has two boat jetties along the Set Yoe Kya crack and these two used for local transportation. And another two jetties, named as Shwe Min Gan and Sittwe are used for abroad. For airway transportation system, there are so many airlines in Sittwe and have flight daily to Yangon.



Fig.3 Road network structure of Sittwe city

C. Significant Places of Sittwe City

Shukhinthar road and view point are the most popular part of the city. From view point, the merging of Kaladan River and the Bay of Bengal as well as the western approaches the Rakhine Yoma can be seen. The next one is hundred year old Shwe Zedi Monastery, founded in 1903. And another one is Lay Shin Island located just around 3.2 miles far from Sittwe city and can be accessible by waterway transportation. The first light house of Myanmar, built during colonial period (1844) is located at these island and most of the foreigners are like to visit there.



A. Shukhinthar Road



B. Shwe Zedi monastery



C. The first lighthouse

Fig.4 Significant Places of Sittwe City

5. SWOT ANALYSIS ON EXISTING CONDITION OF SITTWE CITY

A SWOT analysis can be used to provide clear and simple information about the city and its infrastructure. This can be done through four key points:

- S = What are the strengths and advantages of the city?
- W = What are the weakness and disadvantages in the city?
- O = What are the opportunities that the city (can) exploit?
- T = What are the threats and barriers that can negative affect development in the city? [6]

A. Strengths

As Sittwe city is located on the mouth of Kaladan River and bounded by Bay of Bangal, it is the important seat of maritime commerce, especially as port for export activity. And Sittwe is also known as transit town for domestic and foreign visitors to go to Mrauk-U which is famous heritage site of Rakhine State. Sittwe is the main transit town to go to other towns of Rakhine State. There are options of transportation system such as Roadway, Waterway and Air- Services to go from Sittwe to Yangon as well as others cities of Myanmar region.

B. Weaknesses

There are many weaknesses in Sittwe City. First of all, road condition is presented. Almost all the major roads of the city are not corresponded with the acceptable standard. And all major roads have rough surfaces. There also have not island node and street lighting. The width of all major roads ranges from minimum 45 feet to maximum 60 feet. According to standard, the major road should have at least 100 feet width [5].

And there also lost green buffer zone and sidewalk as shown in Fig.5 and Fig.6. It is some weaknesses of the city. Because roads and streets are the heart of the city and 25 to 35 per cent of a city's developed land is likely to be dedicated to road infrastructure [3].

When studying the residential units, two storied building design will be commonly found in Sittwe. And almost all the housings are brick-nogging. Residential units in downtown areas are applied as retails which occupied public walkways by applying their selling materials. And there is no parking area in downtown. There also have not building set back.



Fig.5 The Strand Road



Fig.6 Main Road

The residential housings in Old Dan ward and Mi Zan ward can be found as shop house as this ward is closely located near the Sittwe wet market and Sittwe Wholesale market. In these wards, it is found that the land use for public areas have been lost. Almost all the residences occupied the public walkway by applying their selling materials.

Besides, when view this Old dan and Mi Zan ward from Kaladan River, the unpleasant scene of environmental condition and unplanned housings will be found as shown in Fig.7.



Fig.7 View of Old Dan ward from Kaladan River

Sittwe wet market and wholesale market areas are also unplanned and wastes from the market are disposed directly into the Kaladan River as shown in Fig.8.



Fig.8 View of market environment

And traffic congestion is happened almost the whole day, shown in Fig.9. The main reasons to cause traffic congestion is due to loss of parking areas, loss of public walkway and the retail shops spill over to the road.



Fig.9 Traffic at wet market area

Another one is Pyi Daw Thar ward. In this ward, institutional areas and the governmental rental housing named as PyiDawThar Housing can be found. Some residential roads of this housing estate are not wide enough to enter fire-engine even private vehicles. And almost are the housing are now unplanned and need to upgrade. Current land utilization of this ward is not appropriate to meet the challenge of urban facilities.

C. Opportunities

Nowadays, Sittwe city is programmed as Sea Port Special Economic Zone according to the potential development of Rakhine Region and Sittwe port has been promoted as Kaladan Multi-modal Transport Project which would have access from India Northeastern state via Kaladan River which makes the region a good investment point in the future. This project has been executed from year 2012 and now 85% of this project is completed and it will be opened soon.



Fig.10 View of Kaladan Multimodal Transport Project at Sittwe

When this Kaladan Project open, ocean liners from foreign countries will land at Sittwe Port and the waterway transportation system of Sittwe city will be more widely used than now and many investments will be come out in Sittwe city and the economy of the city will become more improve. Consequently, the city will need more urban facilities to meet the challenges of this project.

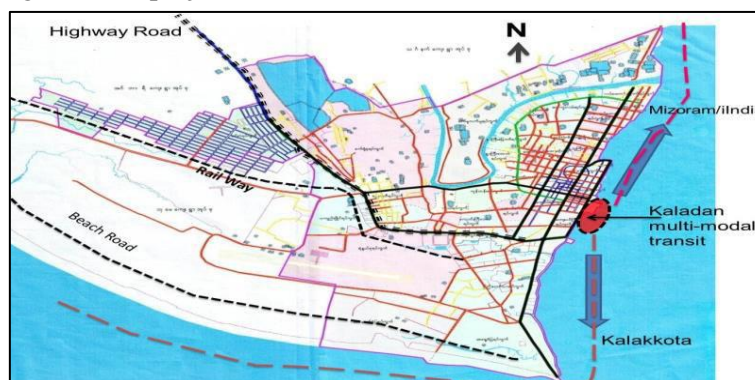


Fig.11 Linking Route between Sittwe and India

As presented in Fig.11, ocean liners will use route (1) to transport to Kolkata port, India. And route (2) will be used to transport to land-locked Mizoram State in India.

D. Threats

Threat of the city is the social conflict between Rakhine people and Bangali who entered illegally from Bangladesh. Consequence of social conflict is arson. There are many acres of land have been fired during social conflict in year 2012.

6. FINDING FROM SWOT ANALYSIS ON EXSTING CONDITION OF SITTWE CITY

After studying the physical Background of Sittwe city and analyzing the current situation of Sittwe City, Sittwe City has many opportunities and challenges for future. It is found that the eastern part of the city also known as waterfront areas along the Kaladan River must surely integrate with Kaladan Project.

But there are many weaknesses in the eastern part, waterfront area related to housing design, land utilization and infrastructure which are presented as above. Therefore, the eastern part of the city, waterfront area as shown in Fig.12 is selected to be redeveloped to meet the required urban facilities for future.

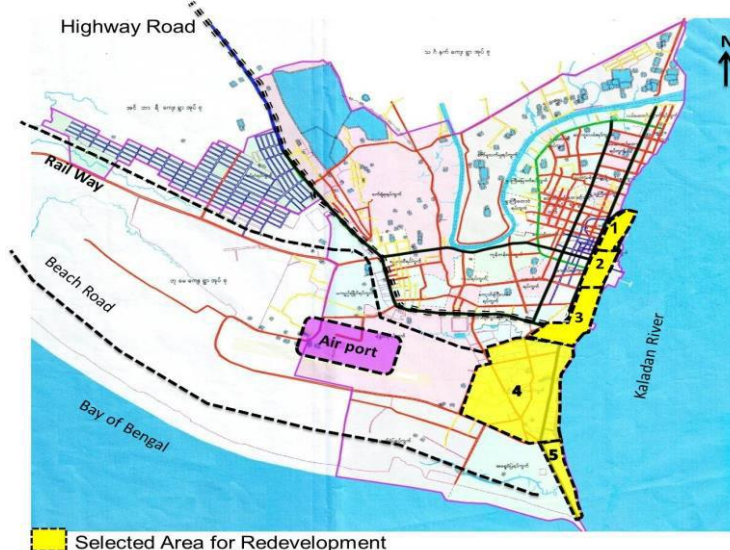


Fig.12 Area for Redevelopment

7. STUDY ON SELECTED WATERFRONT AREA :

Size and Population, land utilisation, road network system, residential and environmental conditions of selected area are described in this section.

A. Size and Population of Selected Waterfront Area

Four numbers of wards and unused governmental area are selected to redevelop. These are Pyi Daw Thar ward, Kyay Pin Gyi ward, Old Dan ward and Mi Zan ward. The total area which is selected to redevelop is 496 acres. The population density of selected wards ranges from 13 persons per acre to 156 persons per acre, shown in Fig.13.

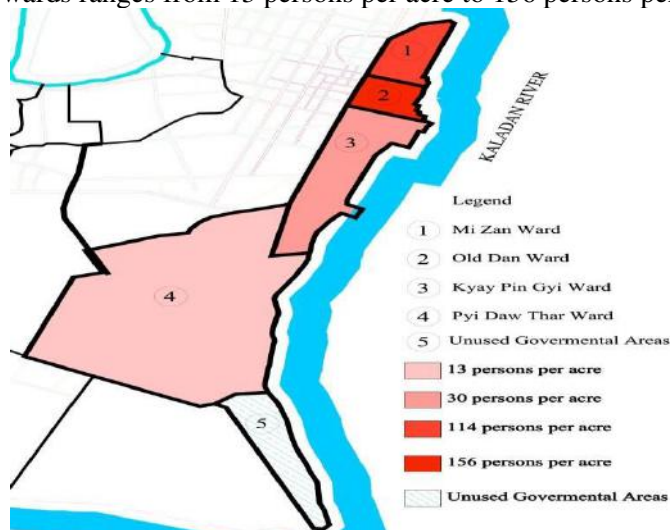


Fig.13 Boundary and Population Density of Selected Area

B. Existing Land Utilization of Selected Area

In the selected areas, over 50% of the land is devoted for residential use. Commercial and recreational areas are too small in the selected area. And nearly 15% of the selected area is applied for infrastructure and road network. The existing land use of selected area is show in Fig. 14.

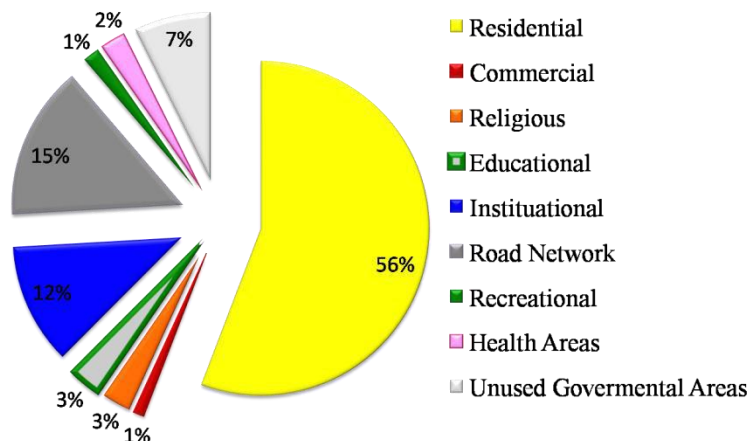


Fig.14 Land Utilization Ratio of Selected Area

C. Road Network of Selected Area

The road width in selected area is comparatively narrow. The main road is only 60ft wide and the secondary road is only 40ft wide. There are also loss of street lighting, island node and buffer zone and pavements in selected area.

Some streets are not wide enough and it is dangerous for fire hazard because of lack of fire engine access and narrow streets cannot control spread of fire. And traffic congestion occurs the whole day near wet market area due to the loss of public walkway, loss of parking area and selling materials spilt over to the road. It is found that the road condition of selected area is in danger for fire hazard as well as causes traffic congestion.

D. Residential Units of Selected Waterfront Area

Residential units in selected area are very crowded. There are minimum 1.7 dwelling units per acres to maximum 18.8 dwelling units per acre shown in Fig.15. This crowded area can cause health problems due to lack of adequate ventilation and natural lighting.



Fig.15 Dwelling Unit Density of Selected Area

When studying the spacing between buildings, it is found that spacing between buildings is so closed as shown in Fig.16. If spacing between buildings is so closed, it will be dangerous for fire hazard and also causes health problem because of inadequate lighting and ventilation.



Fig.16 Narrow Spacing between Buildings' Facade to Facade

E. Environmental Conditions of Selected Waterfront Area

The environmental condition of selected area is influenced by waste pollution even though these areas have good sight to Kaladan river view, shown in Fig.17. The wastes are disposed into the back lane which can cause health problem. Besides, when viewing the Old Dan ward from the Kaladan River, it is found that, the environment of Old Dan ward is very polluted with garbage. The wet market which is located in Old Dan ward is also polluted and unplanned. Wastes from the market are directly disposed into Kaladan River. Not only in these wards, Mi Zan ward also polluted with waste disposal.



Fig.17 Good View and Bad View of Selected Area

Finally, it is found that, environmental problems exist in the selected area. The environment of selected area is polluted with disposed wastes which can cause health problem and also reduce the urban esthetics.

8. SWOT ANALYSIS ON SELECTED WATERFRONT AREA:

SWOT analysis is an analytical technique that provides a balanced assessment of the site. This assessment informs or supports the steps towards the development guide plan. A SWOT analysis of the each dimension of the research area is able to provide realistic assessment of existing challenges, potentials, and competitive advantages of the site. SWOT analysis on selected waterfront area is shown in Fig.18.

Strengths <ul style="list-style-type: none"> ❖ Development of International Port ❖ Direct link with India ❖ On the bank of Kaladan River ❖ View towards the city ❖ View towards the river 	Weaknesses <ul style="list-style-type: none"> ❖ Lack of appropriate infrastructure ❖ Vacant area ❖ Lack of social amenities ❖ Decline image along the river ❖ Vendors are so crowded and make the place with unpleasant society
Opportunities <ul style="list-style-type: none"> ❖ Development of tourism ❖ Opportunity to persuade investors ❖ Opportunity to create more jobs ❖ It can be a hub of leisure & recreational activities ❖ It can be a catalyst for economic growth 	Threats <ul style="list-style-type: none"> ❖ Traffic congestion impact near Kaladan Multimodal Transport Project ❖ Visual Pollution ❖ Impacts on local culture ❖ Loss of river view from the city

Fig.18 SWOT Analysis of Selected Area

9. PROPOSED REDEVELOPMENT PLAN:

The proposed redevelopment plan is designed to meet residential development principle, public services development principle and green areas development principle.

A. Functional Concepts

Development of public service, commercial, recreational, institutional and residential are considered for this redevelopment plan based on field survey and analysis of this area. The following Fig.19 shows the functional development plan of selected areas.

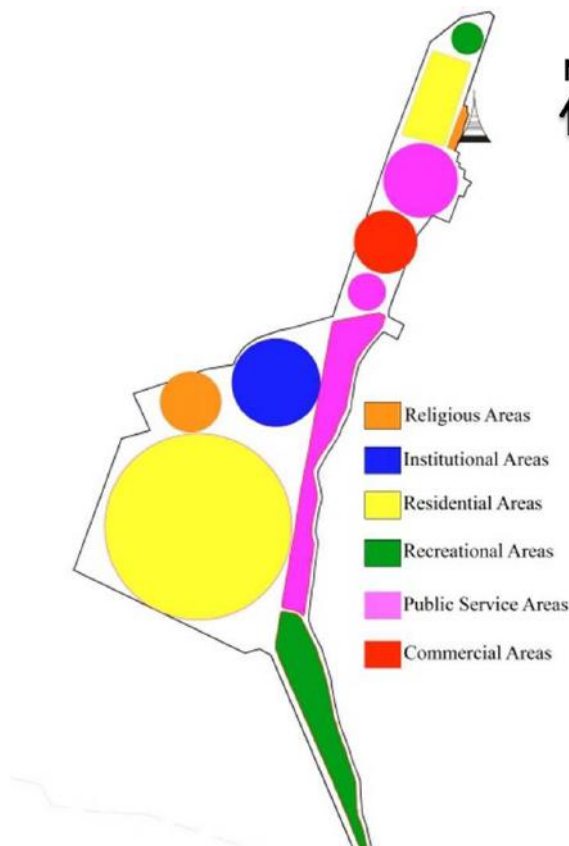


Fig.19 Proposed Functional Plan

B. Structural Concept

A good relationship between houses and road must insist. The road network system should overcome the traffic congestion problems and reduce fire hazard. And a plan must attract the local people with the quality strategies.

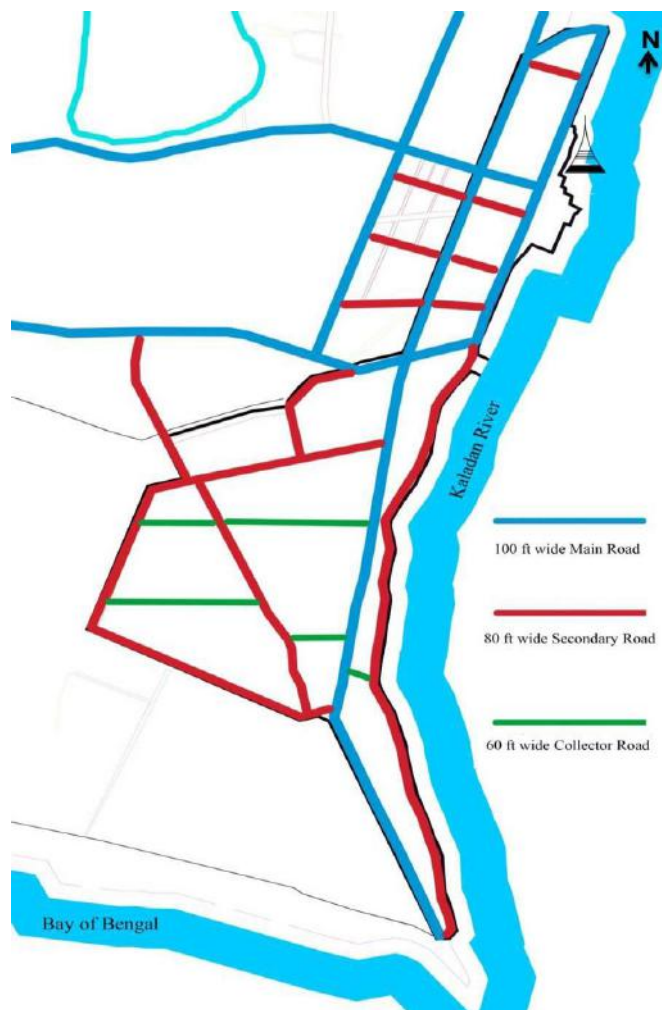


Fig.20 Proposed Structure

Structural system is to be redeveloped in compatible with the existing road network system. The main road of the redevelopment area is expanded up to 100 feet with 10 feet wide platform. Street lighting, island node and green buffer area are also composed in the main road of this area. The secondary road is designed as 80ft wide road with 6 feet wide platform. The main road and secondary road serve to connect from one zone to another in the redevelopment area. The detailed road network design is described in Fig.20.

C. Proposed Redevelopment Plan

After considering the functions and structural concept for the selected area based on surveying and analyzing, the recommended redevelopment plan for selected waterfront area is proposed as shown in Fig.21.

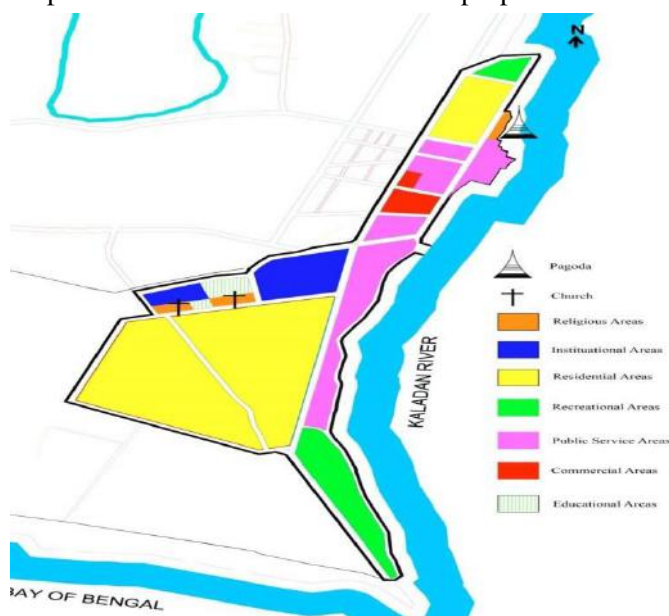


Fig.21 Proposed Redevelopment Plan for Selected Waterfront Area

10. CONCLUSIONS:

The selected area has strong potentials to develop due to the Kaladan project. Kaladan project will become the backbone of the selected area. To develop the selected area systematically, there are more and more public services needed. Therefore, many public service areas such as multi-function hall, offices, hotels, and recreational area have been proposed in the redevelopment design. And many people will migrate from other regions for many job opportunities of Kaladan Project after completing this project. So many housing units will be required. Therefore, the proposed redevelopment planning is designed to meet housing demand for next twenty years. In Sittwe city, as all the buildings mainly depend on natural lighting and ventilation, the building height to street width ratio and building spacing ratio are very important when doing layout the buildings. All the buildings which are composed in proposed design are layout by building regulation to get adequate lighting and ventilation. In the proposed design, road networks are constructed to get easy access from one place to another. Walkway is also provided and it is also wide enough to walk comfortably by recommended standard. The proposed redevelopment planning is designed to meet residential development principle, public services development principle and green areas development. The proposed redevelopment design will be effective for the living people in there and improving the living standard. The proposed redevelopment design will improve urban value of Sittwe city and urban esthetics of city. Finally, it is hoped that, this paper contributes towards the new conceptual design for Sittwe City development and its populace and will give some effective outcome.

REFERENCES:

1. KyawLatt. Dr, "Urban Planning, Urban Design and Regional Planning",
2. PratapRao. M, (2001) "Urban Planning Theory & Practice", New Delhi.
3. Urban Planning for American Institutes of Architect.
4. Donald Watson, Alan Plattus, Robert Shibley, "Time Saver Standards for Urban Design".
5. Hlaing Maw Oo, Daw. Aye Aye Myint, Daw. Tin Tin Kyi, Daw,(2006): "Introduction to Planning Regulations", Yangon.
6. Workbook, International Course, Eco-efficient and socially inclusive urban infrastructure, "increase your city's competitiveness and quality of life through environmental improvement", Republic of Korea.
7. Department of Land Administration, Sittwe City, Rakhine State, Myanmar.