

2.3 Present Condition of Land Use

2.3.1 Administrative Frame of Land Use Management

The administrative frame of land use management generally aims to: (1) realize the future vision of the city that is stated in the urban master plan, etc. and (2) protect/improve urban conditions at community-/neighborhood-level.

In this section, first the general frame is shown, and next the present administrative activities reviewed and the issues/difficulties found are explained.

2.3.1.1 General Administrative Frame for Managing Urban Land Use

(1) Approaches to Realize Future Urban Vision/Master Plan

Zoning System is the typical measure to manage urban land use, and furthermore it will be coordinated/ integrated to other approaches of the urban development for effectively realizing the urban future vision. The approaches to be coordinated with are urban infrastructure development and implementation of urban development/ renewal of projects through partnership/ collaboration with public sector and private sector, as shown in Table 2.3-1.

Table 2.3-1 Zoning System and Other Approaches for Realizing Future Vision

Approaches	Aims / Functions	Legal Basis
(A) Zoning System	To control/promote individual activities of land development / building construction through legalized regulations (Zoning Plan)	Urban Planning Act, and Zoning Act
(B) Development/Improvement of Urban Infrastructure and Public Facilities	To guide/stimulate individual urban activities through improving road network, water supply system, sewerage system, schools and hospitals, and so on.	Act/Mandates of Ministry of Public Works etc.
(C) Implementation of Urban Development/Renewal Projects	To realize directly/locally future visions planned in Master Plan, such as a complex of industrial parks and affordable housings, urban renewal for commerce/business and green and town housing, etc. Public sector (such as MPEA, MPW, MCC, National Housing Authority and so on) will make efforts to activate/attract/ involve private sector (community, stakeholders, investors etc) and international donors also.	Acts for urban renewal, land adjustment, informal settlement improvement, etc.

(2) Component of Administrative Frame of Land Use Management

Zoning System will be an effective measure to guide and realize future visions of Greater Monrovia through: (a) preparing Regional Master Plan and Local Plans; and (2) organizing Every-day Work System to review/inspect activities of land development/building construction and examine the applications, as explained in Table 2.3-2.

Table 2.3-2 Components of Administrative Frame of Land Use Management

General Components	Components and the Role	Necessary Legal System
(1) Urban Master Plan	<p>Long-term Urban Development Policy and Urban Master Plan</p> <ul style="list-style-type: none"> - Urban Development Policy will define future Urban Area (to be urbanized in next 10 years) and Non-Urban Area to be reserved/ protected for environment, historical/cultural heritages, green and agriculture, and future urban development resources. - Urban Master Plan, covering the whole urban area, states Future Vision, and defines land use plan, infrastructure and public utility development plan and the development program etc. <p>Local Plan or Action Area Plan will identify the priority in each neighborhood /community and planning items for improving the living conditions and economic activities. It will be prepared for local people to understand easily.</p>	<p>Urban Planning Act</p> <p>Planning authority for Regional/ Metropolitan Master Plan</p> <p>Planning authority for Local Plan</p>
(2)	<p>In Urban Area, Regulation Plan will:</p> <ul style="list-style-type: none"> - Define regulation-code to control individual's actions of 	<p>Zoning Act (and Building Code), Land</p>

General Components	Components and the Role	Necessary Legal System
Regulation Plan (Zoning Plan)	building/land development in small sub-areas. - Be reviewed every 5 years.	Development Regulation etc.
(3) Every-day Work System	Every-day Work System for implementing Land Use Management. Expected activities are: - Review/Inspection on applications of land development and building constructions - Permission of land development/building construction after review - Inspection of the land development/building construction after permission - Data compilation - Monitoring of land developments/building constructions	Zoning Act, Building Code, Land Development Regulation (Establishment of necessary offices) Legal/administrative power to inspect

2.3.1.2 Present Situations on Land Management in Greater Monrovia

(1) Administrations Related to Land Use Management in Liberia

Administrations related to and responsible for land management are summarized in Table 2.3-3.

Table 2.3-3 Administrations Related to Land Use Management in Liberia

Component	Administration related to the Component	Law
(1) Urban Master Plan	Bureau of Regional Planning (BRP), Ministry of Planning and Economic Affairs (MPEA) - BRP is responsible for preparing comprehensive regional development plan (TOR of BRP) - BRP also has authority to prepare city-wide master plan	No Regional / City Planning Law
(2) Regulation Plan (Zoning Plan)	MPEA is responsible for system of Zoning Plan and planning with MPW and MCC. MPW is the implementation authority.	Zoning Act for the City of Monrovia (1957-1958)
(3) Every-day Work System	MPW (Division of Zoning, Land-use and Planning) is responsible for the implementation and Every-day Work. The role of MCC is not clear. MLME is responsible for managing land transfer process, and cadastral mapping.	

(2) Present Administrative Frame and Activities on Land Use Management

The reviewed present situations are explained in Table 2.3-4. As mentioned in the table, in Greater Monrovia, there was a long-absence of legal/administrative control and management as a formal procedure. The long-term absence of formal management makes very weak the institutional capacity of related authorities and results in lack of experiences and data.

Table 2.3-4 Present Administrative Frame and Activities on Land Use Management in Greater Monrovia

Component	Present Situations	Current Movements
(A) Urban Master Plan	Plan: - No Regional Development Plan for Greater Monrovia - No Urban Master Plan for the City of Monrovia In addition, - MCC prepared "Monrovia City Profile" (Nov. 2005) to identify the overall situations and proposed priority actions/projects in the mission mandate of the City. - Ministry of Internal Affairs (MIA) and Montserrado County Office prepared "Montserrado County Agenda (CDA) 2008-2012 to review the overall situations of the County and proposed the region-wide priority projects. Law: - No City Planning Act/ Law Administrative status of central Government:	On Planning MPEA (BRP): - is studying regional spatial plan of Greater Monrovia; and - needs technical support and comprehensive capacity development program for city/regional plan and institutional system and urban development and management. On Law MPEA (BRP): - is studying the necessary legal measures including City Planning Law, Urban Renewal Law, Land Adjustment Law, etc. and; - needs technical support to

Component	Present Situations	Current Movements
	<ul style="list-style-type: none"> - MPEA has the Bureau of Regional Planning (BPR); it has not prepared the authorized Master Plan of Greater Monrovia. - BPR is preparing drafts on the regional development planning and necessary legal/institutional frame (planning laws). Due to the weak institutional capacity and lack of data, the office faces serious difficulties to develop the planning. <p>Local administrative status:</p> <ul style="list-style-type: none"> - There is no administrative organization for planning for Greater Monrovia District. This District is not Statutory District that has administrative organization and the representative. - Monrovia City was established as the Nation's Capital and directly under the President (not under the Minister of Internal Affairs). - The administrative jurisdiction of Monrovia City covers from Central Monrovia to Old Road, and two zones, Clara Town and Logan Town at Bushrod Island. - As MCC, two Townships of West Point and New Cru Town are included. - Other areas (zones) in Greater Monrovia Area are individual administrations. Paynesville is a City (the largest City in Liberia). Other zones are Township. <p>City planning authority:</p> <ul style="list-style-type: none"> - MCC has the City Planning Division, but it has no clear authority to prepare the city plan. - Central government (MPEA) has the planning authority. 	<p>prepare the drafts of laws.</p> <p>On Local Administrative System:</p> <ul style="list-style-type: none"> - Central government has prepared New Act on "Boundary Harmonization and Demarcation" under the deliberations of Congress. <p>New law aims to repeal all the acts on local administrative status and to establish new Local Government Administrative Structure.</p> <p>New Local Government Administrative Structure is:</p> <ul style="list-style-type: none"> - Five level of authority: (from the smallest) Town, Clan, Chiedom, Township and City/Municipality - Above organizations are local governments (with representative elected) and intend the status of local autonomy. - Tax system and other financial system will be changed to meet the decentralization policy. <p>New Demarcation of Greater Monrovia: In draft Master Plan under Central Government, Greater Monrovia Area will be a City (the City of Monrovia, as the capital of Liberia)</p> <p>City Planning system in new local administration is not yet publicized.</p>
<p>(B) Regulation Plan (Zoning Plan)</p>	<p>"The Zoning Act for City of Monrovia</p> <ul style="list-style-type: none"> - It was established between 1957-1958. - But it hasn't been executed in 2 decades because the Regulation Plan (Zoning Plan) had been lost and new plan is not yet prepared. <p>Outside Monrovia City also doesn't have any Regulation Plan.</p>	<p>On the New Act:</p> <ul style="list-style-type: none"> - MPEA decided to repeal the Zoning Act of (1957-1958) and prepare the new act. - But there was no progress.
<p>(C) Every-day Work System</p>	<p>The currently executed land use management is on the process of land transfer deed: Activities of the Ministry of Land, Mine and Energy (MLME) are:</p> <ul style="list-style-type: none"> - Review of applications on land transfer deed and issue the permission - Site inspection and cadastral survey of the applications; and - Management of cadastral data/cadastral map. <p>However, the cadastral map of Greater Monrovia area is not updated, and the status of state-owned land also not updated.</p> <p>Activities of MPW (Division of Zoning, Land-use and Planning (since last Autumn):</p> <ul style="list-style-type: none"> - MPW is conducting the technical check of the applications. - The check is mainly on housing estates using standard on sub-division of estate. - According to the standard applied for sub-division of estate, spatial dimension of a parcel of sub-division is an area of a 82.3 ft of width and a 132 ft of length (nearly 1,011 m²). 	

(3) Issues and Problems on Administrative Frame

Table 2.3-5 Issues and Problems on Administrative Frame

Component	Issues and Problems	Alternatives to Solve the Problems
(A) Urban Master Plan	<p>No Urban Master Plan for the region and city to guide activities rationally</p> <p>No regulation to control activities of land development/building constructions, in particular at urban expanding lines at Caldwell and Johnsonville, and at swamp areas around Laguna</p> <p>No local authority responsible for Greater Monrovia as the key for land use management</p> <p>Weak institutional capacity of planning sector in MPEA MPW and MCC due to the long-absence of planning execution</p>	<p>To formulate a new City Planning Act</p> <p>The new Act will promote the City Government to cope with the whole Greater Monrovia.</p> <p>Comprehensive capacity development is urgently required to solve current issues step-by-step. Expected areas of the capacity building are:</p> <ul style="list-style-type: none"> - Institutional/legal system, such as preparing draft laws of city planning, land adjustment, urban renewal, and reorganizing National Housing Authority to include urban development, complex of housing and industrial park, etc.; - Training planning staffs; and - On the job training for urban master plan making, zonal planning, local action planning, etc.
(B) Regulation Plan (Zoning Plan)	<p>No Zoning Plan, and Zoning Act is not updated</p>	<p>Formulating new Zoning Act that could cope with not only transition issues found at built-up area of current Monrovia City, but also urban sprawl found outside Monrovia City.</p> <p>Preparing new Zoning Plan</p> <p>Comprehensive capacity development for, MPW and MCC (and future Monrovia City) Expected areas are:</p> <ul style="list-style-type: none"> - Urban monitoring and database development through the mandate of administrative offices - Urban planning survey and GIS data development - Zoning Plan (including on the job training)
(C) Every-day Work System	<p>Weak capacity and lack of necessary administrative organizations</p>	<p>Comprehensive capacity development and institutional reform Expected areas are:</p> <ul style="list-style-type: none"> - Urban monitoring, urban survey and database development, as mentioned above. - Establishment of new offices - Training on Every-day Work

(4) Tasks for Updating Zoning Act

(a) Zoning Act (1957-1958)

The Zoning Act for the City of Monrovia was enacted to control land use through restriction and inducement of building activities by designating districts.

The City of Monrovia was divided into Zoning Districts of eight (8) district categories. However, the designated district map was lost during the period of Civil War.

Table 2.3-6 Zoning Act for the City of Monrovia

Classification		Characteristics	Permissible buildings and structures
Residence	R1 Districts	Low density housing area	<p>A. Buildings</p> <ul style="list-style-type: none"> a. Single-family dwellings b. A church, public school, public library, public park, or playground c. Form of agriculture or horticulture <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Housing lot: not less than 10,890 sq. feet (1,011.7sq.m.) b. Building coverage of lot: not more than 39%
	R2 Districts	Low density housing area	<p>A. Buildings</p> <p>Same as R1</p> <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Housing lot: not less than 5,445 sq. feet (506.03sq.m.) b. Building coverage of lot: not more than 41%
	R3 Districts	Medium density housing area	<p>A. Buildings</p> <ul style="list-style-type: none"> a. Same as R1 or R2 b. Two-family dwellings <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Housing lot for single family dwellings: not less than 2,722.5 sq. feet (252.9 sq.m.) b. Housing lot for two-family dwellings: not less than 3,400 sq. feet (315.9 sq.m.) c. Building coverage of lot: not more than 30%
	R4 Districts	High density housing area	<p>A. Buildings</p> <ul style="list-style-type: none"> a. Same as R1 or R2 b. Two-family dwellings c. Apartment dwellings <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Housing lot for single family dwellings: not less than 2,722.5 sq. feet (252.9 sq.m.) b. Housing lot for two-family dwellings: not less than 3,400 sq. feet (315.9 sq.m.) c. Housing lot for apartment dwellings: not less than 1,815 sq. feet (168.6 sq.m.) per dwelling unit d. Building coverage of lot: not more than 60%
Business	B1 Districts	High density commerce, general business, and the retail sale of commodities area	<p>A. Buildings</p> <ul style="list-style-type: none"> a. Buildings for commerce, general business, and the retail sale of commodities b. Joint occupancy dwellings, boarding houses and other <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Housing lots and coverage for dwellings: same as those for residence R4 b. Housing lots and coverage for joint-occupancy dwellings: not less than 2,772.5 sq. feet (257.6 sq.m) per unit and not more than 60% of coverage c. Other types of buildings coverage of lot: not more than 85% d. No lot shall contain less than 2,772.5 sq. feet (257.6 sq. m.)
	B2 Districts	Low density commerce, general business, and the retail sale of commodities	<p>A. Buildings</p> <ul style="list-style-type: none"> a. Same buildings as those in B1 b. Approved gasoline filling stations <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Area shall be the same as those in B1 district. b. Coverage: no more than 40%
	B3 Districts	Commerce and light manufacturing processing area	<p>A. Buildings</p> <ul style="list-style-type: none"> a. Same buildings as those in B1 and B2 b. Wholesale business c. Cold-storage plants, ice plants, creameries, ice-cream plants, bottling or central distributing stations, baking plants, and dyeing plants d. Laundries and dry-cleaning plants e. Garages, automobile repair shops, and approved gasoline filling stations f. Use for light mechanical operations or industrial processes <p>B. Area and coverage</p> <ul style="list-style-type: none"> a. Coverage shall be the same as those in B1 district

Classification		Characteristics	Permissible buildings and structures
Industrial	M1 Districts	Light industry area	A. Buildings a. Use for slaughtering and processing of animals, fish, or fowl b. Approved junk yards c. Garages, automobile repair shops, and gasoline filling stations B. Area and coverage a. Coverage: no more than 60%

1 sq. feet = 0.09290304 sq.m

(b) New Zoning Act

To cope with the current land use situations found in 2.3.1.2 (2) and (3), Zoning System might be transitional in its status on the way to a sustainable system. The reasons are as followings:

Growth control measures and growth promotion measures (at selected area and for selected land use) required to cope with current issues on land use management found in the whole Greater Monrovia, such as:

- **Overcrowded Informal Settlements** (so called Urban Slum, including squatter settlement) inside Monrovia City
- **Un-used Lands** of office buildings, hotels and so on
- **International Facilities** (mainly UN-related organizations)
- **Freeport Area** where UNMIL uses a half part of the area
- **Sprawling “Unplanned Settlements”** outside Monrovia City

Applicable and useful “regulation on living standard for unplanned/informal settlements” required.

Major part of settlements area is unplanned/informal settlements. These are generally beyond existing standard.

Control measures to individual construction actions are to be used for improvement.

Expected alternative concepts for New Zoning Systems are:

- To identify the urbanized areas in the next ten years
- To identify the categories of major tasks in the next ten years at specific or typical areas, and then to make zoning by such local tasks including categories of strategic development areas for major action areas, and categories of settlement improvement areas to control actions and improve priority issues.
- To prepare the specific regulation to control or promote building/land developing actions.

As sustainable zoning system, new zoning act is to be applied to all urban areas in Liberia.

2.3.2 Present Land Use Condition

2.3.2.1 Land Use Survey and GIS-data Development

(1) Land Use Survey as an “Urban Planning Survey”

Land Use Survey is a component for urban planning; and the field survey has some difficulties to identify the necessary categories for zoning and master plan preparation.

(a) Data and Surveys for Urban Planning

Most data necessary for urban planning are related to the mandates of governmental offices, as follows.

- Population data and other socio-economic data – data to know trend/tendency of urban growth and spatial pattern of population/economic activities (physical number of shops,

factories, and specific facilities)

- Land ownership - tendency of land/house ownerships at local areas, location of state-owned land.
- Location/system and future improvement scheme of urban utilities (water, sewerage, garbage, electricity, gas etc.), public facilities (school, hospital, park etc.) and road network.
- Hazardous materials, chemical materials used in factory, shop, hospital, school etc.
- Specific facilities/locations – local market, other governmental facilities.
- Land development data – such as accumulated/spatial data of land transfer deed and the land prices, large-scale development projects (housing estate, etc.), in particular, by public sector such as port project, road, bridge, market, etc.
- Areas regulated by environmental act/regulations: such as the Lagna registered in the list of “Ramsar Convention on Wetland”.

Furthermore, offices related to/responsible for the above data might be organized to prepare and monitor master plan.

(b) Field Survey of Land Use

What categories the field survey could obtain/identify depends on the existence of the above administrative data. Data/information in governmental offices was limited. Major reasons were that: data has been lost during the crisis; data management/compiling system was collapsed; and there is no regulation /mandate to manage and compile the data.

The field survey in JICA Study had the following difficulties:

- To identify the categories of manufacturing and logistics industries.
 - Categories of light/general/heavy industries themselves are defined by the zoning act.
 - The categories are defined not only by the kinds of products but also the volume of facilities/scales of machines and the level of using chemical hazards.
- To identify the boundary of land parcel or the settlement area: furthermore, there was no available and updated map (around a scale of 1:10,000) at initial stage of the survey. However, new topographical map covering whole Study Area was prepared in the course of the Study by other JICA Study Team based on satellite imagery and aerial photograph.

(c) Land Use Categories Used in the Field Survey

Land use categories were set up based on the Zoning Act (1957 – 1958), and then the following categories were added for specific land use (building use) in Greater Monrovia.

- Rental House – “Monrovia City Profile” explains existence of mass of rented houses in Monrovia as the identification of informal settlements/urban slums. Migrants from outside Monrovia are found and settled on state-owned lands at three Towns of Bushrod Island, West Point and Buzzi Quarters. After squatter settlements were filled, mass of “rented houses” were constructed within a pocket of block in Central Monrovia, and due to the economic factor, the rented houses became “multi-family dwelling houses”. More than 25 people share a house. Those are overcrowded rented house settlements.

2.3.2.2 Overall View of Existing Land Use in Greater Monrovia

(1) General View of Land Use in Greater Monrovia

Land Use Field Survey was conducted to identify present land use in early 2009 during this Study.

Table 2.3-7 General View of Land Use in Greater Monrovia

	Present Conditions	Planning Issues
Urban Expansion	<ul style="list-style-type: none"> ● Settlement and Industrial Areas have expanded into inland swampy areas in Caldwell, Barnesville, Johnsonville and Paynesville. 	To decide A Borderline of Urban Area to be urbanized in next 10 years to reserve the inlands as future urban/non-urban resources of Greater Monrovia.
Transition of Land Use	<p>Central Business District (CBD):</p> <ul style="list-style-type: none"> ● Densely built-up informal settlements due to job opportunities there ● Un-used high-rise buildings ● International organization offices and Facilities <p>Informal Settlements:</p> <ul style="list-style-type: none"> ● Rented houses have shared around 90% of settlements in built-up area. ● The settlements are reaching at natural buffers of swamp at inlands and around Lagna. ● Road, water, sewerage, electricity etc. are not recovered; huge population inflow is making worsening living conditions. <p>Large-scale On-going Settlements / Housing Estates at Paynesville:</p> <ul style="list-style-type: none"> ● The current scheme is mainly for housing estate. ● Integrated Local Plans for road network, future water supply and sewerage have not been established yet. ● Future urban center concept also has not been established yet. 	<p>Urban Master Plan for Greater Monrovia has not yet been prepared and there are serious difficulties to draw the future vision due to the weak institutional capacity; lack of staffs, data, equipment and the current transition phase.</p> <p>Local (Action) Plans also will be required in major action areas, such as Central Monrovia – Sinkor-Old Town Corridor, Port Area – Bushrod Island and the hinterland, and Paynesville (having population of 300,000 and more).</p>

Latter half of 1990'

January 2009



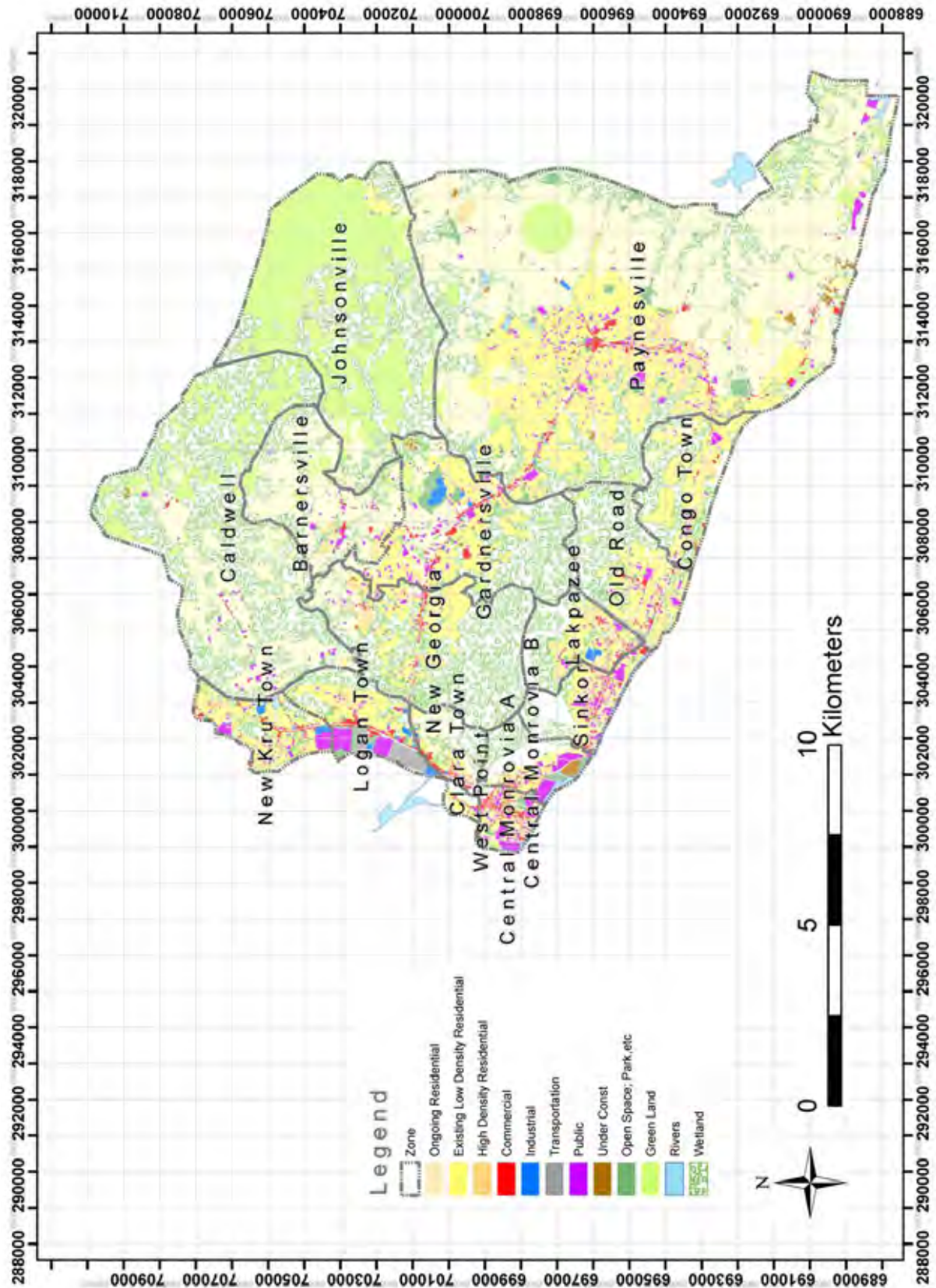


Figure 2.3-1 Present Land Use in Greater Monrovia (January 2009)

(2) View of Industrial Land Use

Table 2.3-8 View of Industrial Land Use

	Present Conditions	Planning Issues
Land for Business and Commerce	<p>Four (4) Areas/Zones</p> <ol style="list-style-type: none"> Central Monrovia: Activities as CBD has been partially resumed; but the area is the center of informal sector activities, such as at the central market, local markets, commerce/business/service mixed down town. Road network is weak to cope with motorization. Sinkor-Old Road Corridor or Zone: The area/zone has grid-pattern road network with super block. Embassies, large-scale school/churches, governmental offices, and business offices are accumulated. Port Area and Bushrod: Trading Center for Liberia and Monrovia. Mixed traffic by heavy trucks, taxis (to/from Central Monrovia, road-side local markets) make serious traffic jam every day, in particular on the roads and bridge concentration to Port Area and Connecting central area and road-side markets. Redlight at Paynesville: 3 roads concentrate at Redlight that works as local trading center. Local market has moved inside a block neighboring Redlight. Center for 300,000-populated Paynesville is not yet developed. Municipality office is inside a block. <p>Corridors along primary roads:</p> <ol style="list-style-type: none"> “Port Area - Redlight Corridor” (Somalia Drive): Road-side temporary shops are ranging at corridor. The sites are within right-of-way of Somalia Drive dyke. Those shops are mainly various service shops and various used-parts shops. Local markets are inside of community. “Redlight – Old Road Corridor”: On-going built-up area. Corridor has potential to transform to road-access based business/commerce area. <p>As recent tendencies, both nation-wide highways from Redlight to North and from coastal zone of Paynesville to International Airport promote trading/light industrial land development.</p>	<p>Central Monrovia:</p> <ol style="list-style-type: none"> CBD is a historically developed; but its previous activities are not yet resumed. Densely-built “rented houses” fill inside the previous business blocks. Large-scale land owners exist; from a long-term viewpoint, all Central Monrovia will be able to be placed at “Strategic Land Transformed Zone”; the scheme will include all factors, such as un-used offices/hotels, huge informal settlements and squatter areas also, mixed-use historical downtown, hotels at seashore, heritages of reserved greens at international organization sites, and unique landscape/townscape. <p>Sinkor-Old Road Corridor/Zone: Central Government offices concentrate around the Presidential House due to the existence of state-owned lands and facilities. It will bring the positive impacts on Sinkor with well- arranged road network and supper block sites. (special business and residential zone)</p> <p>Port Area and Bushrod: Three towns at Bushrod Island were developed from squatter settlements. Present land ownership is also mainly state-owned. Ministry of Planning and Economic Affairs (MPEA) has concepts to renew Bushrod Island as a new business/trading center. Inside blocks is huge seasonal inland swamp due to lower lands. UNMIL uses a half of the Free Zone; it will be utilized in next 10 years. All Bushrod will be able to place strategic land transform zone. The planning study should start immediately.</p> <p>Redlight in Paynesville: The future vision depends on the future vision of Paynesville City. Western part of Paynesville is on-going housing estate mainly for individual houses. The land belongs to few landowners; therefore, through involving stakeholders, to organize a planning body will be needed. Related government organizations are MPEA, MPW, and Paynesville City.</p>

	Present Conditions	Planning Issues
		<p>“Port Area - Redlight Corridor” (Somalia Drive): “Port Area - Red Light Corridor” (Somalia Drive): Along with the Road Improvement of Somalia Dyke and water pipeline construction, a Strategic Land Transformation Scheme will be needed for the road-side (on the Right-of-Way) and the corridor. In this scheme, Port-area impact and the role of this corridor for Paynesville and inland zones shall be identified. Corridors in Paynesville have a potential impact from the viewpoints of the nation-wide highways and regional development of outside Greater Monrovia. Light industry, tourism at sea-front, higher education facilities, and also alternative sites for new business /IT industry are envisaged.</p>
<p>Land for Industrial Activities</p>	<p>Light industry and manufacturing industry:</p> <ul style="list-style-type: none"> ● Manufacturing industrial activities are very few: a large-scale food processing factory around Port Area, and bottling factories. ● In Port Area and the surrounding areas, there are oil storage bases and heavy logistics bases including railway yards. ● An industrial park was provided inside Gardnersville; but half of the large park is utilized for oil storage facilities. MPEA has a proposal to move it outside of Greater Monrovia (in western neighboring County) due to its disturbances on the surrounding settlements and decentralization of such industrial facilities. ● Small-scale workshops at temporary spaces are active in Central Monrovia, Sinkor, Lakpazee, and Old Road. 	<p>Industrial Development in Future:Light industry and new business, according to MPEA are envisaged.</p> <p>As the first step, it will be alternative concept to promote labor-intensive light industries for domestic market and neighboring countries around Port Area. A corridor from Port Area to Caldwell has a large spaces including inland wetlands and the railway is available to transport to / from Port and Inland. Affordable housing development similar to 5 estates in Greater Monrovia by NHA (National Housing Authority) is envisaged</p>

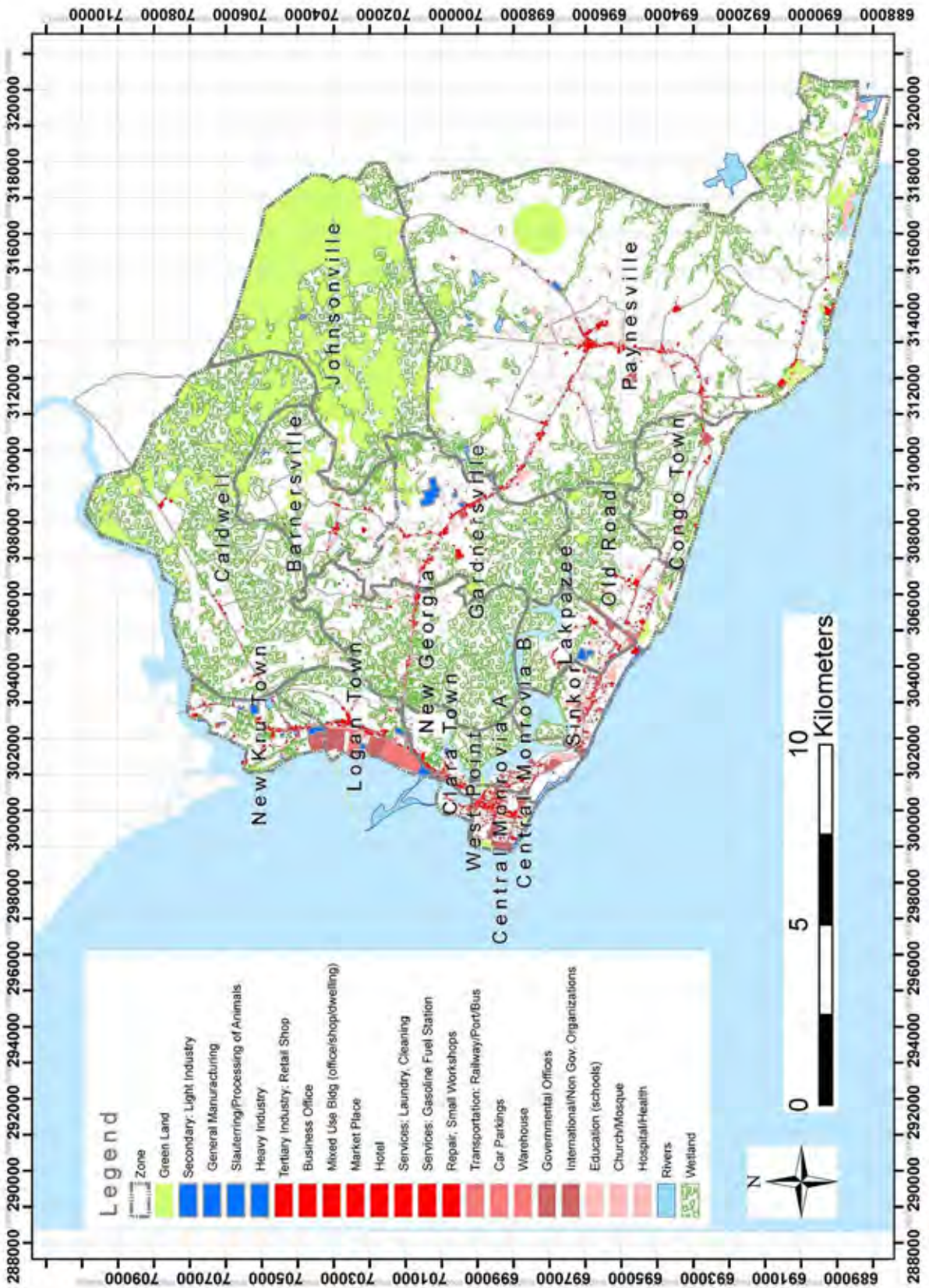


Figure 2.3-2 Present Industrial Land Use

(3) Settlements and Housing

“Monrovia City Profile” (Nov. 2005) explains specific settlement situations in Monrovia, as follows:

Nation’s growth center Monrovia has been under strong population pressure by job-seeking migrants before/during/after the crisis. The existence of mass of rented houses in Monrovia is the identification of informal settlements/urban slum. Migrants from outside Monrovia are found and settled on state-owned lands at three Towns of Bushrod Island, West Point and Buzzi Quarters. After squatter settlements were filled, mass of “rented houses” were constructed within a pocket of block in Central Monrovia, and due to the economic factor, the rented house became “multi-family dwelling houses”. More than 25 people share an individual house in such settlements to form overcrowded rented house settlements. Settlement formed by lots of “rented house” is a key factor to identify the settlement conditions.

Table 2.3-9 Informal Settlements

	Present Conditions	Planning Issues
Informal Settlements	<p>Squatter Settlement:</p> <ul style="list-style-type: none"> ● According to “Monrovia City Profile, 2004”, Port Area developments attracted huge migration from rural areas. First squatter settlements were formed at state-owned lands around Port Area, such as West Point, New Kru Town, Logan Town, Clara Town and Slipway. ● At present, the areas are not clear excluding West point and New Kru Town. Ministry of Lands, Mines and Energy had not updated the land transfer deed. <p>Water-front temporary settlements at originally public water</p> <ul style="list-style-type: none"> ● Areas surrounding Lagna are extending into public water. Migrants have been settled in the low wetlands or seasonal wetlands. ● Formally they should be regarded as squatters. <p>Characteristics of “Informal Settlements”:</p> <ul style="list-style-type: none"> ● 90% or more of settlements are living in rented houses. The most prevalent type is “multi-family dwelling houses” where a family lives in a room of the house. ● This type of settlement becomes high population density area; but due to swamp and low lands surrounding the settlement, population density of transitional zone is generally at 200 persons per hector. ● Central Monrovia and Sinkor have a population density of some 500 per hector or more. Building density at the settlements is very high. <p>Housing estates at the urbanizing area of Paynesville</p> <ul style="list-style-type: none"> ● In the on-going housing estates, share of informal/rented houses drops to around 70%. <p>Front-line of present settlements has reached at the natural barrier by inland wetland/swamp. However the urban sprawl extends into such areas at Johnsonville.</p>	<p>Squatter settlements issues shall be included and solved by the “Strategic Zone Planning”.</p> <p>Informal settlement issues</p> <ul style="list-style-type: none"> ● It has various types of rented houses. If income level is improved, families will move to apartments or share several rooms of the house. ● Mass production of affordable houses is urgent. ● NHA has the concept to upgrade informal settlement by PPP (Public and Private Partnership) scheme. It is impossible to find large state-owned lands in Greater Monrovia, but there are some large-scale land owners. <p>To urgently designate urbanization control area to prevent capricious development.</p>

(4) Non-Urban Land Use

Generally, non-urban lands are natural greens (grass land, forest etc.), and farm/garden.

In Greater Monrovia, agricultural lands and agro-forest lands are few excluding some part of Caldwell and Johnsonville.

Small gardens beside Lagna supply fresh vegetables for citizens at local markets. Those gardens stand on seasonal wetlands. Farmers settle beside the farm. Urban agriculture in Monrovia is self-sustaining agriculture, but the farms/gardens might work buffer zones to wildlife’s habitat at Lagna.

Lagna is registered on the list of “the Ramsar Convention on Wetland”.

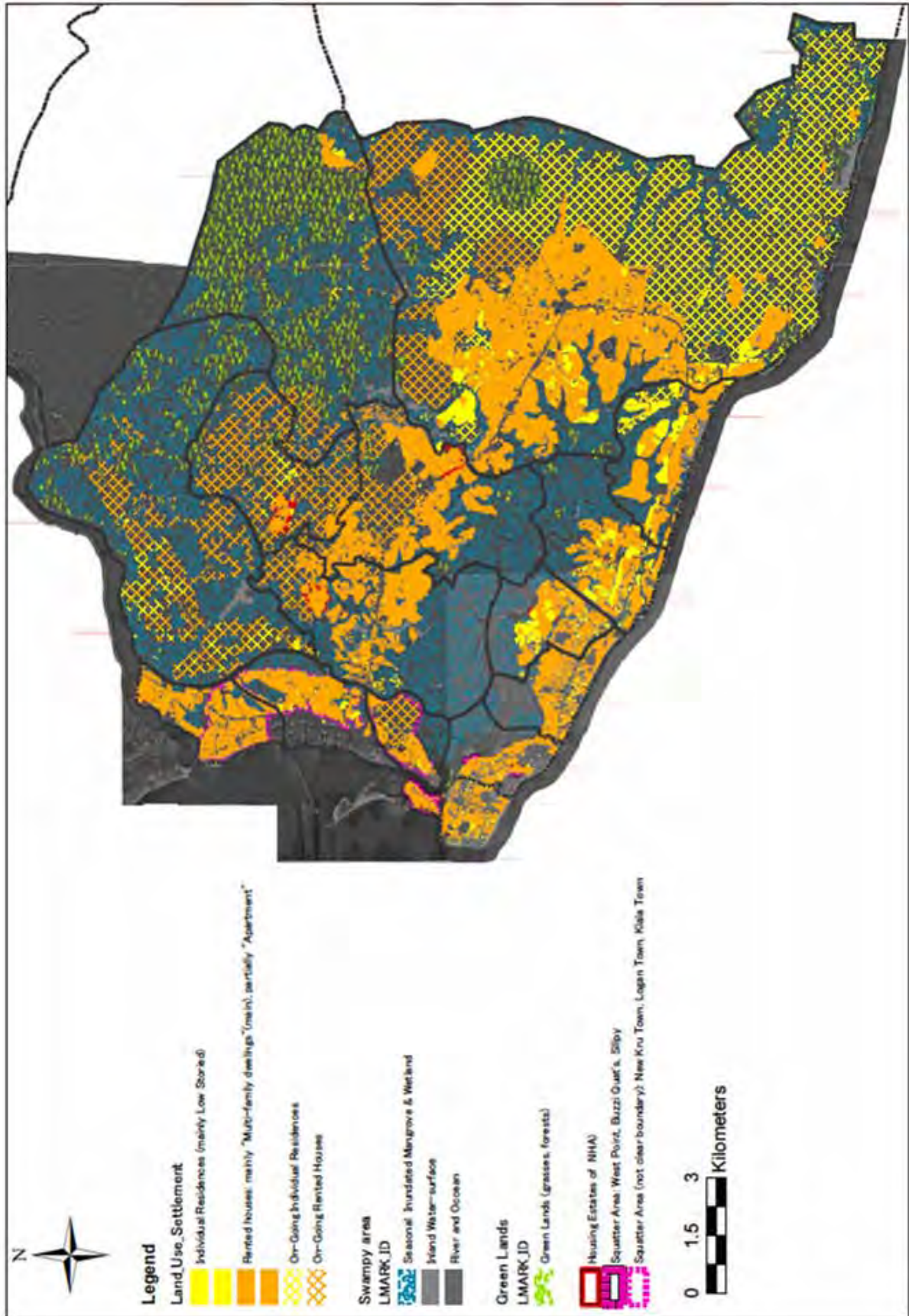


Figure 2.3-3 Present Informal Settlements

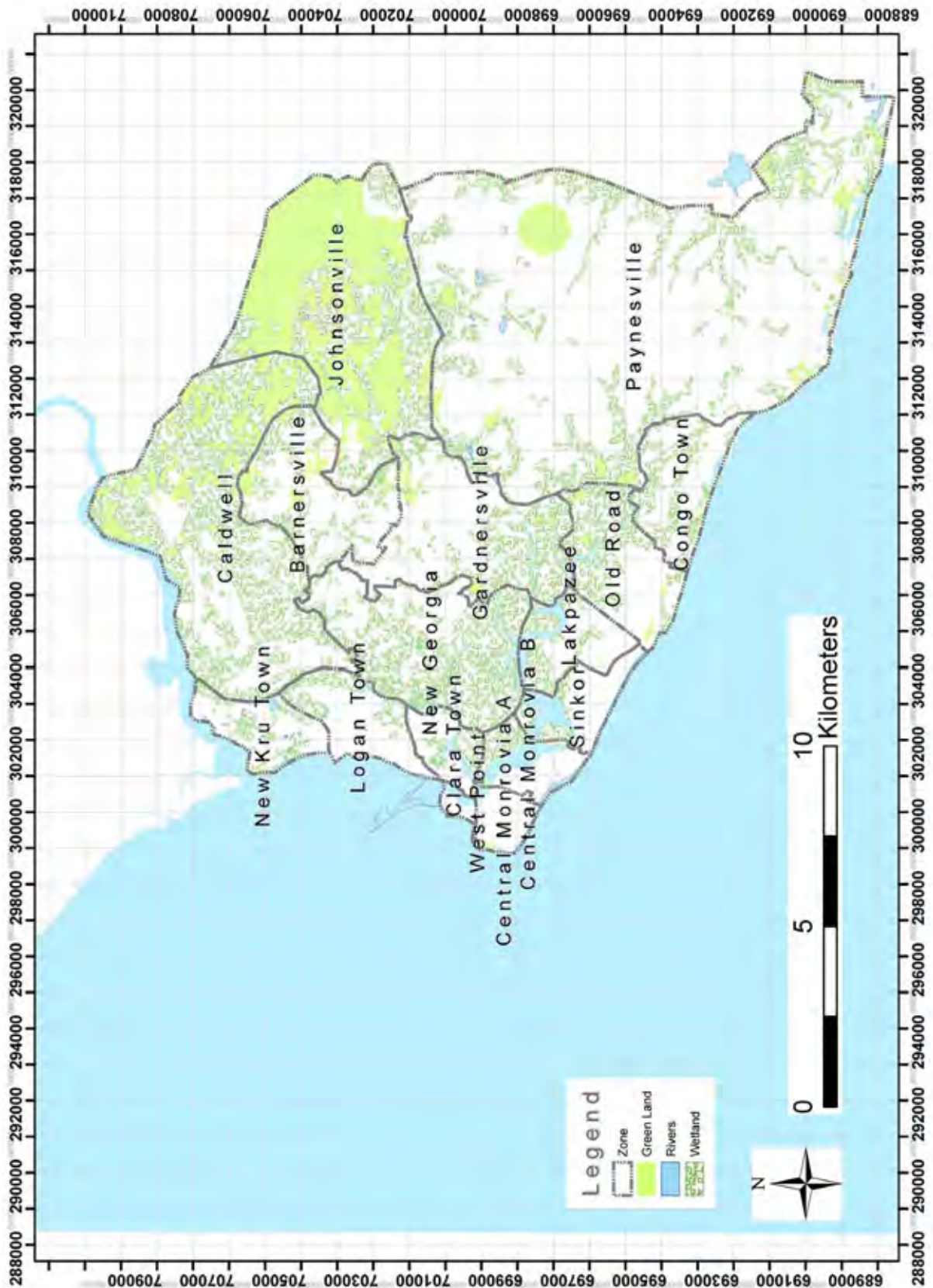


Figure 2.3-4 Present Non-Urban Land Use

2.4 Present Condition of Road and Transportation

2.4.1 Profile of Road and Transportation Sector

2.4.1.1 Institutional Framework of Road Sector

(1) Institutional Framework

Until 2006 when the new Government was inaugurated, the management of the transport sector was divided among several Ministries. The Ministry of Transport (MoT) was responsible for transport sector policy development and regulation. The responsibility for managing the national road network was divided between two Ministries: (a) the Ministry of Public Works - responsible for the primary and secondary roads and (b) the Ministry of Rural Development - responsible for the feeder and farm-to-market roads. The new Government transferred all road infrastructure responsibilities to the Ministry of Public Works (MPW).

During the civil conflict, these Ministries lost their capacity to manage their respective functions. They lost their data and documentations, and currently rely on collective memory to determine road data. They have been unable to undertake regular road condition assessments and confirm that almost no road maintenance has been carried out from 1986 to 2006. As a result, most roads are in very poor conditions. All of the offices of both Ministries were completely looted and are therefore in dire need of all types of basic office equipments, vehicles and specialized engineering gear.

(2) Ministry of Public Works (MPW)

The MPW has the mandate to perform the following responsibilities:

- Planning, designing and constructing public infrastructure;
- Constructing and also supervising construction contracts;
- Building and maintaining roads, bridges and public buildings;
- Ensuring that acceptable engineering and architectural standards are adhered to;
- Registering and issuing certificates to construction companies/contractors operating in the country;
- Administering urban planning and zoning.

The organization chart of the MPW is illustrated in Figure 2.4-1.

In terms of road sector, the MPW is the main organization concerned with road sector and is responsible for the provision and maintenance of main road network. This includes the primary and secondary roads. The MPW is also responsible for urban road maintenance and provision. For Monrovia, there is a separate maintenance section that took over this responsibility from the MCC.

The MPW has small core of technical and maintenance staff remaining from the period prior to the war, but the lack of equipment, years of skills atrophy and very little training, limit the capacity of the MPW to carry out the tasks associated with post-war reconstruction efforts.

The MPW is responsible for execution of internationally-funded civil works. Some core capacity and resources exist within the organization and the Emergency Infrastructure Project (EIP) now under implementation, is building targeted fiduciary capacity through Special Implementation Unit (SIU) to be hosted by the Ministry and Project Financial Management Unit (PFMU) at the Ministry of Finance (MoF). The use of these two units as well as the assistance provided by international financial controllers help ensure the proper use of resources associated with infrastructure projects.

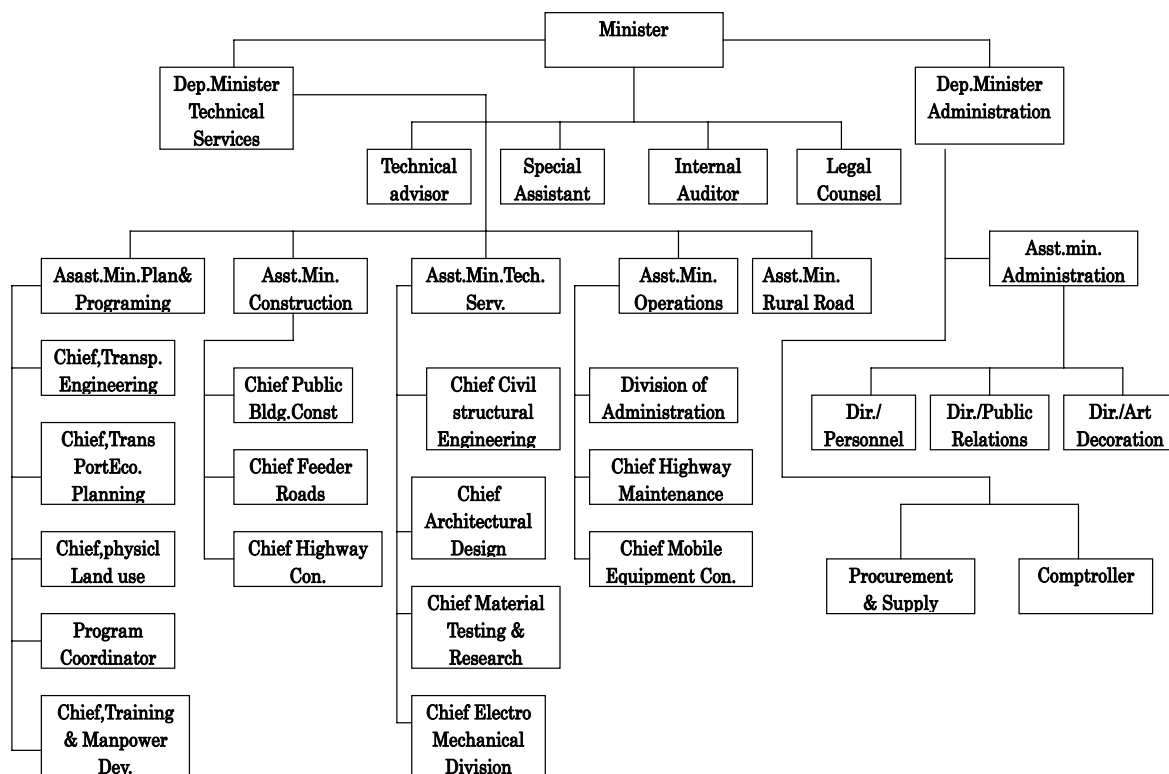


Figure 2.4-1 Organization Chart of the MPW

(3) Ministry of Transport (MoT)

The Ministry of Transport (MoT) is responsible for the administration and implementation of national transport laws and the execution of respective transport policies for land, sea, rail and air transport services. The Ministry was mainly created to:

Administer and implement the Transportation, Insurance and the Maritime Laws, and to plan and execute policies related to all modes of Land, Rail, Sea and Air transport services within the Republic of Liberia and abroad;

Collect, collate, evaluate and periodically publish such data related to land, rail, sea, and air transport services as well as insurance and the maintenance of meteorological services;

Establish rules and procedures, and enforce standards for transport services of private and public common carriers of whatever nature, and in general, to develop, regulate, control and monitor vehicles, boats, ships, fishing vessels, ferries, canoes, rural and urban mass transport, and the inspection and safety of highways, airports, railroads and ports;

Establish and implement the overall transportation policy of the Republic of Liberia, and develop plans for the movement of goods and people in and out of the Republic;

To regulate the use of ports and harbors, domestic airports and vehicles, parking lots as they affect shipping, civil aviation, motor and rail transport;

Regulate the use of inland waterways and, rivers, ships flying the Liberian Flag in domestic and foreign commerce as well as all modes of watercrafts for civil transport.

To carry out these functions, it is in charge of data collection in each one of these sub-sectors. The MoT has to ensure and implement meteorological services to the country. The MoT is also in charge of administering the payment of vehicle registration fees and of collecting registration and renewal fees for driver's licenses. The organization chart of the MoT is illustrated in Figure 2.4-2.

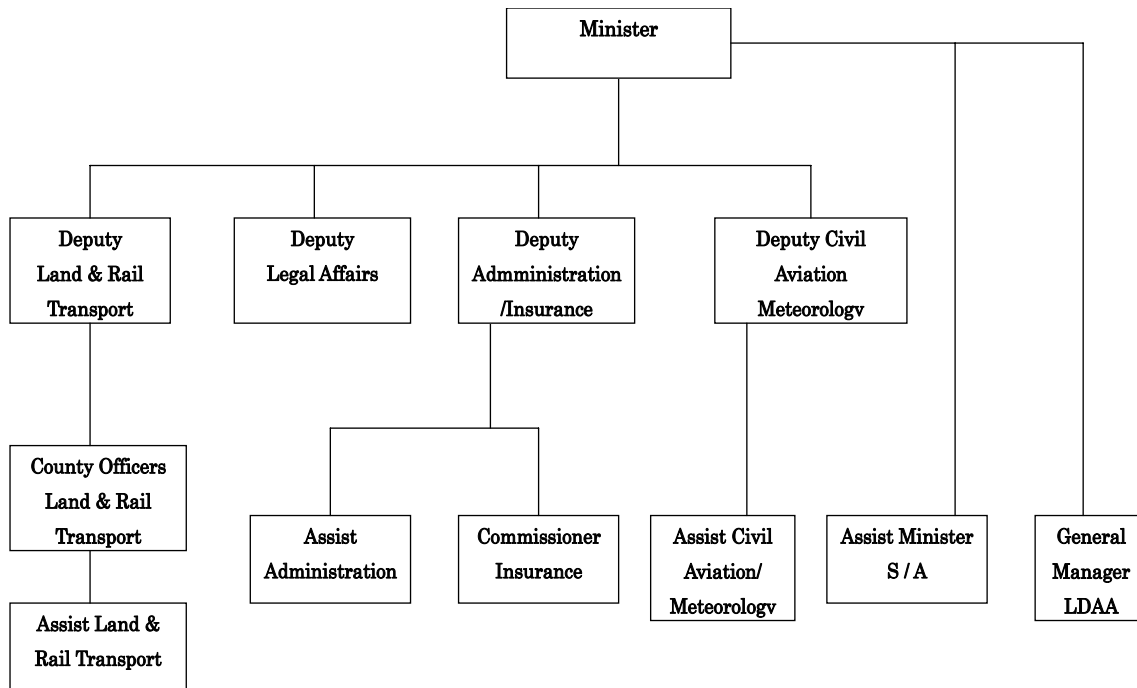


Figure 2.4-2 Organization Chart of the MoT

Currently, the MoT has little capacity to implement this responsibility. During the war, the MoT lost its data and documentation to perform its duties. Its offices have been completely looted and there is no equipment left. The MoT is in dire need of all hands of basic office equipment, vehicles, and training for its staff.

(4) National Transit Authority (NTA)

The GoL will implement the provisions of an Act to create a National Transit Authority (NTA). The Act is with the Legislature and passage is expected shortly. The Act provides a framework for effective, efficient, integrated and affordable national transit services, and for the establishment of a national public bus transport system. The Government will also begin to develop a National Transport Master Plan to support infrastructure in the transport sector, including roads, bus stop signs, bus shelters, and bus terminals across Liberia.

In order to meet the demand in both urban and rural areas for accessibility, customer safety, comfort and adequacy, the envisaged National Transport Master Plan will aim to:

Increase private sector participation and public-private partnerships in the provision of transport and alternative transport services;

Develop and operate modes of transport in urban and rural centers on the basis of economic savings on fuel usage, efficiency including traffic congestion, and environmental protection and safety;

Examine the current technologies available with a view to adopting the most ideal modes for urban and rural transport;

Segregate the flow of public transport and in particular bus transport, which should be confined to selected routes to speed up traffic flow;

Facilitate a strong operator union and other fora for effective transport services;

Encourage the use of non-motorized transport and mass passenger transport as alternatives to ever growing vehicle traffic; and,

Streamline regulatory functions for the oversight and monitoring of the above activities and in particular, the business of private operators in the country.

(5) Monrovia Transit Authority (MTA)

The MTA is a publicly owned company started in Monrovia, Liberia, to provide timetabled bus services at present. The Authority owns and runs a depot outside of Monrovia in Gardnersville. But the MTA is under-capitalized, with unclear legal status and authority and insufficient finance. Steps will be taken to engage the private sector in the provision of reliable and sustainable transportation services. The organization chart of the MTA is shown in Figure 2.4-3.

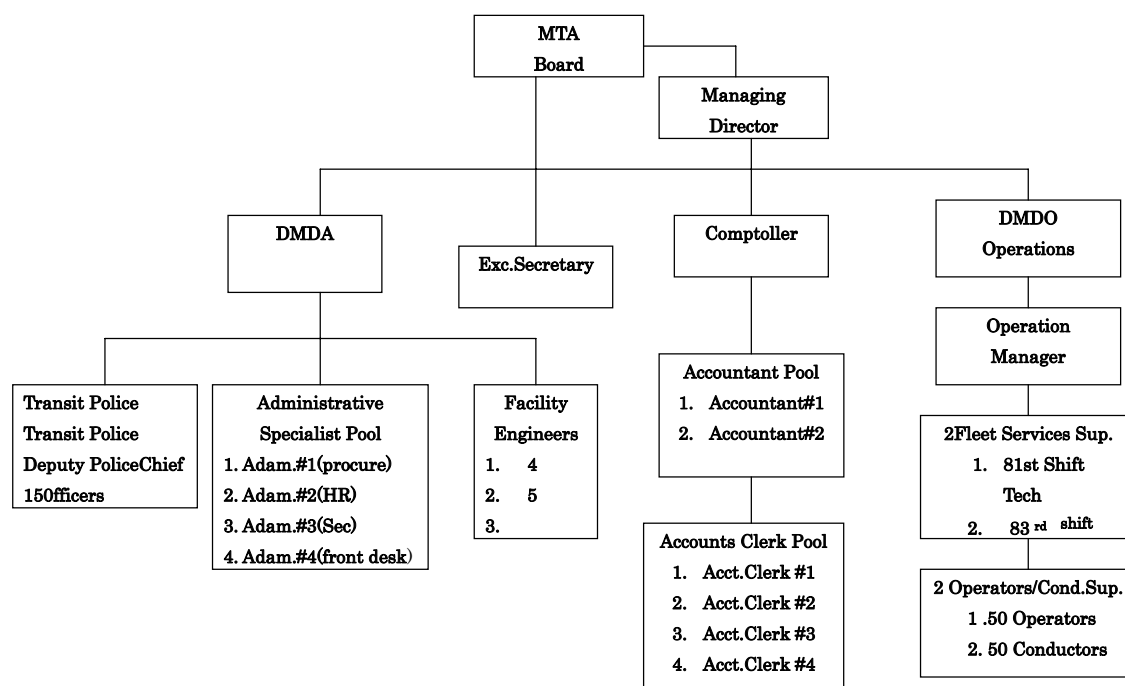


Figure 2.4-3 Organization Chart of the MTA

In addition, the MTA plans to introduce new routes and new bus stations to facilitate mass movement of commuters in areas of Monrovia not currently served by private operators. Further, MTA plans to introduce a fleet of small buses to take commuters from the main routes to various communities.

(6) Traffic Section of the Liberia National Police

Traffic Section of the Liberia National Police (LNP) organizes the following mandates:

- Traffic Operation and Control
- Accident Investigation
- Executive Mansion Escort
- Uniform Ticketing Violation
- Garage Inspection (licensing garage and vehicle repair shop and inspection)
- Technical Service
- Traffic Court Liaison
- Highway Patrol.

Through the discussion with the chief of traffic department, LNP, the problems have been pointed out that the most important aspect is skill improvement of traffic officers and getting the opportunity of training program, next is installing the facilities and equipment for their ordinary tasks. The organization chart of the LNP is shown in Figure 2.4-4.

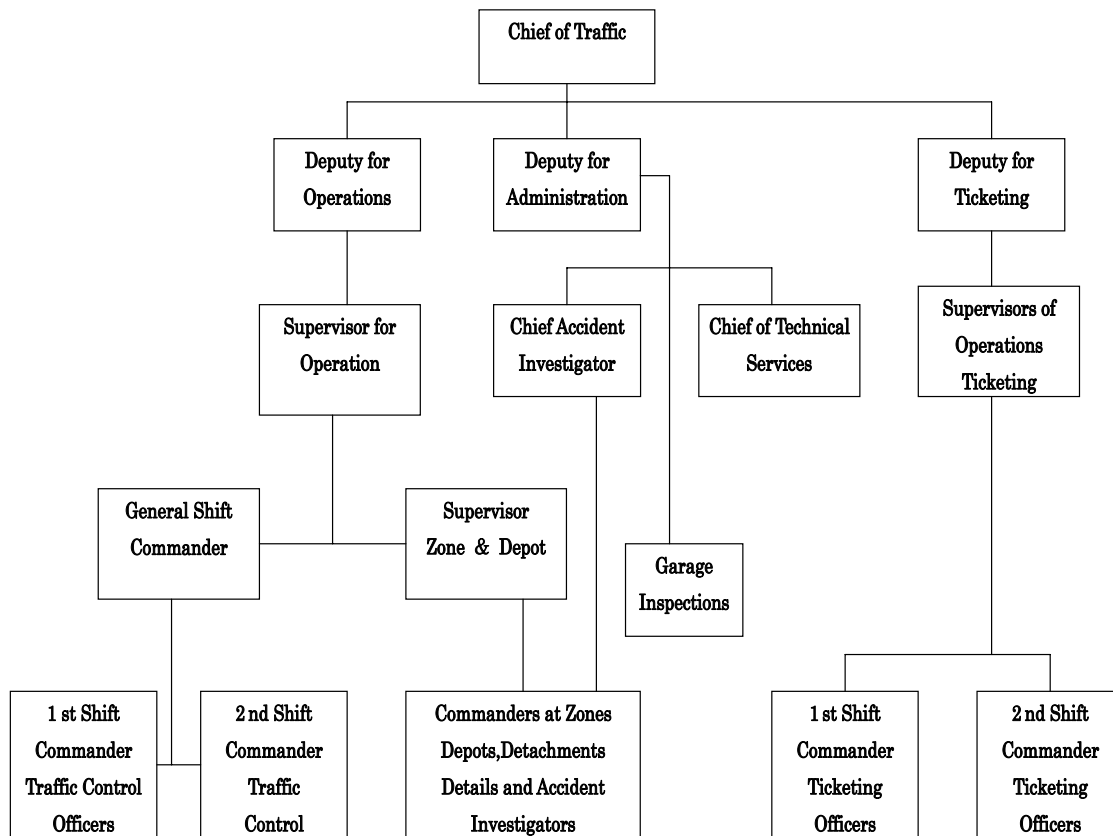


Figure 2.4-4 Organization Chart of the Traffic Section, LNP

2.4.1.2 Existing Policies and Regulations

(1) National Transportation Policy and Strategy (NTPS)

The new National Transport Policy and Strategy (NTPS) is officially approved in November 2008 by GoL with technical and financial support from the WB. The NTPS defines the vision for transport in Liberia. It is a guide to decision making by the Government and its various agencies. It will provide a point of reference for local government, business and communities. The objectives of the NTPS are to make transport financially and economically sustainable; accessible to all persons, including the disabled and elderly; affordable to all strata of society; safe to ensure high standards of health and personal security for all people, including users, workers, and operators; and environmentally sound.

This NTPS was developed within the framework of the Poverty Reduction Strategy (PRS) – the overarching development program (2008-2011) of the Government. The PRS considers transport as a key to reducing poverty and raising living standards in the medium and long terms. To achieve these goals, the NTPS envisages a crucial role for the private sector working in collaboration with the government through various forms of Public-Private Partnership (PPP), complimentary investment and planning.

The NTPS is the result of collaboration amongst the ministries of Public Works and Transport as well as other agencies of Government. The NTPS are summarized as follows.

(a) Vision

The Vision of the NTPS is to develop an efficient, safe, affordable and sustainable transport system in Liberia by 2011.

(b) Transport Sector Objectives and Goals

The NTPS seeks to ensure full compliance with the national, social and economic development objectives and goals, with emphasis on the following:

Support the short and long term national development programs for sustainable economic growth and

reforms, the development of human resources, the creation of employment and the meeting of basic needs;

Ensure private sector participation in the provision of services, while the government assumes the role of coordinator for key strategic transport infrastructure, promoter and developer of initiatives for Public Private Partnerships (PPPs);

Apply a participatory approach in the provision of transport infrastructure and services by involving all the stakeholders (i.e. Government, operators and users) in playing their roles in the development of the sector;

Provide effective institutional arrangements, laws and regulations, capacity building and the use of appropriate technology;

Support appropriate development strategies including development corridors, land use densification and efficiency as well as economic integration through, among others, the establishment of a strong infrastructural base and services in all major towns and other centers of socio-economic activities and growth; and,

Facilitate sustainable development by ensuring that all aspects of environment protection and management are given sufficient emphasis at the design and development stages of transport infrastructure and when providing services;

(c) The Main Short Term Objectives (2008-2011/2014) for the Road Sector

In the short term, the aim is to rehabilitate major roads and bridges, a critical component of the infrastructure and basic services pillar, to facilitate economic activities and combat poverty. Without adequate infrastructure (roads & bridges), the ability to reduce poverty is severely hindered and increases the likelihood of a return to conflict. Massive roads projects will provide thousands of jobs for the youth and will have substantial multiplier effects on the economy and poverty reduction, facilitating the enhancement of networking that spur rapid national development.

(d) The Main Objectives in the Medium Term for the Road Sector

The main objective of the government in the medium term is to restore the road network through the maintenance of paved roads, the upgrading of primary roads and the rehabilitation of secondary and feeder roads as well as the construction of the Bopolu to Belleyalla Road. This is critical for getting agricultural outputs to markets and for improved economic activities throughout the country.

(e) Priority Actions of Roads and Bridge Sectors in Poverty Reduction Strategy

The goals of the priority interventions for Roads and Bridge sector within PRS are:

To ensure that all roads are pliable all year round, to refurbish selected public buildings, and to build the capacity necessary for a sustained road maintenance program,

To improve the Liberian transport sector through policy, systems and infrastructure development that creates access to reliable, affordable and efficient services.

Aiming at these goals, the strategic objectives and actions in roads and bridge sectors are shown in Table 2.4-1 and Table 2.4-2.

Table 2.4-1 PRS Action Matrix Roads and Bridge Sector No. 1

Issue	Priority Interventions	Delivery Date	Lead Ministry / Agency
Goal: To improve the Liberian transport sector through policy, systems and infrastructure development that create access to reliable, affordable and efficient services.			
Strategic objective 1: To improve the transport sector through effective systems and infrastructure for quality service provision			
The transport sector suffers from a lack of coherent policy guidance, and inadequate coordination, and a lack of data for planning purposes.	Formulate and launch a National Transport Policy	February 2008	MoT
	Formulate and launch a National Transport Master Plan	December 2008	MoT
	Harmonize national meteorological and hydrological services within the appropriate legal framework in line with WMO standards	December 2008	MoT
	Conduct training for MoT staff in transport management, economics, research, and meteorology	August 2008	MoT
Strategic objective 2: To improve urban transit in Monrovia and its environs			
Monrovia and surrounding areas lack a mass transit system.	Rehabilitate and repair 25 buses donated by the Spanish Government to service main bus routes	2008, 2009	MTA
	Purchase 15 mini-bus to take commuters from main routes to various communities	2008, 2009	MTA
	Development Urban Transport Policy of MTA	2008, 2009	MTA
	Construct three bus stops at ELWA, Fendell and Brewersville-Moulton junctions and post signs along bus routes	2008, 2010	MTA, IPA
	Develop a three-year Business Plan for restructuring MTA, diversifying investment including a private equity partnership	2008, 2009	MTA, MoF, MCC
	Rehabilitate and upgrade maintenance facilities and inventory systems for mass transit	2008, 2011	MTA
Strategic objective 3: To restore and expand national air capacity as quickly as possible to international standards			
Airport infrastructure is generally poor and the sector lacks adequate institutional frameworks.	Conduct a feasibility study on reconstruction of airport infrastructure	December 2009	RIA
	Pending economic feasibility study, rehabilitate Roberts International Airport and the Liberia Domestic Airport Agency, including terminal buildings and runways; fire rescue and ground handing facilities, control towers, security and ramp equipment, and navigational aids	2010	MoT, RIA, LDAA
	Reacquire land encroached upon by squatters at the LDAA	March 2008	LDAA
	Resurvey and fence the LDAA to ensure safety and control of airport facilities	July 2008	RIA
	Rehabilitate at least five airfields located in Foya, Harper, Vionjama, Greenville and Zwedru	November 2009	MoT
	Formulate and implement a Master Plan for RIA	July 2008	MoT
	Integrate RIA and LDAA's operations under National Airport Authority through legislation	July 2008	RIA, Legislature
	Strategic objective 4: To restore viable, self-sustaining activities at physically more robust national ports		
Ports infrastructure is generally poor and the ports lack adequate institutional frameworks.	Rehabilitate facilities of NPA including small ports for improved operating efficiency	December 2009	NPA
	Improve operational performance of NPA by privatizing management of operations	August 2008	NPA
	Structure and implement the National Port Master Plan	2009	NPA

Source: Poverty Reduction Strategy

Table 2.4-2 PRS Action Matrix Roads and Bridge Sector No. 2

Issue	Priority Interventions	Delivery Date	Lead Ministry / Agency
Goal: To ensure that all roads are pliable year round, to refurbish select public building, and build capacity necessary for a sustained road maintenance program.			
Strategic objective 1: To rehabilitate, reconstruct and construct primary/secondary, feeder and neighborhood roads			
The country's road network is in a state of near-total deterioration.	Build or reconstruct 1,187 milers of primary roads, (1,075 miles paved, surface dressing) and 300 miles of all-weather secondary roads (year one: 450 miles, year two: 520 miles, and year three: 517 miles)	June 2011	MPW
	Install a total of 33 bridges around the country	June 2011	MPW
	Reconstruct and rehabilitate 200 miles of all weather secondary roads: 100 miles per year	June 2011	MPW
	Rehabilitate and construct 150 miles of neighborhood roads in Monrovia and the country seats	June 2011	MPW
	Ensure that environmental impact studies are conducted and that sound environmental practices are followed in all of these projects	June 2011	MPW
	Design and implement a road safety initiative including side brushing, and fabricate and install road safety signs on city streets	June 2011	MPW
Strategic objective 2: To build human resource capacity			
The capacity of maintenance workforce and management is limited.	Renovate the RMTC and develop a long term strategy for capacity building	June 2011	MPW
	Provide scholarships for study in subjects relevant to Roads and Bridges infrastructure at local universities and abroad, on a gender equity basis	June 2011	MPW

Source: Poverty Reduction Strategy

2.4.1.3 Finance Structure and Budgeting

(1) Liberia Reconstruction Trust Fund (LRTF)

The extent of infrastructure needs in Liberia has prompted a new multi-donor, pooled fund approach to infrastructure rehabilitation. The World Bank-administered Liberia Reconstruction Trust Fund (LRTF) was developed during 2007 to mobilize critical funding for national priorities as defined in the PRS, with a particular focus on infrastructure. LRTF projects will also seek to accomplish two additional objectives, employment creation and capacity development. The projects will be executed by the Government through the Special Implementation Unit (SIU) in the Ministry of Public Works and the Public Financial Management Unit (PFMU) in the Ministry of Finance. The LRTF provides partners with a mechanism through which to contribute to Liberia's reconstruction and development efforts without having to establish a ground presence in Liberia. The creation of a multi-donor fund will also simplify the management, monitoring and evaluation of aid flows, and thereby facilitate Government ownership of the reconstruction process. Already, the LRTF has received contributions from the World Bank (USD3 mln) and from the German Government (USD 12 mln) with additional contributions from new donors expected soon.

(2) Road Sector Expenditure / Budget

The total budget of MPW in fiscal 2008/2009 is expected to be 22.1 million USD including LRTF as shown in Table 2.4-3. That of 2007/2008 was about 9.9 million but not considering LRTF, so that the budget for road construction and rehabilitation has been constant for the last two years. Comparing with 2004/2005 just after the war, the budget in 2008/2009 grows up by four times.

Table 2.4-3 Expenditure and Budget of MPW (unit: USD)

Items		FY 2007/2008	FY 2008/2009
Personnel		1,179,651	4,210,000
Goods/Services		2,473,690	
Road Construction / Rehabilitation	Monrovia area (includes Public Buildings)	6,240,603	6,218,000
	Nationwide (15 counties)		11,755,000
MPW Budget Total		9,944,179	22,100,000

Source: Ministry of Public Works

(3) Funding Requirement in Short Term Road Sector Plan by NTPS

In NTPS approved in 2008 estimate the finance requirement for road sector in the next three years. NTPS addresses that road network and its maintenance is a critical point to tackle poverty reduction. Therefore, the need to finance road projects is ever-increasing. The World Bank, European Commission, USAID and UNMIL currently intervene in several projects in the reconstruction of Liberia's roads. Some are through LRTF and others are direct investment through grant scheme by International Organizations.

Two such direct projects are the reconstruction of the Monrovia-Buchanan trunk road as well as the rehabilitation of Monrovia city streets. Other priority road projects to be undertaken in the next three years include the primary roads and some secondary/farm-to-market roads; the total cost is around USD181mln..

Additionally, the amount of USD2.625mln. is required over the next three years for capacity building; this amount covers the establishment of IT lab and other local and foreign training programs. The rehabilitation of the Road Maintenance Training Center is being carried out by LCIP under a USAID program.

2.4.1.4 Existing Project in Road and Transportation Sector

(1) World Bank Road Sector Projects in Monrovia

World Bank (WB) has been contributing many road investment projects through a grant scheme or LRTF scheme. The main grant projects by the WB in Monrovia related to transport and road sector are listed up as follows:

- Emergency Infrastructure Project (EIP) – Grant No 236
- Emergency Infrastructure Project (EIPSC) – Grant No H256
- Liberia Infrastructure Rehabilitation Project (LIRP) – Grant No TF57072
- Agriculture and Infrastructure Development Project (AIDP) Grant No H327

The Project activities will comply with safeguard and fiduciary requirements as applicable to the emergency assistance and will accommodate cross-cutting social issues, e.g., HIV/AIDS awareness campaigns, gender and poverty reduction. The intention of these projects is to be prepared in response to the emergency situation in the country. The objective of these project components concerted to road sector was identified as follows.

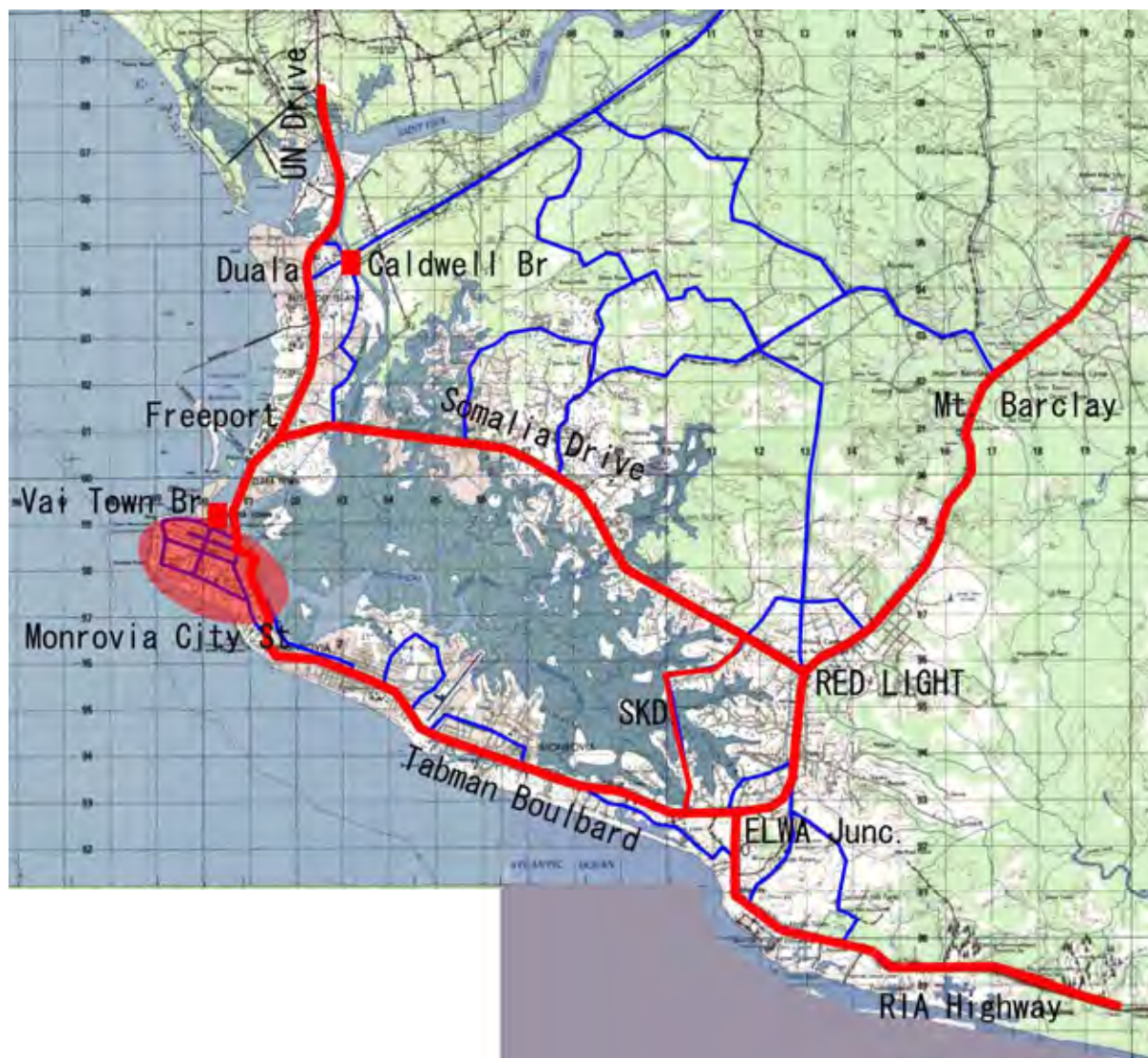
Emergency rehabilitation and repair of Critical Infrastructure: This will support the repair of the primary road network, the reconstruction and re-instatement of urban and rural road, bridges and culverts in Monrovia. This component would also allow for supervision and additional design activities associated with the works.

Table 2.4-4 and Figure 2.4-5 show the locations of main road projects components.

Table 2.4-4 Status of Road Project by SIU with WB Grant in Monrovia

Description	Planned Length	Completed Length	Starting Time	Finishing Time	Remarks
Freeport to MFA (Pavement Patching)	5,180 m		N/A	N/A	
MOFA to 18th Street (Excavation and Rehabilitation of the Pavement Structure)	2,2400 m	2,2400 m	Nov-07	Feb-08	Completed
Freeport to MFA 18th Str. To ELWA Junction (Pavement Patching)	8,840 m	4,400 m	Feb-08	N/A	Under Processing
Freeport Drain	480 m	480 m	Oct-07	Jan-08	Completed
Somalia Drive Freeport to CEMENCO (Excavation and Rehabilitation of the Pavement Structure)	700 m	700 m	Feb-08	Feb-08	Completed
Somalia Drive CEMENCO to Red Light Junction (Pavement Patching)	12,549 m		Mar-08	N/A	Under Processing
UN Drive Freeport to Caldwell Junction (Pavement Patching)	3,560 m		Mar 08	N/A	CICO
ELWA JCT to RIA Pavement Patching	44,300 m	44,300 m	Dec-07	19-Jan-08	Completed
ELWA JCT to RIA 5 cm Asphalt Wearing Course Overlay	20,000 m	10,000 m	Feb-08	N/A	Under Processing
ELWA JCT to RIA Crack Sealing	20,000 m	18,000 m	Jan-08	N/A	* See Note No 2.
ELWA Junction to Red Light Junction (Pavement Patching)	4,500 m	180 m	N/A	N/A	Shoulder has been finished.
SD Cooper Road (Laterite Base Course and Double Layer Chip Seal)	1,300 m	-	Jan-08	N/A	Laterite, Base Course two culverts finished
Monrovia Street Rehabilitation Including Broad Street	15,600 m		Oct 2008	2010	CICO
SKD Boulevard	5,000 m		2009		CICO
Marshall Road	10,000 – 15,000 m		2009		CICO
Vai Town Bridge Re-construction including Caldwell Bridge design			2009		CICO

Source: SIU, WB



Source: JICA Study Team

Figure 2.4-5 Main Road Sector Projects by WB Grant Scheme

(2) Monrovia Street Rehabilitation Project

The road rehabilitation project is also being implemented through the specialized Monrovia City Streets under output and performance-based road construction, financed by the World Bank Emergency Infrastructure Project's supplemental component. The project will be undertaken by China Chongqing International Construction Corporation (CICO) and is expected to last for 24 months covering 24km length of streets. The project is supervised and managed by MPW, through their Special Implementation Unit (SIU). The component of the Project will include the resurfacing of the road pavement along the selected streets, fixing potholes and cleaning and unblocking of affected road drainage along the selected city streets, and the rehabilitation of roads in Monrovia, mostly in the CBD. The rehabilitation will cover all major streets in Monrovia including the Caldwell to St. Paul Bridge Road. The project cost estimated at nearly USD15.7mln and the rehabilitation work is expected to be completed in the next two years. A preliminary list of the city streets to be re-surfaced and improved is provided in Table 2.4-5.



Figure 2.4-6 Rehabilitation Work on Broad Street in CBD Monrovia (March 2009)

Table 2.4-5 Prioritized Roads in the Monrovia CBD and Suggested Rehabilitation Works.

ITEM	PATCHING ROAD	LENGTH (km)	ITEM	OVERLAY ROAD	LENGTH (km)
1	Ashmun Street	1.00	1	Tubman Bivd (By-pass-11St.)	4.00
2	Front Street	0.80	2	Center Street	0.90
3	Halie Selassie Ave	1.80	3	Randall Street	1.30
4	Broad Street	1.40	4	Sekou Toure Ave	0.80
5	Carey Street	1.10	5	Newport Street	0.80
6	Benson Street	1.90	6	Russel Ave	3.70
7	UN Drive	3.20	7	Cheeseman Ave	2.20
8	Camp Johnson Road	1.10	8	15 th Street	0.10
9	Neison Street	0.30	9	16 th Street	0.20
10	Robert Street	0.20	10	17 th Street	0.20
11	Johnson Street (Broad St. Intersect)	1.40	11	18 Street	0.10
12	Lymch Street	1.10			
13	Warren Street	0.25			
14	McDonaid Street	0.40			
15	Ciay Street	0.55			
16	Perry Street	0.50			
17	Water Street	1.00			
	TOTAL LENGTH (km)	18.10		TOTAL LENGTH (km)	14.30
	TOTAL COST (USD)*	491,343		TOTAL COST (USD)**	1,508,650

* Patching cost is per km USD 27,146

** Overlay cost per km USD 105,500

Asphalt works have been prioritized to optimize the use USD 2 mln. Based on the following criteria:

1. Selection of most critical areas of repairs with respect to maximizing resources
2. Minimizing operational cost of vehicles
3. Increase in the level of road safety

Source: WB

(3) Urban Works and Public Awareness and Training Campaign Program by WB

Urban works, public awareness and training are being incorporated into each of the construction activities. This includes the delivery and maintenance for urban works as well as the public outreach campaign. Urban works will include painting of public buildings and monuments; restoration of public signs, such as bus stops; side walks, street cross walks and center line listed up as in Table 2.4-6 with public awareness campaign.

Table 2.4-6 Pre-selected Areas for Rehabilitation for Urban Works

1. Market Sites:	2. Public Areas:
i) Waterside General Market; ii) Rally Time General Market; iii) Nancy Doe Jorkpen Town Market; iv) Providence Island Structures.	i) Monrovia bus stops; ii) CBD sidewalks; iii) CBD cross walks; iv) Public monuments; v) Street Center Lines; vi) National museum; vii) Public beaches.

Source: WB



Side walk on Urban Street

Bus Stop sign by MTA

Figure 2.4-7 Status of Urban Work in CBD Monrovia

(4) Community-Based Recovery (CBR) Program for Liberia by UNDP (outside Monrovia)

Community-Based Recovery (CBR) Program for Liberia by UNDP assists the Government of Liberia by facilitating the resettlement and reintegration process of war affected Liberians in counties and communities affected greatly by years of civil crisis. This includes supporting peace-consolidation and grass-roots governance efforts at the community level. The operating principles of the Program are field presence and community participation. The Program interventions include:

- Support to local governance structures and ensuring community participation by establishing and strengthening District Development Committees (DCCs) in Liberia;
- Capacity-building for target communities in planning and management of recovery activities;
- Support the creation of sustainable livelihoods through training, farming and micro-enterprise development; and
- Assistance with the provision of basic services through rehabilitation of infrastructure at the community level, including water and sanitation services, education, and health facilities.

One of the main output of the CBR Program is the establishment of District Development Committees. The CBR program has already established seventeen District Development Committees in the three front line counties of Bong, Nimba and Grand Geddeh as of 2008.

(5) Labor-Based Public Works Project by AfDB

The AfDB available balance will be used to fund a labor based public works project in support of the Government's National Public Works Program. The main objective of the project is the rehabilitation of the Fish Town-Harper Road stretch, thereby enhancing mobility and accessibility to the country's interior. The project also aims at enhancing access to basic social services and economic activities create permanent and temporary job opportunities through the use of labor-based methods, and to increase the skills of workers and local communities. The project will pay greater attention to ensure women's participation in project activities by targeting that at least 30% of those beneficiaries from the

employment and skills training will be women. Moreover, in order to secure women's income, the project will apply equal pay for similar job policy. The project is complementary with other donor interventions, especially WB and UNMIL financed projects, as the planned rehabilitation of the Fish Town-Harper stretch is a continuation of the Zewdru-Fish Town road under WB funding. Moreover, the proposed project envisages joint implementation arrangements with the WB by using the existing Special Implementation Unit (SIU) which has been jointly established by the MPW and the WB.



Work scene at Johnsonville

Work Scene at Mamba Point

Figure 2.4-8 State of Labor-Based Public Works

(6) Capacity Building Project for the Transport Sector of Liberia by GTZ

The key objective of the Study on Capacity Building Needs for the Transport Sector of Liberia was to find a solution to building up a functioning local capability to analyze + plan + solve transport policy problems on their own within the next 3 to 5 years. This Project shows a way to break this vicious circle of institutional self-strangling: On a broad scale all pertinent players will be incorporated into a comprehensive capacity building effort, which is to last for a minimum of 10 to 15 years.

This Project has started in 2008 funded by German Government and technical specialists have been dispatched to Ministry of Transport by GTZ. Total of the required Project Budget is as follows:

1. Start Up Phase 03/2008 – 06/2008:	EUR250,000--
2. 07/2008 – 12/2008:	EUR660,000--
3. 01/2009 – 12/2009:	EUR715,000--
4. 01/2010 – 12/2010:	EUR715,000--
5. 01/2001 – 06/2011:	EUR440,000--
Grand Total for the Project:	EUR2,780,000--

This viewpoint includes the whole transport sector of the country: Ministries + Contracting Associations + Contractors + Educational Institutions training future staff of these entities. Targeted Ministries are the ones of Transport, Public Works, and Planning and Economic Affairs. Two local educational institutions are being brought into the effort: The University of Liberia (transport planning and economics, geographic information systems) and the Stella Maris Polytechnic College (public administration training, IT training and secretarial/clerical training).

The expected project benefits will eventually be:

- Involved Ministries being capable again of carrying out the necessary planning to rebuild the transport sector;
- University and Colleges being capable again of training BSC and MSC graduates in the state of the art know-how about public administration management;
- Introduction of state of the art computer applications facilitating quick catching up with the rest of the region in terms of planning knowledge and skills and methods;

- The development of at least 2 competent contractors capable of handling medium sized projects in road construction and maintenance;
- Quality workmanship through proper training of road contractor staff in key competencies of their trade; and
- Entrepreneurial support for old and new contractors to become active again despite all the known limitations and shortages.

2.4.2 Present Condition of Road and Transport System

The transport sector in Liberia prior to the civil war included road and railway networks, civil aviation and several ports. Today, the railway network is almost non-existent, civil aviation is limited to Monrovia with only UN flights operating upcountry. The Port of Monrovia is the only fully operational port in the country while the port of Buchanan is partially operational. During the years of conflict, the road and transport sector was able to undertake intermittent maintenance activities but no periodic maintenance. Partial rehabilitation and new construction were sporadic and limited in scope. As a result of the chronic underinvestment and lack of maintenance, the rehabilitation requirements of the sector today are enormous.

2.4.2.1 Existing Road Network System

(1) Existing Road Network System in Liberia

The national road network has not changed since prior to the conflict and is divided as per the Table below. The existing Liberia's roads network is 9,916km in length. 734km are paved, even-though the pavement has grossly deteriorated, while 9,183km remain unpaved as shown in Table 2.4-7. Paved roads segments include city streets and some primary roads. Primary and secondary roads connect the 15 political sub-divisions of Liberia including the provincial capitals, district and chieftaincy headquarters. However, most of these unpaved roads are not pliable during the six months of intense rainy season and have to be re-graveled annually. The travel time is extremely long and up-country areas are often cut off in the months of April to September. Additionally, primary roads link Liberia with its neighbors. 2,357km of feeder roads in Liberia have in the past been privately constructed, mainly by logging and mining companies, and partially by farmers for the purpose of extracting their produce from their production sites to markets.

Table 2.4-7 Extent of Road Network in Liberia

Road Type	Roads (km)		
	Paved	Unpaved	Total
Primary (incl. urban paved roads)	734	1,130	1,864
Secondary	0	2,350	2,350
Feeder	0	5,702	5,702
Other roads (forestry, community, private)	0	n/a	
Total	734	9,182	9,916

Source; Ministry of Public Works



Source: Ministry of Public Work

Figure 2.4-9 Status of Road and Bridge in Primary Road in Liberia as of Dec. 2007

The present road network system and condition in Monrovia are discussed in detail at Section of Road Inventory Survey Result.

(2) Status of Road and Land Transport in Monrovia

The road conditions in Monrovia are more acute to the high traffic volumes throughout the city. There are specific areas that experience congestion for most of the day. There are several factors causing the congestions. The road network was never expanded to allow normal traffic growth while the large numbers of internally displaced persons and other refugees in the city add to the congested conditions.

The road networks in Monrovia interconnect production with consumption and market centers. Most roads can hardly cope with rapid increase in traffic volumes due to their bad state and insufficient road capacities. Other road related problems particularly in Monrovia include, inadequate parking spaces, lack of maintenance and room for future expansion, lack of modern terminal (bus/truck terminals), inadequate facilities for non-motorized traffic and pedestrian lanes and lack of road furniture. Furthermore, road capacity has been reduced by road side parking, street vending and pedestrians who are compelled to walk on the carriageways as most of the walkways are full of parked vehicles and petty businesses.



Road Congestion at Red Light Market



Road Congestion at Water Side Market



Figure 2.4-10 Present Road Transport Situation at Congested Areas

The inadequate physical planning and poor implementation coupled with lack of enforcement of urban bylaws have negative impact on mobility and accessibility in most parts of the urban areas, especially in unplanned urban settlements in Monrovia. In order to meet the expectations of the demand side in relation to the urban road infrastructure, the NTPS provides the following policy directions for both Monrovia and the other main towns:

- Design of residential areas should be done in tandem with provision of adequate transport infrastructure. It should ensure security, safety and comfort to pedestrians and cyclists by providing for dedicated pedestrian and cyclist lanes;
- Enhance capacity building for future urban road traffic demand;
- Influence land use planning and settlement patterns to achieve easy access to amenities; and
- Promote possible private sector participation in road funding and management decision-making.

2.4.2.2 Existing Public Transport System

(1) Overall Status of Public Transport Service in Monrovia

The provision of transport services in urban centers like Monrovia is generally dominated by the private sector. Members are taxi, mini bus and two wheels motor bike services. At present, public transport share of the market in Monrovia is negligible. The quality of public transport is very poor with permit holders using imported secondhand vehicles. There is no traffic safety enforcement. Monrovia already experience traffic congestion every day. This could be alleviated with the introduction of larger vehicles for public transport. In this concerned, MTA installed scheduled bus service with donated large bus fleets by Spanish Government and Canadian NGO from 2008.

(2) Scheduled Bus Transit Service by MTA

Public transportation remains a major problem in the country creating inconvenience for commuters who report to work, school and at other places very late due to an acute shortage of commercial vehicles. The government operated a public transport system under the Monrovia Transit Authority (MTA) prior to the civil war with buses purchased from France. Currently, two dilapidated MTA buses play the streets along with private commercial vehicles but they are unable to meet the huge demand of the public.

MTA received 25 used buses donated by the Spanish Government at the end of August 2007. The buses were be accompanied by spare parts and experts who would train Liberians on how to operate and maintain the vehicles. Nine of these buses have been rehabilitated and had been in service on a

pilot basis. However, most of the donated buses were not in service because of lack of spare parts and the maintenance faculty and capacity. In 2009 January, the MTA had announced the arrival of additional buses to join its current fleet of buses operating. The new 12 buses with 75 seats were obtained as a grant that was made by the McCain MaCall Foundation, an international Canadian NGO. These buses have created additional routes and have added two suburb communities to their operations by providing transportation service to commuters in the Brewerville and Robertsfield areas.

The MTA plans to introduce new routes indicated in Figure 2.4-12 and new bus stations to facilitate mass movement of commuters in areas of Monrovia not currently served by private operators. Further, MTA plans to introduce a fleet of small buses to take commuters from the main routes to various communities.



Figure 2.4-11 Bus Transit Services in Monrovia

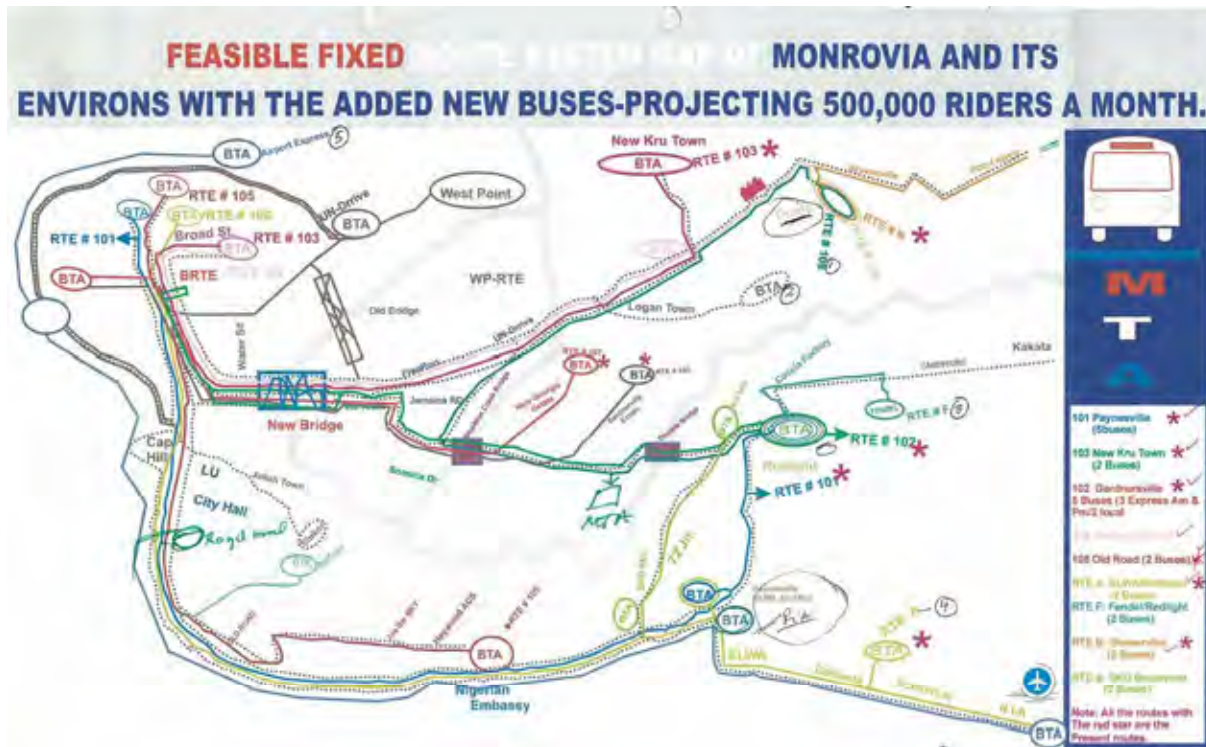


Figure 2.4-12 Future Network Plan of Bus Transit Services by MTA

(3) Future Direction of Public Transport Service

The provision of transport services in urban centers like Monrovia is generally dominated by the private sector. At present, public transport share of the market in Monrovia is negligible. In order to meet the transport service demand in urban areas in terms of customer safety, comfort and adequacy, the NTPS provides the following policy directions:

- Increase private sector participation in the provision of transport and alternative transport services;
- Develop and operate modes of transport on the basis of economic savings on fuel usage, operational efficiency including reducing traffic congestion, environmental protection and safety;
- Examine the current available technologies with a view to having the most ideal mode for urban transport;
- Segregated public transport and in particular bus transport should be confined to selected routes to speed up traffic flow;
- Have in place a strong operator union(s) and forums for efficient and effective transport services;
- Streamline regulatory functions;
- Encourage use of non-motorized transport and possibly mass passenger transport as alternative to ever growing traffic demand; and.
- Establish trucks/bus terminals near the main cities.

2.4.2.3 Existing Traffic Management and Control System

(1) Traffic Operational and Safety Facilities

As such all roads and bridges were seriously damaged during the war, the traffic control and safety facilities were either damaged or destroyed. The traffic signals were installed in main intersections but all the signals were damaged and out of work. Most of other facilities such as traffic signs, pedestrian crossing, and bus stop facilities have disappeared during the war. To overcome the present situation of traffic control and safety, LNP is to launch the new plan, named “Road Safety for All”, which will ensure the placement of road traffic signs and regulatory signals on all streets, intersections, and junctions respectively. The plan covers the entire Monrovia City, and including the following facilities, Crossing Walks 600, Stopping Signs 75, Speed Limitation Signs 250, No Parking, Waiting Signs 2008, One way Signal 8, Do not Enter Signals 8.

(2) Number of Registered Vehicles

The number of vehicles in 2008 has suddenly doubled that of 2007 as shown in Table 2.4-8, because the commercial motorbikes started to register with a high number of about 11,000. The motorbike market in Liberia was not so large and could not permit commercial usage before 2008. The actual number of four-wheel vehicles registered has been constant for the last three years with about 10,000 to 13,000 vehicles. Based on only this statistical data, it is difficult to estimate an accumulated number of vehicles presently driven, but the total number of vehicles presently driven are expected to increase about 10,000 every year considering the long-aged car-holding situation.

Table 2.4-8 Number of Registered Vehicle in Every Year from 2006 to 2008

Description	Category	Year 2006	Year 2007	Year 2008 (Jan – Nov)
Commercial	Taxi	3374	1,618	1,990
	Bus	756	320	382
	Pick Up	283	221	227
	Truck	335	246	277
Business	Car	1396	1,334	1,368
	Car Initial	74	155	112
	Bus	202	121	149
	Pick Up	380	499	986
	Pick Up Initial	0	1	54
	Truck	640	499	590
Private	Car	3669	2753	4270
	Car Initial	553	857	670
	Bus	33	47	23
	Bus Initial		0	2
	Pick Up	355	301	548
	Pick Up Initial		0	3
	Truck	7	8	12
Others	NGO	944	857	1280
	NGO Initial	330	473	454
	NGO Motorcycle	263	-	497
Commercial	Motorcycle	106	-	11,457
Private	Motorcycle	-	-	974
Private	Motorcycle Initial	37	-	1
Others	Trailers	4	17	11
Others	TEST	-	2	9
Business	Motorcycle	-	291	53
	Motorcycle Initial	3	12	3
Others	Consulate	106	4	6
Total		13,774	10,636	26,408 (Exclude Motorcycle 13,920)

Source: MoT

(3) Traffic Accident in Monrovia

During the year 2008, a total of 1,009 road traffic accident cases were recorded, which is almost

doubled against 2005 accidents as referred to in Table 2.4-9. Among these accidents, 160 pedestrians are involved in the accidents with 26 deaths and 134 injured. The number of deaths and injured persons are adding year after year according to the increased numbers of accident cases. The crash type of vehicle to vehicle comes to more than 50% within the last two years. The increase of accidents is caused by the expansion of motorization and lack of maintenance and installation of road facility, especially such as traffic signal, traffic sign, and lack of traffic safety education.

Table 2.4-9 Traffic Accident Report 2005 – 2008 in Monrovia

Year		2005	2006	2007	2008
Number of Accident		528	689	825	1009
Accident Casualty of Death	Driver	12	9	15	25
	Accompanied	9	6	45	87
	Pedestrian	28	19	22	26
	Total	49	34	82	138
Accident Casualty of Injury	Driver	201	112	168	115
	Accompanied	411	374	209	651
	Pedestrian	111	146	158	134
	Total	723	632	535	900
Type of Crash	Vehicle to Vehicle	126	190	729	684
	Vehicle to Pedestrians	199	257	153	417
	Self Accident	286	290	182	211

Source: LNP

(4) Vehicle Inspection System

The Liberia National Police are to launch vehicle inspections, beginning with trucks from November 2008. The exercise which would be launched by Police Director, is intended to ensure that only road worthy vehicles ply the streets of Liberia. The exercise which for now is a voluntary one would be launched at the Monrovia Transit Authority (MTA) head office in Gardnerville, near Monrovia.

2.4.2.4 Status of Other Transportation Sub-Sectors

(1) Existing Ports Infrastructure and Facilities

The National Port Authority (NPA) has, by the 1974 Act of the National Legislature, been mandated to manage all seaports in Liberia. The NPA is an incorporated State-Owned Enterprise, responsible to provide and maintain port facilities, and derive its revenues from marine and port services, storage and handling charges. NPA's management is over-sighted by an Executive Board appointed directly by the President.

There are four main seaports in Liberia: the Freeport of Monrovia, Buchanan, Harper and Greenville. The Freeport is the most important and active, and this is where most of the imported commodities arrive. The other three ports, mainly used in the past for exporting logs, have limited handling capacity thereby forcing vessels berthing at these ports to provide their own handling equipment. Major constraints at the Freeport include channel shrinkage, blockage of berths by capsized vessels, limited and outmoded discharging and handling equipment and heavy reliance on manual labor. The Freeport of Monrovia is a major problem for any investor either bringing in supplies or attempting to export products.

(2) Airports and Civil Aviation

The MOT is responsible for regulating the civil aviation sub-sector. This includes the licensing of airports, aircraft and pilots.

Liberia has one international airport, Roberts International Airport (RIA), about 45km outside Monrovia. The RIA and all its operations are managed by Roberts International Airport Agency (RIAA). In contrast to the NPA, RIA has not been incorporated and technically it is a public budgetary entity, while in reality, it functions as a State Owned Enterprise (SOE).

Liberia Domestic Airport Agency (LDAA), prior to the war, served as a hub for air traffic to the leeward counties of Liberia and to some of Liberia's neighboring countries. UNMIL has carried out

partial repairs of runways and renovation of portions of the infrastructure, thereby creating leverage for limited operation of fixed-wing aircrafts and helicopters. 5 of the 43 airstrips around the country, including James Spriggs Payne, have benefited from the repairs and renovations.

In the future, the aviation network needs to be revitalized and coordinated from James Spriggs Payne airport for domestic and regional flights; and RIA for passengers and goods arriving from abroad and directed to other centers of Liberia besides Monrovia.

(3) Railway Transport

The railways have been almost non-operational for nearly 20 years. The railway network in Liberia was constructed by the mining companies to transport iron ore from the now closed iron ore mines at Mano River (Grand Cape Mount County), Bong Town (Bong County), and the Gahnpa -Yekepa area (Nimba County) to the ports of Monrovia and Buchanan. The total length of the network was about 500 km. The last mine closed soon after the war started in 1986. Since then tracks were left unattended.

2.4.2.5 Existing Road Maintenance System

(1) Organization and System

The maintenance of all roads except tracks in the communities is under the responsibility of the Ministry of Public Works. Within the Ministry, Operation Department is conducted, the maintenance works and the Department has highway Maintenance Division, Mobile Equipment Division and Administration Division.

Under highway maintenance division, there are 16 maintenance districts in the country and they are responsible for road maintenance in their districts. Each resident engineer of the field office submits their monthly progress report to the chief of Highway Maintenance Division. The field offices covered the entire country are as follows:

- | | |
|--|-------------------------------------|
| 1. Nimba Maintenance District | 2. Lofa Maintenance District |
| 3. Bomi Maintenance District | 4. Bong Maintenance District |
| 5. Grand Cape Mount Maintenance District | 6. Grand Gedeh Maintenance District |
| 7. Grand Kru Maintenance District | 8. River Cess Maintenance District |
| 9. River Gee Maintenance District | 10. Gbarpolu Maintenance District |
| 11. Bassa Maintenance District | 12. Margibi Maintenance District |
| 13. Montserrado Maintenance District | 14. Careysburg Maintenance District |
| 15. Sinoe Maintenance District | 16. Mary Land Maintenance District |

However there is a plan to restructure this maintenance organization. In the new plan, 15 counties in the country will be divided into 5 regions and it will be established in each regional base station. Labor force and equipment will be integrated to the base station and individually responsible for the maintenance works in the region. Labor force and equipment belonging to the head quarter will be out of this regional base station and this central station will be placed in Grater Monrovia but they will act for emergency mobilization and /or equipment management.

Some portion of the maintenance works are carried out by private contractors which are selected through competitive bidding. The work volume of the Ministry's own labor force is approximately 60% and the other margin is contracted out to private sector.

(2) Budget

The actual expenditure of the operation department in year 2008 is USD3, 727,257. Breakdown of the amount is shown in Table 2.4-10.

Table 2.4-10 Expenditure of Operation Department (2008)
(unit: USD)

Item	Amount
Personal Services	510,057
Basic Salary – Civil Service	310,057
Overtime Payment	200,000
Goods & Services	970,407
Fuel	620,235
Insurance for Vehicles	25,500
Specialized Equipment	15,875
General Office Materials & Services	49,600
Rental & Lease – Residential Property	58,400
Other Rental & Leases	75,000
Other General Consumable	21,922
Domestic Means of Travel	35,000
Routine Maintenance, Repair of Equipment	23,500
General Reserves	45,375
Capital Expenditure	2,246,793
Vehicles	195,215
Computers	18,785
Office Equipment	24,093
Other General Equipment	927,500
Sub Stance Maintenance and Renovation	1,081,200
Total	3,727,257

(3) Equipment

The Ministry received 10 units of construction equipment from China in 2004 and 16 units from United States in 2007. The donation from China was the first cooperation after the civil crisis. The program of USAID was not only equipment supply but also theoretical and practical training for operation and maintenance method of equipment was provided.

The Ministry plans to purchase several vital units of construction equipment by 09-10 Budget allotment. Some of this equipment will be deployed in parts of rural Liberia to do routine road maintenance exercise.

The owned equipment and its condition at present are summarized in Table 2.4-11.

Table 2.4-11 List of Equipment

Equipment	Condition
Wheel Loader	1-good, 3-fair, 1-poor & 1-down
Motor Grader	2-good, 2-fair & 2-down
Roller	6-good
Bulldozer	2-fair
Backhoe Loader	1-down
Cargo Truck	1-good
Dump truck	9-good, 4-fair & 3-down
Water Truck	1-good
Fuel Truck	1-good
Trailer	1-good

The rehabilitation of the Road Maintenance Training Center is expected to be carried out by LCIP under USAID program.

2.4.3 Result of Road Inventory Survey

2.4.3.1 Conduction of Road Inventory Survey

The Study Team carried out the inventory survey of the road network in the Study Area. The main objectives of the inventory survey are the following:

- To collect data on the present condition of the existing road to be used in the traffic analysis/forecast, and
- To assess the existing road condition in the Study Area and identify the problems.

There are many roads for the access to the communities and most of those are dead-end tracks. Effective road network will contribute smooth mobility and cost saving for the road users. In this inventory, some minor feeder roads are also included to consider the expected role in the sparse network. But feeder roads which do not work in the road network are excluded.

The Road category is classified into 4 classes, i.e. Primary, Secondary, Feeder and Urban. The field survey was conducted in February 2009. It means that the road condition will be improved due to ongoing rehabilitation works in central Monrovia and some major road sections.

Road section and its location under this road inventory survey are shown in Figure 2.4-13 and Table 2.4-12 respectively.

Table 2.4-12 Road List of Inventory

Rd No.	Road Name	Start	End	Distance	Remarks
1	TUBMAN Boulevard	UN Drive/Bypass	ELWA Jct.	11.3 km	
2	Water Street	Johnson St. Br.	UN Drv.	0.9 km	
	UN Drive	Water St.	Sekou Tonre Ave.	1.2 km	Road closed
	Sekou Tonre Avenue	UN Drv.	UN Drv.	0.8 km	
	UN Drive	Sekou Tonre Ave.	Bypass	2.1 km	
3	Bushed Island Rd.	Benson St./Bypass	Saint Paul Br.	10.3 km	
4	SOMALIA Drv.+Paynesville	Free Port	ELWA Jct.	17.1 km	
5	KAKATA Highway	Red Light Jct.	Mount Barclay	8.0 km	
6	RIA Highway	ELWA Jct.	Wamba Town	11.2 km	
7	Benson Street	UN Drv.	Bypass	2.0 km	
	Bypass	Benson St.	UN Drv.	1.5 km	
8	Caldwell Rd.	Duala	Sah Town	11.0 km	
9	Banersville Rd.	SOMALIA Drv.	Kaba Town	5.0 km	
		Kaba Town	Caldwell Rd.	5.8 km	
10	Johnsonville Rd.	Dry Rice Market	Mount Barclay	10.7 km	
11	GSA Rd.	SOMALIA Drv.	Rehad Rd.	2.8 km	
12	SKD Boulevard+72nd Rd.	TUBUMAN Blvd.	SOMALIA Drv.	4.9 km	
13	Flamah Rd.	TUBUMAN Blvd.	TUBUMAN Blvd.	3.8 km	
14	Congo Town Back Rd.	TUBUMAN Blvd.	RIA Hwy.	4.4 km	
15	Pipe line Rd	Red Light Jct.	Johnsonville Rd.	7.0 km	impassable
16	Logan Town Rd.	Caldwell Rd.	Free Port	2.7 km	
	Jamaica Rd.	Logan Town Rd.	SOMALIA Drv.	2.1 km	
17	Russell Avenue	Bypass	12th St.	2.3 km	
18	New Georgia Rd.	SOMALIA Drv.	Samie Town	5.9 km	impassable
19	Congo Town Old Rd.	TUBUMAN Blvd.	TUBUMAN Blvd.	4.0 km	
20	Red Light Detour	Pipeline Rd.	SOMALIA Drv.	3.1 km	impassable
21	Red Light Detour	KAKATA Hwy.	Pipeline Rd.	1.3 km	
22	Red Light Detour	Paynesville	KAKATA Hwy.	2.9 km	
23	Samuka Rd.	Caldwell Rd.	Johnsonville Rd.	8.1 km	
24	Greene Town Rd.	Johnsonville Rd.	Kaba Town	4.2 km	
25	Detour	Samuka Rd.	Greene Town Rd.	2.1 km	
26	Dixbille Rd.	Caldwell Rd.	Banersville Rd.	3.8 km	
27	Sah Town Rd.	Caldwell Rd.	Samuka Rd.	3.8 km	
28	Duport Rd.+Rehad Rd.	Paynesville	RIA Hwy.	6.1 km	
29	Kotafe Rd.	RIA Hwy.	GSA Rd.	2.0 km	
30	Abtolbert Rd.	Paynesville	ELWA Jct.	1.9 km	
31	S.D. Cooper Rd.	TUBUMAN Blvd.	RIA Hwy.	1.3 km	
32	VP Rd.	TUBUMAN Blvd.	Old Rd.	0.5 km	
33	Coleman Ave. to 12th St.	21st St.	TUBUMAN Blvd.	1.3 km	
34	Mechlin Street	UN Drv.	UN Drv.	1.3 km	
35	Camp Johnson Rd.	Broad St.	UN Drv.	1.1 km	
36	Broad Street	Johnson St.	Mechlin St.	0.8 km	
37	Airport Short cut	TUBUMAN Blvd.	Flamah Rd.	0.5 km	

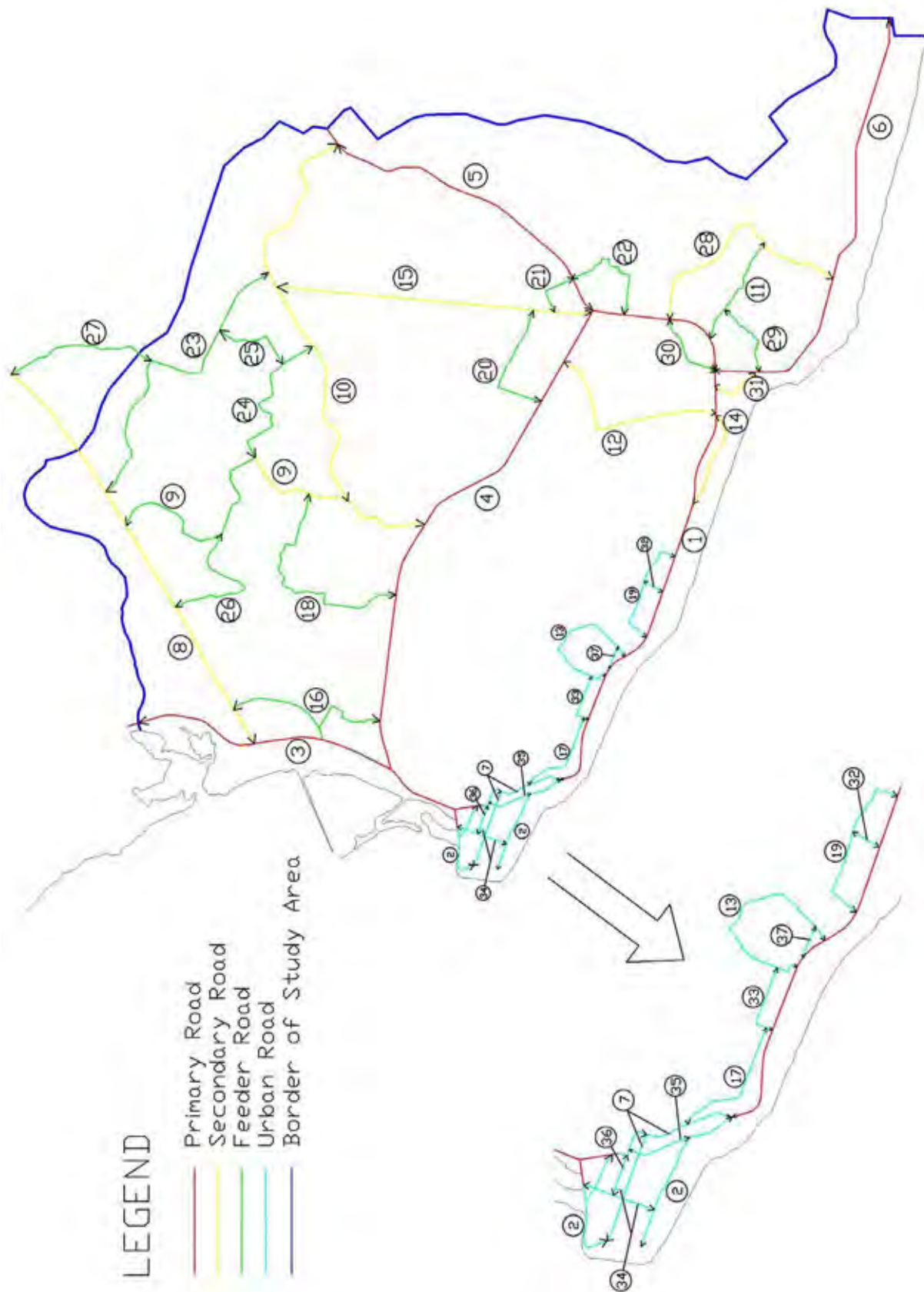


Figure 2.4-13 Location of Road Section

2.4.3.2 Existing Road Network System

The road network of Greater Monrovia is quite sparse. It is composed of a circumferential road around huge marsh and three radial roads as primary road network. While, secondary roads shall be connected with primary network to cover the whole concerning area but it does not work well at present. Thus vehicles concentrate in the primary network and it creates traffic congestion. A road network needs to be balanced from the viewpoint of functional hierarchy. Figure 2.4-14 shows existing road network investigated by the Study Team. Figure 2.4-15 shows the road density by community, based on the road network investigated by the Study Team.

At present feeder roads are utilized for the access and/or inside communities by the local residents. Although feeder roads are not functioning as part of present road network, this inventory survey investigates them because it is expected to work in the future road network.

The urban roads are utilized for social and/or commercial activities. Central Monrovia is the most congesting area by several people and several purposes. Capital Bye-pass Road and Russell Avenue are effective alternative routes to avoid congesting sections of Tubman Boulevard. Sinkor, Lakpazee and Old Road district have many roads and densely cover the communities. However, network is not developed for travelling to the other areas.

Figure 2.4-16 shows the share of each road category by road length.

Basically the share of lower category shall be bigger for the effective functional hierarchy. In the long term development plan of Great Monrovia, it is necessary to consider the new road development for the substantial secondary road function.

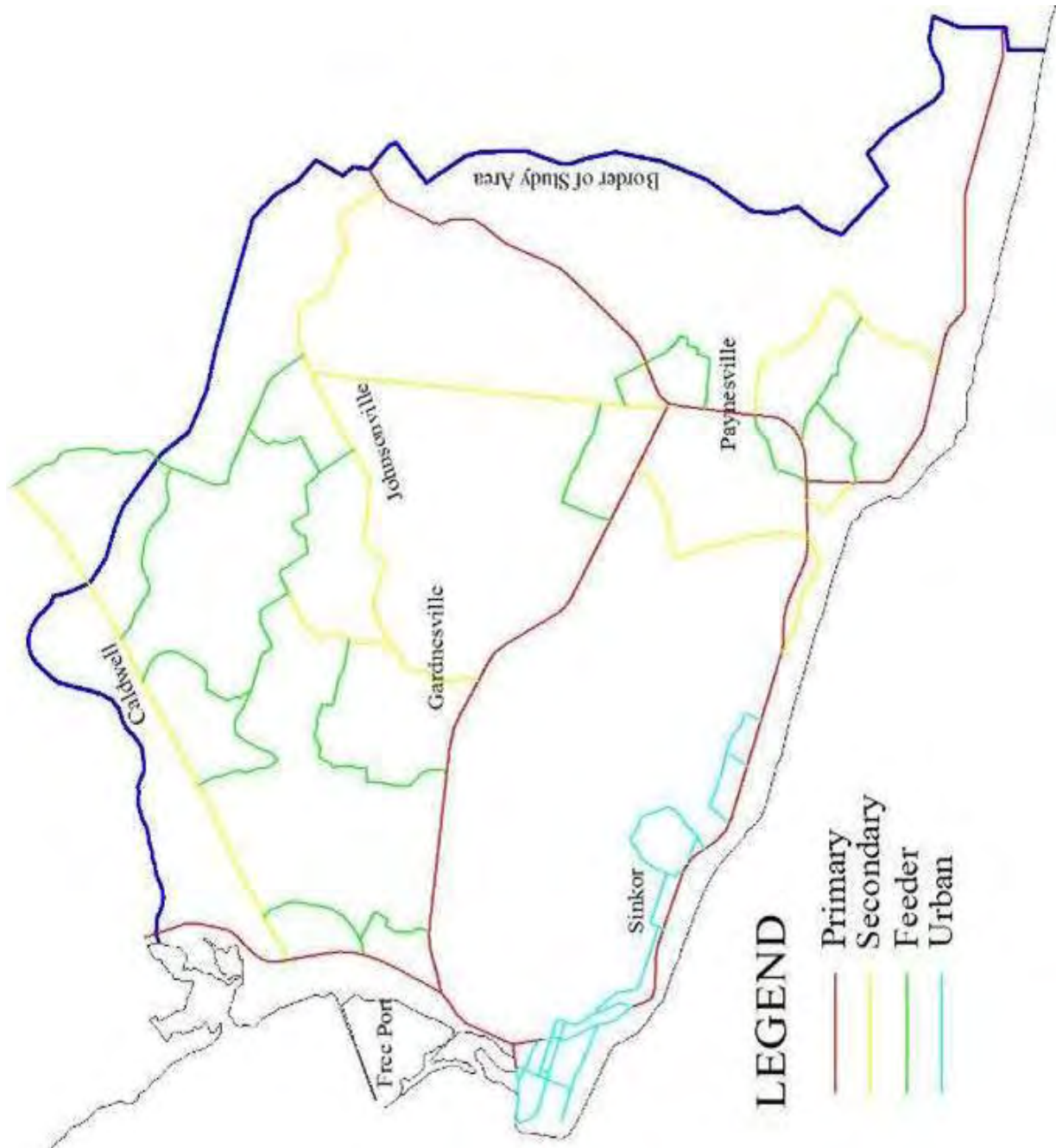


Figure 2.4-14 Existing Road Network

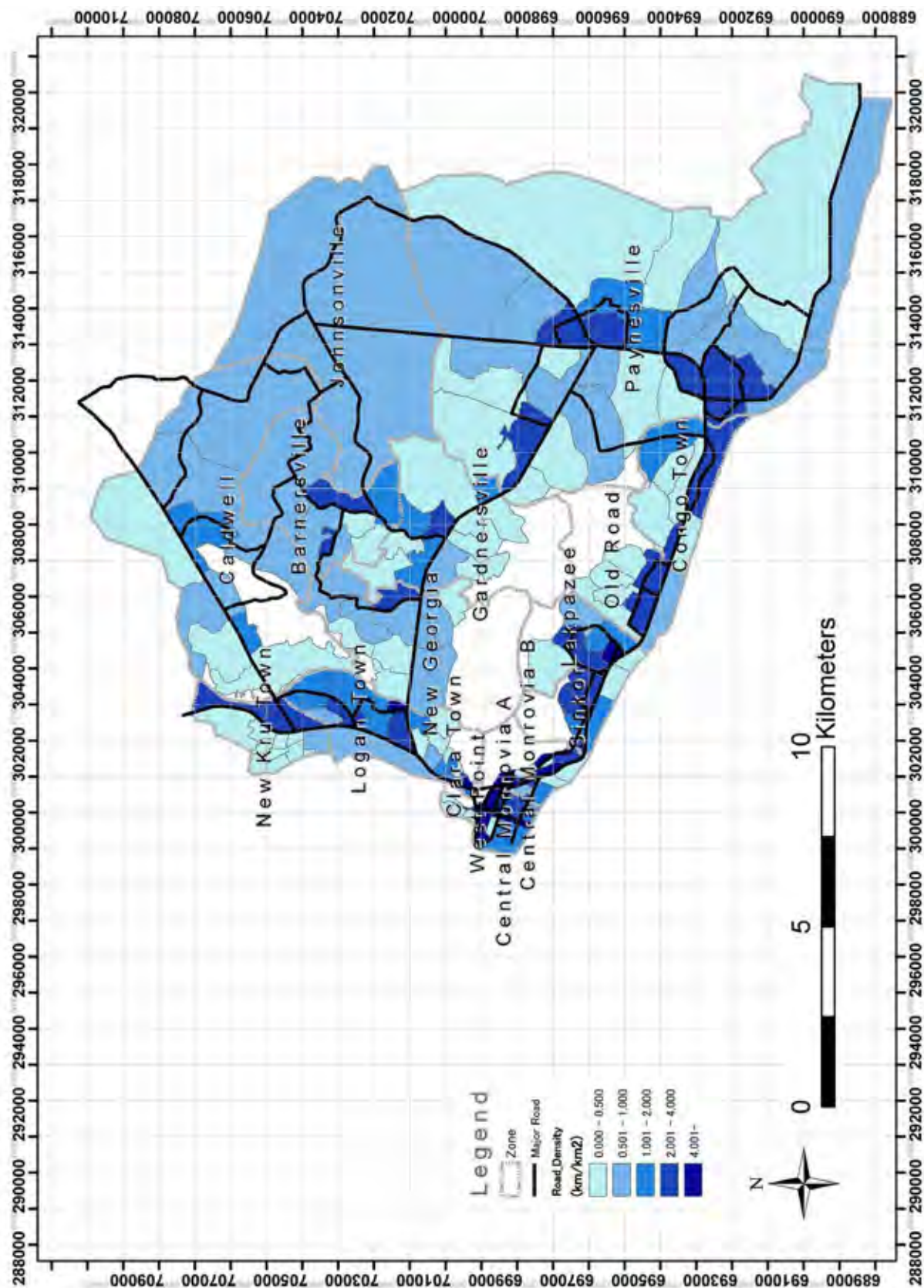


Figure 2.4-15 Road Density by Community

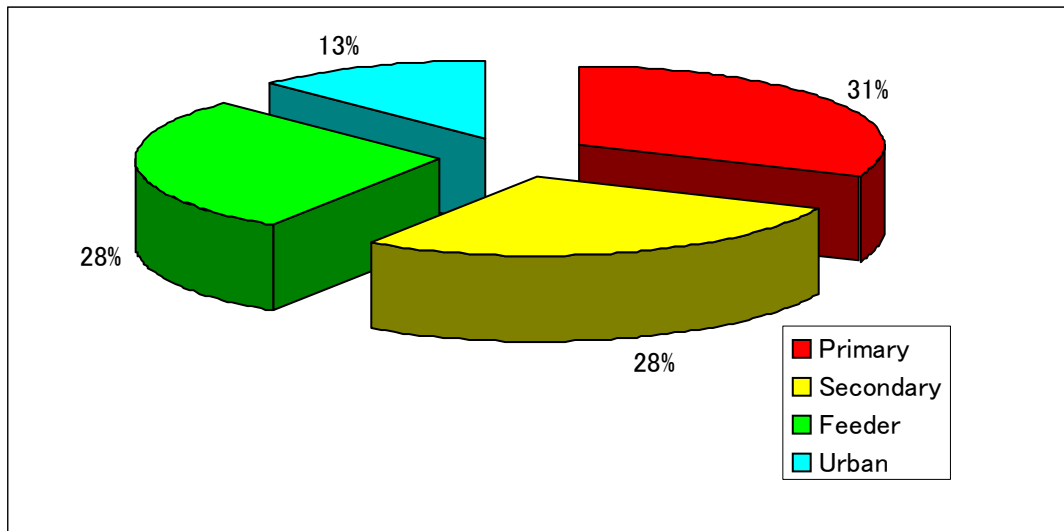


Figure 2.4-16 Share of Road Category

2.4.3.3 Existing Road Condition

The details of inventory survey results including road condition will be attached in Appendix.

(1) Surface Type and Condition

Surface of roads are divided into five types, i.e. cement concrete (CC), asphalt concrete (AC), bituminous surface treatment (BST), gravel and earth. It seems that the gravel and earth roads may be impassable during rainy season due to the deep puddles and/or muddy surface which are caused by their roughness and poor drainage system. The shares of surface type by road categories are shown in Figure 2.4-17. The share of BST is very small and it is included in AC category.

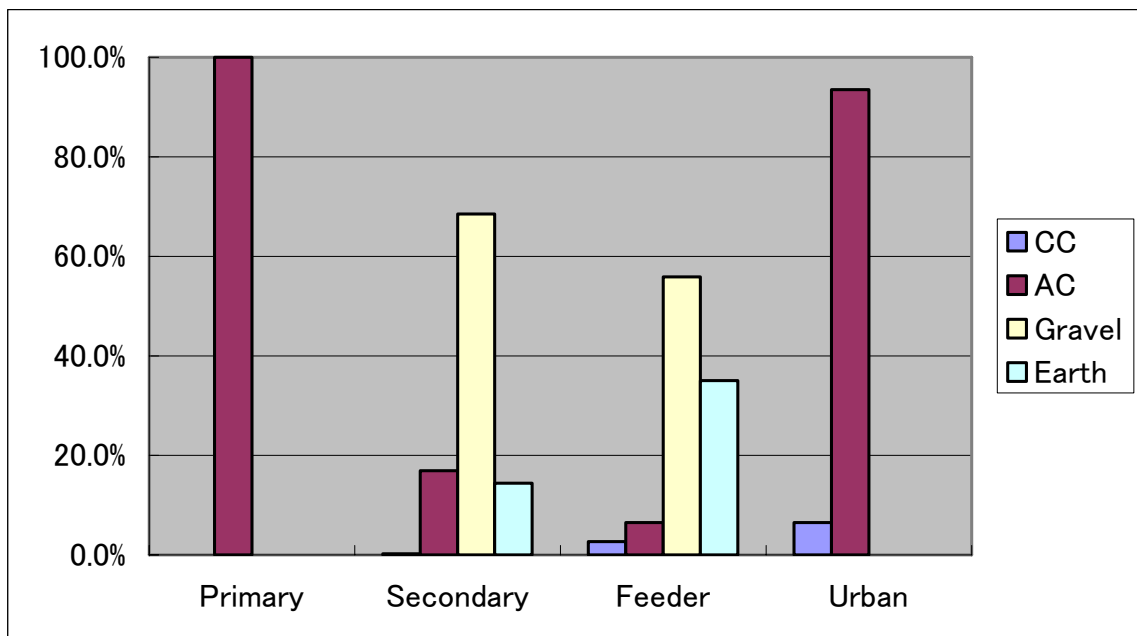


Figure 2.4-17 Share of Surface Type

Primary roads were recently rehabilitated with AC pavement. The share of AC surface is 100% in primary roads. The condition of surface is generally favorable in most of the stretch of primary roads. In Freeport area, the pavement is heavily damaged and it is having many potholes and raveled pavements.

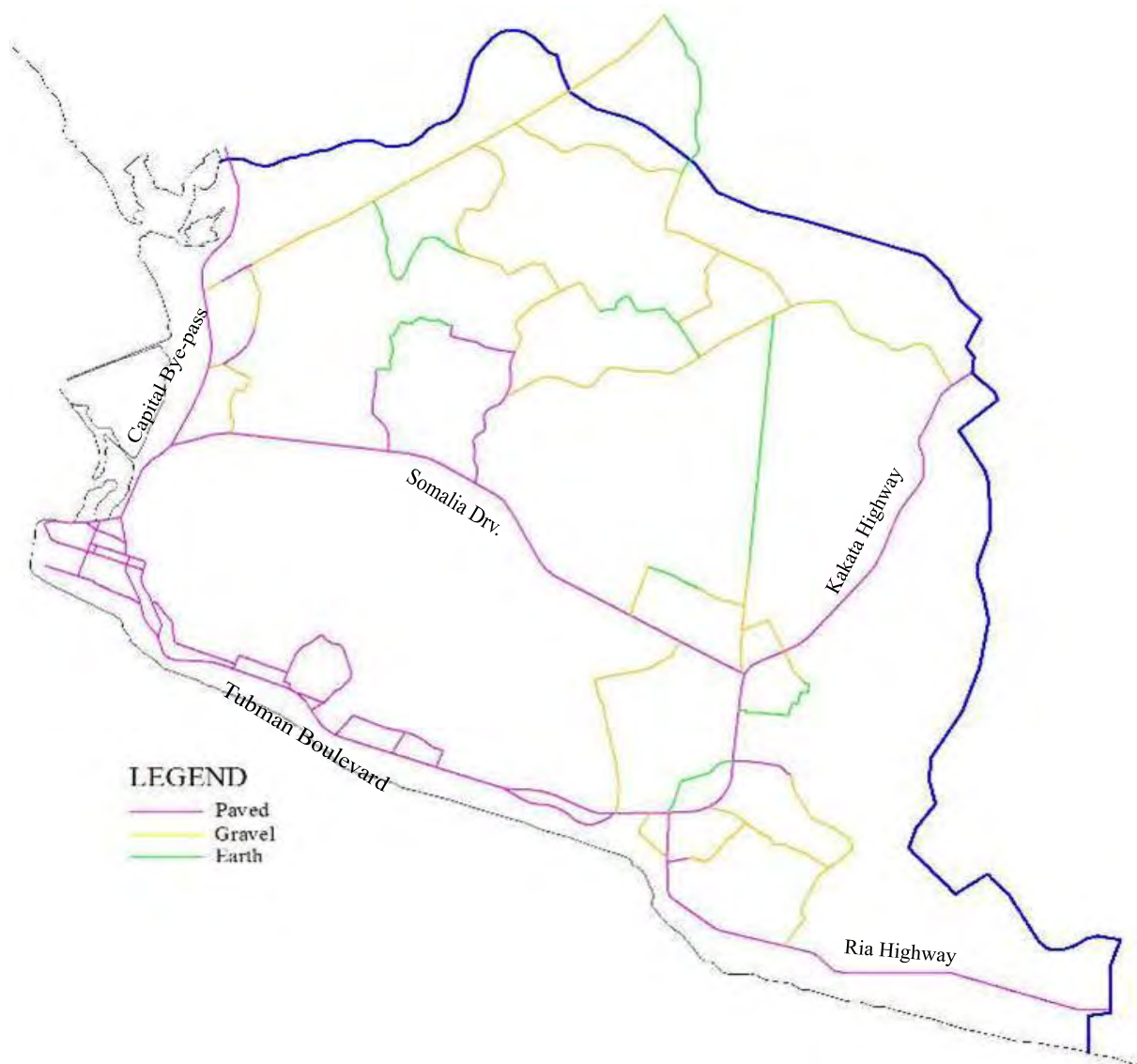


Figure 2.4-18 Surface Type of the Road

There are many unpaved urban roads in Sinkor, Lakpazee and Old Road District. But it is focused only on the roads in the network of this study. Investigated road sections of urban roads are all paved by CC or AC. The condition of pavement is generally worse than primary road. There are many potholes unrepaired in Central Monrovia district. While Emergency Infrastructure Project implemented by the Ministry of Public Works is going to rehabilitate Monrovia city streets covering 24km in length. It is expected that the urban roads will be in better condition.

As shown in the above figure, the ratio of pavement in secondary and feeder roads is low. Except Barnesville Road, typically only few hundred meter of the stretch from junction with major road is paved in this road category. In addition, condition of pavement is unfavorable. There are many potholes and cracks due to the age of pavement and it is observed that raveled edge of pavement caused by the gap with shoulder in many sections. In some sections it is difficult to identify gravel surface or earth surface because of the quality of laterite layer. The secondary roads with gravel surface are generally maintained well and it may be passable on all weather condition. It seems like the maintenance of the feeder roads are been abandoned for long. Generally, drainage of surface water is not considered and even roadside level is higher than road. It is easily guessed that there are impassable situations of many feeder roads during rainy season. In fact some small streams are crossing the road without any drainage structure.

Figure 2.4-18 shows surface type of each road section.

(2) Cross Section

Most of the roads are undivided 2 lane composition. Among the investigated roads, Tubuman Boulevard, Bushrod Island Road, Capital Bypass and Broad Street are multi lane composition. Only Broad Street has median strip.

Basically lane width in paved road is 3.5 meter per lane. So undivided 4 lane road has 14.0 meter or more in width and 2 lane road is normally 7.0 meter in width. Typical cross sectional composition is illustrated in Figure 2.4-19.

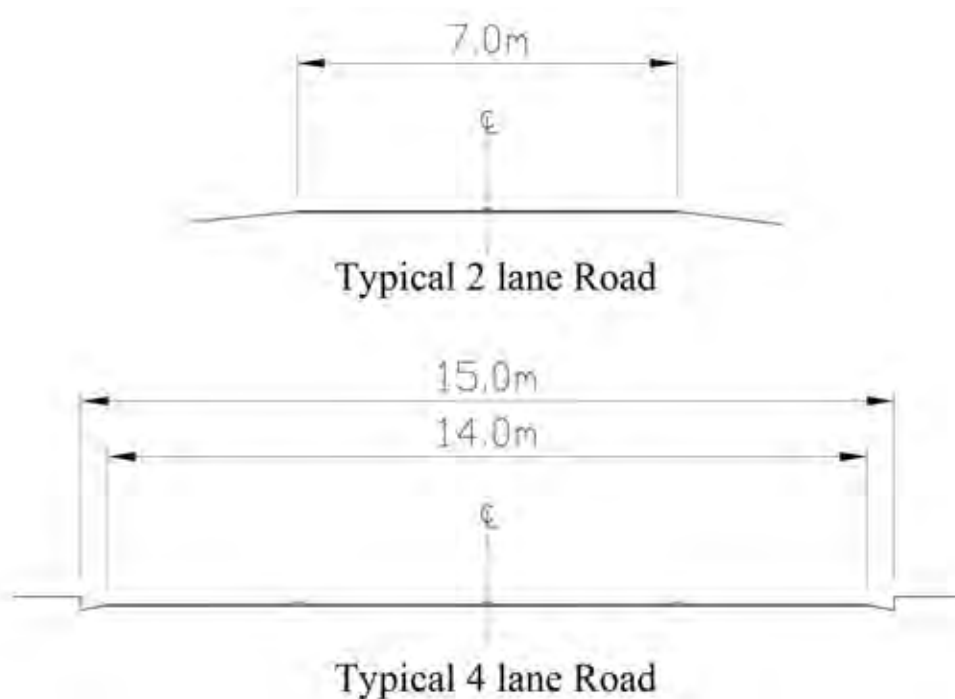


Figure 2.4-19 Typical Cross Section

Regarding unpaved road, the width of travelled way is various. In general tendency, secondary roads with gravel surface have enough width for the traffic of both directions in range from 7 meter to 10 meter. The roads with earth surface and feeder road with gravel surface are basically narrow and range from 2.5 meter to 5 meter. It is difficult for a vehicle to pass by a car coming from an opposite direction.

2.4.3.4 Existing Bridge Condition

Along the investigated road sections, there are 16 bridges including the fallen Vai Town Bridge. Instead of bridge, so many culverts are installed for the cross drainage structure and they are made by concrete pipes, corrugate pipes and/or RC box type structures. Locations of surveyed bridges are shown in Figure 2.4-20.

At present 3 locations are in an impassable condition. Pipe Line Road is impassable at broken pipe culvert, only this location is culvert, and New Georgia Road is unconnected at heavily damaged bailey bridge. The bridge marked "K" on the Red Light detour is impassable by the vehicle because of the washed away approach road. In the survey, Vai Town Bridge is excluded because reconstruction has started.

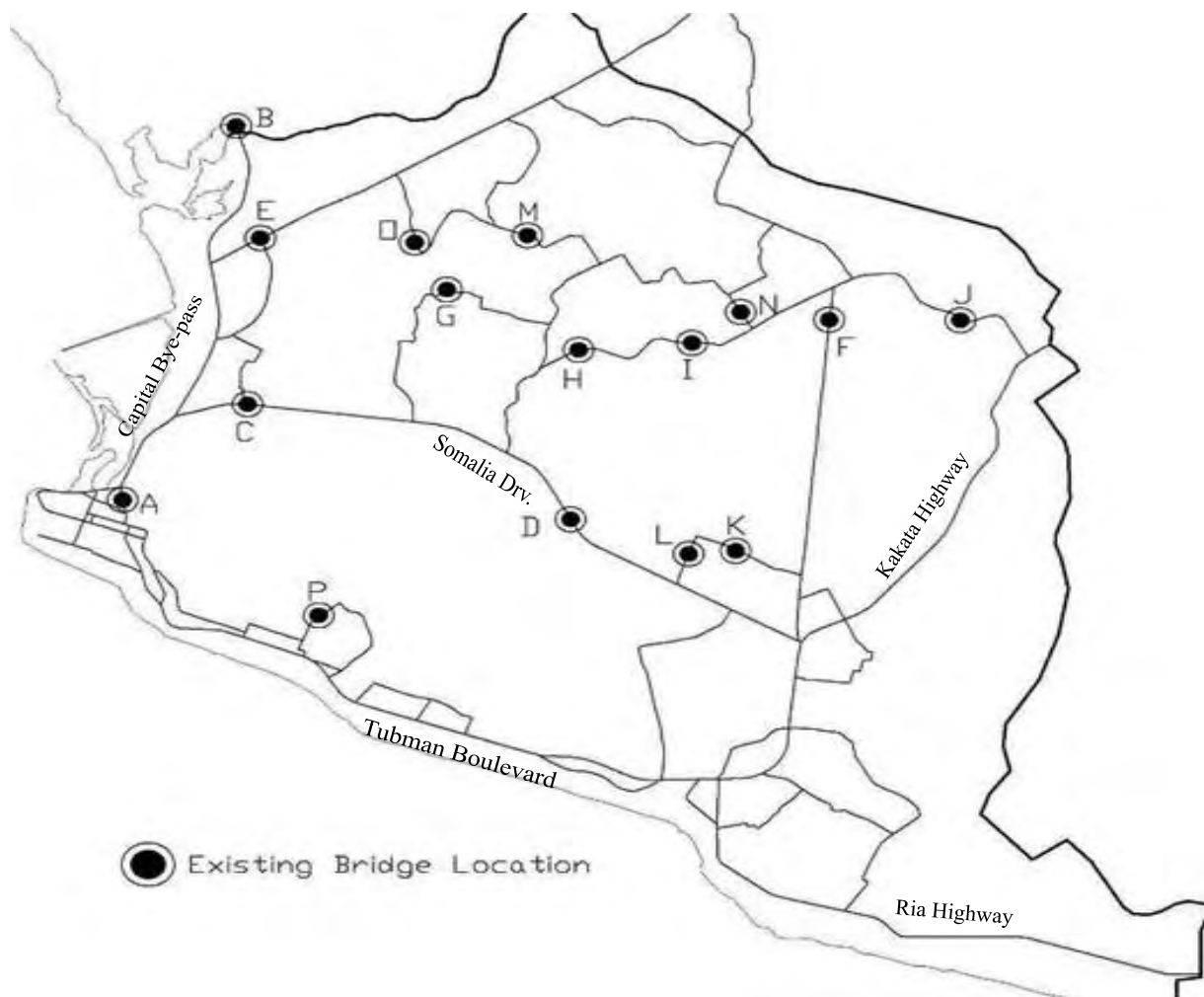


Figure 2.4-20 Location of Bridges

Among the sixteen (16) locations, the impassable sections are only 3, but weak, narrow, unstable and/or damaged bridges are placed yet on other secondary and feeder roads. In the case of considering the heavy loaded trucks, which transports agricultural products from the interior to the markets, all the bridges located on secondary, feeder and urban road are weak compared to the expected traffic load and they should be replaced. Summary of survey results is shown in Table 2.4-13.

Table 2.4-13 Bridge List and its Condition

Br. Code	RD. No.	Chainage	Location	Length	Width	Structure Type	Condition	Remarks
A	3	0+300	Johnson Street	420.0m	9.0m	3 span PC Box Girder	Fair	2 lane
B	3	10+000	Saint Paul	286.5m	9.0m	3 span PC Box Girder	Fair	2 lane
C	4	1+300	Somalia Drv.	83.5m	9.2m	4 span PC Girder	Fair	
D	4	8+200	Somalia Drv.	50.0m	7.2m	2 span PC I Girder	Fair	
E	8	1+000	Caldwell Rd.	107.0m	5.1m	Multi span steel Girder	V Bad	1 lane
F	15	6+300	Pipeline Rd.	-	-	Pipe Culvert	Broken	Impassable
G	18	2+200	New Georgia Rd.	15.0m	3.3m	1 span Bailey	V Bad	Impassable
H	10	0+800	Johnsonville Rd.	11.7m	5.3m	1 span RC Slab	Bad	1 lane
I	10	3+100	Johnsonville Rd.	7.0m	8.0m	2 span RC Slab	Fair	
J	10	8+900	Johnsonville Rd.	7.4m	3.0m	1 span RC Slab	Bad	1 lane
K	20	1+300	Redlight detour	5.6m	3.3m	1 span RC Slab	V Bad	Impassable
L	20	2+500	Redlight detour	9.0m	5.0m	2 span RC Slab	Fair	1 lane
M	9	6+900	Banersville Rd.	18.0m	3.3m	1 span steel Girder	V Bad	Temporal
M	24	0+400	Greene Town Rd.	10.5m	3.6m	1 span RC T-Girder	Bad	
O	26	1+600	Dixville	9.0m	3.3m	1 span steel Girder	V Bad	Temporal
P	13	1+100	Fiama Rd	10.0m	7.0m	3 span RC Slab	Fair	

Caldwell bridge is narrow 1 lane bridge even approach road has enough width for the traffic on both directions. This bridge is considered to reconstruct by World Bank fund.

2.4.4 Result of Traffic Volume and Travel Speed Survey

2.4.4.1 Preparation of Field Survey

(1) Survey Manual

Prior to the field surveys, the survey manual for each of the surveys was prepared by Local Consultant in English and approved by the JICA Study Team.

(2) Survey Forms

The JICA Study Team prepared sample of the survey form. The local consultant prepared the actual interview/counting form with approval of the JICA Study Team. Each of these survey forms were properly designed for coding, input, and include at least the following general items:

- Survey point and direction of traffic flow;
- Name of interviews/enumerators/surveyors and supervisor; and
- Date and time of Survey.

(3) Zoning

The zoning of the Study Area was prepared in consideration of the followings.

- Traffic zones in the Study Area shall accord to the administrative boundaries of the 16 districts and 3 outer zones.
- Outer zones shall be grouped by the same access points to primary road.

Table 2.4-14 Traffic Zoning Code

Area	No.	Zone Name	Remarks
Greater Monrovia	01	New Kru Town	
	02	Logan Town	
	03	Clara Town	
	04	West Point	
	05	Central Monrovia A	
	06	Central Monrovia B	
	07	Sinkor	
	08	Lakpazee	
	09	Old Road	
	10	Congo Town	
	11	Paynesville	
	12	Gardnersville	
	13	New Georgia	
	14	Barnersville	
	15	Johnsonville	
	16	Caldwell	
Outside Greater Monrovia	17	Bomi, Grand Cape Mount, Gbarpolu,	SIERRA LEONE
	18	Montserrado, Margibi, Bong, Nimba, Lofa	GUINEA
	19	Grand Bassa, River Gee, Sinoe, Grand Gedeh, River Cess, Grand Kru, Maryland	COTE D'IVOIR

(4) Traffic Survey Location

The survey locations are shown in Table 2.4-15 and Figure 2.4-21 respectively.

Table 2.4-15 Location Name of Traffic Count Survey

Type	No	Location Name	Time
Screen Line Survey	SC1	Johnson Street Bridge, UN Drive	24hours
	SC2	TB Annex Congo Town, Tubman Boulevard	
Cordon Line Survey	CL1	St. Paul bridge, UN Drive	Counting 24hr/ Interview 12hr
	CL2	Gbengbar Town, Airport Road	
	CL3	Mount Barclay check point	
Traffic Count Survey	TC1	Stockton Creek bridge, Somalia Drive	24hours
	TC 2	Double bridge, Somalia Drive	
	TC 3	Cellcom Horton drive	
	TC 4	Fish Market, Tubman Boulevard	
	TC 5	Cadwell bridge	12hours
	TC 6	Freeport Intersection, UN Drive	
	TC 7	UNMIL Green Building	
	TC 8	Shalks Junction Air-Field	
	TC 9	Old road Junction b/w German Embassy &Nigeria High Commission	
	TC 10	Victory Chapel Paynesville City	
	TC 11	Chocolate City Junction	
	TC 12	Barnesville Estate Junction	



Figure 2.4-21 Traffic Count Location

2.4.4.2 Methodology of Traffic Count Survey

(1) Screen Line Survey

The screen line survey aimed at calibrating the current origin-destination matrices obtained from the person-trip survey in terms of vehicles. To obtain the traffic volume data, a screen line survey was carried out at two (2) stations (SC1 and SC2) along the urban and primary roads connecting central Monrovia. The classified vehicular traffic volume by vehicle type and direction was counted for 24 hours from 6:00 a.m. to next 6:00 a.m. The types of vehicle were classified as follows.

- Sedan /Pickup/Wagon
- Taxi
- Mini-bus
- Large Bus
- Light Truck (2-Axle Truck)
- Heavy Truck (>2-Axle Truck)
- Trailer
- Motorbike
- Bicycle

(2) Cordon Line Survey

Greater Monrovia has connection with other counties economically and socially. Therefore, there are significant transport movements of passengers and goods among these counties. The cordon line survey aimed at determining the trips to/from the Study Area made by nonresidents and to calibrate the origin-destination (OD) matrices obtained from the person trip survey on the Study Area boundary. To obtain such data, roadside OD interview survey and traffic count survey at three (3) stations (CL1, CL2, and CL3) were conducted along the boundaries of the Study Area.

The classified traffic volume by vehicle type and direction was counted for 24 hours from 6:00 a.m. to next 6:00 a.m. Vehicle type classification was the same as that used in the Screen Line Survey.

Roadside OD interview was conducted for 12 hours from 6:00 a.m. to 18:00 p.m. while the above mentioned survey was conducted at the same time. Target samples more than 10 % from the traffic were stopped at random, and then drivers were interviewed.

The following information was collected in the driver's interview

- Trip Purpose (To home, To work, To school, Private Business, Employers Business, or Private)
- Origin and Destination
- Number of Passengers (including Driver and co-drivers)
- Loading Items/ Commodity
- Vehicle Registration Place

(3) Traffic Count Survey

The vehicular traffic volume by vehicle type and direction was counted at twelve (12) stations. 24 hours counting at four (4) stations (TC1 to TC4) are carried out from 6:00 a.m. to next 6:00 a.m. excluding Saturday, Sunday and national holidays, 12 hours counting at eight(8) stations (TC5 to TC12) are from 6:00 a.m. to 18:00 p.m. Vehicle type classification was the same as that used in the Screen Line Survey.

(4) Travel Speed Survey

The objectives are to find where the bottle-necks of road network exist in the peak hour, and to set the quantity-velocity function for each road combined with the result from traffic count survey. Travel speed survey was conducted along major 5 routes in the Study Area. By the floating car method Travel Speed Survey was conducted 3 times at the peak of the morning hours, the afternoon and also at the peak of the evening hours of weekdays.

The survey route and location are shown in Table 2.4-16 and Figure 2.4-22 respectively.

Table 2.4-16 Road and Location Name of Travel Speed Survey

No	Road Name	Location Name	Feature	Time
1	UN Drive	St. Paul bridge - Johnson Street Bridge	Industrial and Commercial Area	Morning peak, Afternoon, and Evening peak
2	Somalia Drive	Somalia Drive from Freeport - Red light	Industrial and Commercial Area	
3	Tubman Boulevard	Red light - Old Road Catholic Junction	Commercial	
4	Broad Street - Capital Bye-pass-Tubman Boulevard	Jct. Broad Street / Mechlin Street - Old road	City Center	
5	Robert Field Highway	E.L.W.A Junction - Gbengbar Town (Study boundary)	Sub Urban	



Figure 2.4-22 Travel Speed Survey Locations

2.4.4.3 Results of Traffic Count Survey

(1) Screen Line Survey

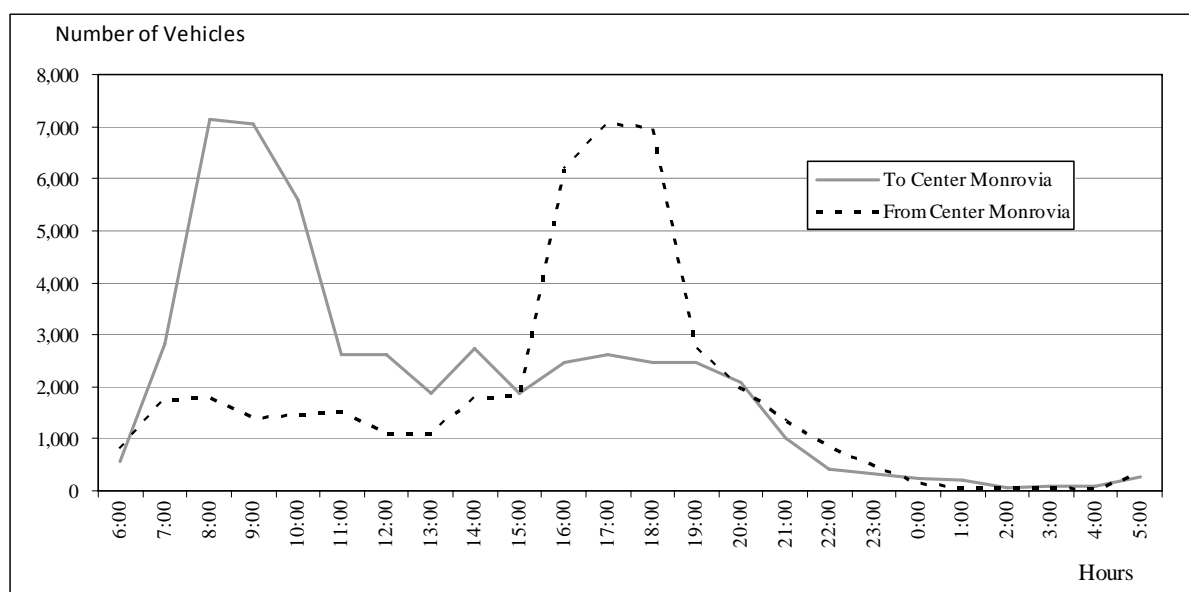
Table 2.4-17 shows traffic volumes by type of vehicle. Figure 2.4-23 shows only the accumulated values of two stations. The figure clarifies that there is one peak in each direction into central Monrovia while on the opposite direction out of central Monrovia; the traffic volume is almost constant in the morning and evening daytime hours.

Table 2.4-17 Traffic Volume by Vehicle Type

Unit: Vehicle/day

Vehicle Type		Sedan /Pickup/ Wagon	Taxi	Mini bus	Large Bus	Light Truck (2-Axle Truck)	Heavy Truck (>2-Axle Truck)	Trailer	Motor Cycle	Bicycle	Total
Station											
SC1	24 hours	17,745	21,903	4,977	725	105	71	14	2,562	11	48,113
	12 hours	14,030	16,416	4,565	667	93	64	13	1,771	9	37,628
	24/12hrs Ratio	1.26	1.33	1.09	1.09	1.13	1.11	1.08	1.45	1.22	1.28
SC2	24 hours	15,412	18,932	3,557	1,479	1,041	708	67	2,901	152	44,249
	12 hours	10,198	13,722	2,103	842	563	551	64	1,893	128	10,198
	24/12hrs Ratio	1.51	1.38	1.69	1.76	1.85	1.28	1.05	1.53	1.19	1.51

Source: JICA STUDY TEAM



Source: JICA STUDY TEAM

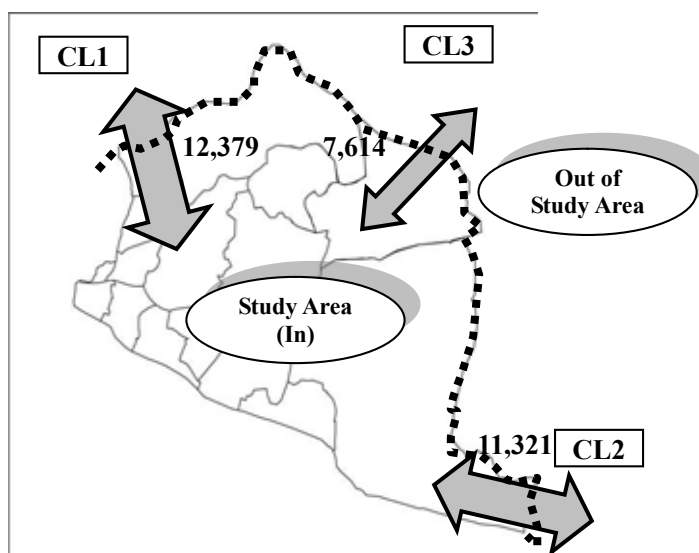
Figure 2.4-23 Hourly Distributions at Screen Line Stations

(2) Cordon Line Survey

Figure 2.4-24 summarized the collected data for each direction and illustrated sketch-map. The highest traffic volume was recorded in the North-West at CL1 about 12,600 vehicles on both directions. Other information that was derived from this survey includes occupancy rate for persons in each vehicle type, and loading items. Table 2.4-18 gives the average occupancy rate for each category. Table 2.4-19 shows commodity items to/from Greater Monrovia.

Unit: Vehicle/day

CL 1	Traffic Volume	Share
In-Out		
Out-In	12,379	97.9%
Out Out	261	2.1%
Total	12,640	100.0%
No. of Roadside OD Interview	1,242	
CL2	Traffic Volume	Share
In-Out		
Out-In	11,321	100.0%
Out Out	-	0.0%
Total	11,321	100.0%
No. of Roadside OD Interview	1,144	
CL3	Traffic Volume	Share
In-Out		
Out-In	7,614	99.8%
Out Out	14	0.2%
Total	7,628	100.0%
No. of Roadside OD Interview	911	



Source: JICA STUDY TEAM

Figure 2.4-24 Characteristics of Traffic to/from Study Area

Table 2.4-18 Average Occupancy

Vehicle Type	Sedan/Wagon	Pickup	Taxi	Mini bus	Large Bus	Light Truck (2-Axle Truck)	Heavy Truck (>2-Axle Truck)	Trailer	Motor Cycle
	4.4	5.6	5.1	13.5	21.6	5.2	4.3	2.0	1.6

Source: JICA STUDY TEAM

Table 2.4-19 shows the 4 commodity items by direction (to/from Greater Monrovia) based on the cordon line interview survey.

Table 2.4-19 Commodity Items

From out of Study Area to Greater Monrovia(out-in)			From Greater Monrovia to out of Study Area (in-out)		
Commodity	No. of Sampling		Commodity	No. of Sampling	
Coal	151	31.7%	Food or kindred products	133	21.3%
Farm products	76	15.9%	Farm products	94	15.0%
Food or kindred products	55	11.5%	Coal	59	9.4%
Metallic ores	30	6.3%	Metallic ores	33	5.3%
Total	306	65.4%	Total	319	51.0%
Sampling Total	477		Sampling Total	625	

Source: JICA STUDY TEAM

(3) Traffic Count Survey

Table 2.4-20 shows the 24 and 12 hours traffic volumes. Since TC5 to TC12 for 12 hours traffic counting, they were converted into 24 hours traffic volumes based on the 24 hours counting results. Daily traffic volumes of over 40,000 vehicles were observed at stations TC1, TC3, TC4, TC6, TC7, TC9, and TC10. Those 7 stations are located on ring roads, Tubman Boulevard and Somalia Drive.

The largest traffic volume of 59,000 vehicles per day was observed at station TC6 (Freeport).

Table 2.4-20 Traffic Count Results

Station No.	Time	Sedan/ Pickup/ Wagon	Taxi	Mini Bus	Large Bus	Light Truck	Heavy Truck	Trailer	Moto Cycle	Bicycle	Total
TC1	24h	15,825	14,384	4,148	441	253	342	216	4,447	34	40,090
	12h	13,124	11,812	3,339	289	169	246	195	3,317	19	32,510
TC 2	24h	9,532	12,471	5,589	3,502	2,977	1,842	911	2,125	333	39,282
	12h	7,767	9,471	3,939	2,413	2,134	1,152	510	1,398	260	29,044
TC 3	24h	19,511	18,333	2,616	1,761	1,516	626	248	2,191	118	46,920
	12h	16,487	14,691	2,190	1,535	1,324	392	93	1,805	98	38,615
TC 4	24h	17,188	18,577	2,716	1,203	964	647	383	1,243	119	43,040
	12h	13,978	15,291	2,169	951	605	282	103	829	104	34,312
TC 5	24h	2,522	3,877	495	24	55	20	1	8,394	116	15,502
	12h	1,732	2,991	382	17	44	18	1	6,326	109	11,620
TC 6	24h	22,733	31,349	1,187	103	158	101	79	3,214	44	58,967
	12h	18,403	24,568	1,018	79	120	81	72	2,306	29	46,676
TC 7	24h	17,046	16,019	3,038	991	1,098	383	532	1,037	70	40,214
	12h	13,140	12,378	2,324	754	768	244	250	729	59	30,646
TC 8	24h	8,536	7,623	903	30	575	535	76	2,366	321	20,965
	12h	6,719	5,931	687	22	401	346	40	1,660	246	16,052
TC 9	24h	20,842	26,614	992	237	136	165	30	549	40	49,605
	12h	16,066	20,564	759	180	95	105	14	386	34	38,203
TC 10	24h	10,531	12,046	7,558	2,355	882	640	307	11,529	31	45,880
	12h	7,691	8,935	4,860	1,468	544	444	217	7,554	25	31,738
TC 11	24h	4,381	4,397	2,086	406	348	650	265	4,654	48	17,236
	12h	3,601	3,470	1,568	273	241	435	183	3,254	31	13,056
TC 12	24h	3,678	5,174	2,070	503	408	801	101	4,940	72	17,748
	12h	3,023	4,083	1,556	338	282	536	70	3,454	47	13,389

(4) Travel Speed Survey

The Average travel speeds on each routes are shown in Table 2.4-21. The Average speed at the peak of the morning hours is the lowest speed, which is about 20.0km/hr from Robert Field Highway to Gbengbar Town. The Average speed result at noon time is less than 20.0km/hr from Tubman Boulevard to Old Road Catholic Junction to Red Light. At Red Light, which is the biggest commercial area in Greater Monrovia; the average speed results at the peak of the evening hours is the lowest of 24.0km/hr on UN Drive to Johnson Street Bridge to St. Paul Bridge.

Results were analyzed in three periods time:

Morning Peak: 06:30 to 09:00 hours

Noon: 12:30 to 14:00 hours

Evening Peak: 16.00 to 19:30 hours

Table 2.4-21 Average Travel Speed

No.	Road Name	Section	Distance	Average Speed (km/h)		
				Morning Peak	Noon	Evening Peak
1	UN Drive	St. Paul bridge → Johnson Street bridge	8.95	29.3	25.7	32.4
		Johnson Street bridge → St. Paul bridge		22.0	31.0	24.0
2	Somalia Drive	Freeport → Red light	13.2	36.4	29.7	31.6
		Red light → Freeport		24.8	30.2	33.0
3	Tubman Boulevard	Old Road → Red light	9.62	29.4	18.3	24.4
		Catholic Junction → Old Road Catholic Junction		22.2	23.5	28.3
4	Broad Street - Capital Bypass-Tubman Boulevard	Jct. Broad Street / Mechlin Street → Old road	7.54	32.0	40.8	40.3
		Old road → Jct. Broad Street / Mechlin Street		36.4	40.7	32.0
5	Robert Field Highway	E.L.W.A Junction → Gbengbar Town	8.93	44.0	56.3	55.4
		Gbengbar Town → E.L.W.A Junction		20.5	29.2	36.5

Source: JICA STUDY TEAM

2.4.5 Result of Person Trip Survey

2.4.5.1 Preparation of Person Trip Survey

(1) Methodology

The primary objective of the person trip survey (otherwise known as the Household Interview Survey or HIS) is to acquire information on the travel and socio-economic characteristics of the residents of the Study Area. In this Survey, survey manuals and forms were also prepared by local Consultants and approved by the JICA study team.

The zoning of the study area was prepared in accordance with the traffic zones in the Study Area. , 16 districts and 3 zones. Outer zones are grouped by the same access points to trunk road the same as Cordon Interview Survey

The zoning of the study area was prepared in accordance with administrative boundaries of the Sixteen (16) districts and three (3) outer zones. Three (3) outer zones are connected with the study area (Refer to Table 2.4-14).

(2) Questionnaire Items

The survey form was designed to cover household and personal characteristics, as well as trip descriptions. The information to be collected by the survey is listed and described below.

The survey was implemented through household visit and direct questioning to adult members with sufficient competence to accurately answer the questions posed. The questionnaire was distributed in advance or delivered and explained during the first visit and in the following day a second visit was made for the interview and collecting the questionnaires. Visits and date covered in questionnaire was on weekdays, i. e. Monday through Friday, excluding holidays

Table 2.4-22 Questionnaire Items in Person Trip Survey

Category	Questionnaire Items
Household attributes	<ul style="list-style-type: none"> • Home address • Number of household members • Household income • Vehicle ownership • Ownership of house and land/rental fee • Length of stay
Household member attributes	<ul style="list-style-type: none"> • Address of Home, Office and School • Age and Gender • Occupation • Personnel income • Driver License
Trip Description (for each one-way trip)	<ul style="list-style-type: none"> • Trip purpose • Origin and destination • Departure and arrival time • Mode of travel

2.4.5.2 Results of Person Trip Survey

(1) Number of Interviews

The number of sample size was accomplished for more than 2,500 household and all the members with the aged 13 years old and above were interviewed (the sampling rate secured about 1.0% of the population over aged 13 years in the Study Area, approximately 640,000).

Table 2.4-23 Number of Households Interview

Zone	District	Census Pop2008	POP 13& Above *)	Sample HH	No. of Sample Interview			Family Composition		
					Total	Male	Fe male	Under 12	Over 13	Total
2	Logan Town	58,168	37,203	234	617	305	312	448	795	1,243
3	Clara Town	55,462	31,873	235	405	241	164	652	881	1,533
4	West Point	29,516	17,247	223	445	259	186	488	686	1,174
5	Central Monrovia A	42,139	26,394	293	739	336	403	550	922	1,472
6	Central Monrovia B	40,688	24,121	180	396	225	171	432	629	1,061
7	Sinkor	43,780	28,581	296	858	473	385	761	1,431	2,192
8	Lakpazee	42,045	24,062	105	247	131	116	352	471	823
9	Old Road	48,274	33,792	109	389	208	181	183	427	610
10	Congo Town	25,217	20,433	49	185	96	89	81	346	427
11	Paynesville	350,335	222,781	335	962	436	526	1,160	2,026	3,186
12	Gardnersville	80,397	48,261	157	292	146	146	285	428	713
13	New Geogia	54,188	34,381	101	212	107	105	386	670	1,056
14	Barnersville	35,224	23,593	82	190	94	96	246	499	745
15	Johnsonville	4,514	2,661	9	30	18	12	39	56	95
16	Caldwell	26,586	16,653	21	53	21	32	68	114	182
Total		1,009,912	639,540	2,661	6,783	3,469	3,314	6,966	11,914	18,880

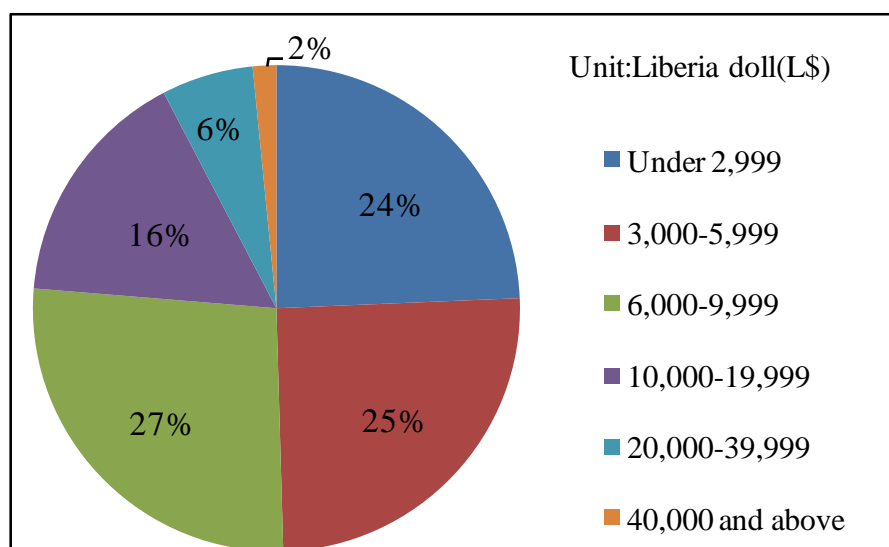
Source: JICA STUDY TEAM

Note Pop: Population,HH:Household

*) Population of over 13 years old was estimated by person trip result

(2) Household Income

According to the interview result, Figure 2.4-24 shows that the household's monthly income share of 50% has less than LRD 6,000, compare to the share of 2% has LRD 40,000 and above. The highest share of 27% has a range in monthly income from LRD 6,000 to LRD 9,999.



Source: JICA STUDY TEAM

Figure 2.4-25 Household Monthly Income

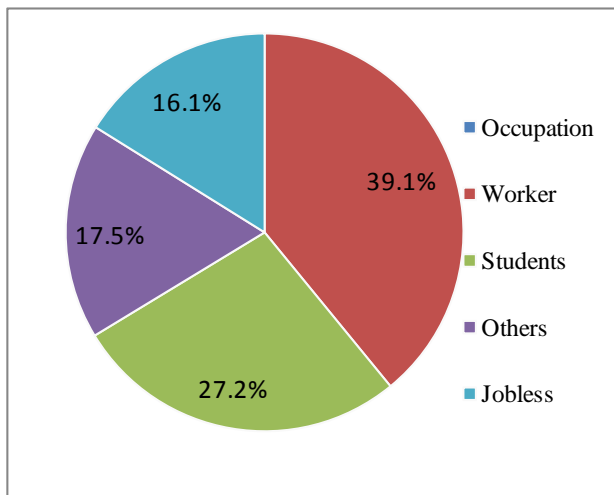
(3) Number of Owned Vehicle

In 2,661 sampling household, the number of owned vehicles has 306 households. The ownership rate of vehicle was 11.5%.

(4) Occupation and Sector

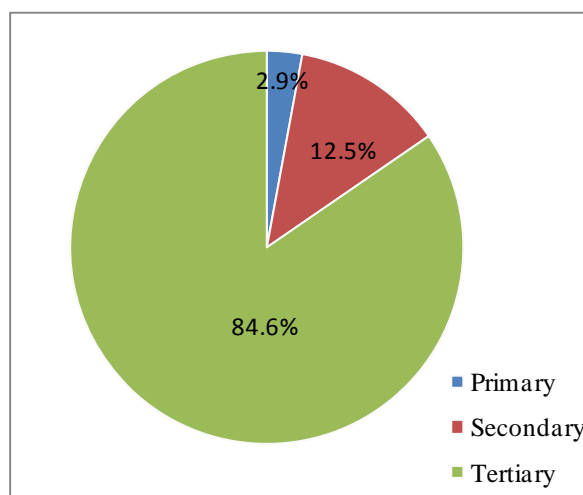
There are 15 occupation categories in the survey sheets (Refer to Person trip survey sheet). The 15

categories were integrated into 4 categories (Work, School, Others, and Jobless) as clarified in Figure 2.4-26. The share of Employed workers was about 40%. Figure 2.4-27 shows shares of employed workers by sector.



Source: JICA STUDY TEAM

Figure 2.4-26 Occupation Type



Source: JICA STUDY TEAM

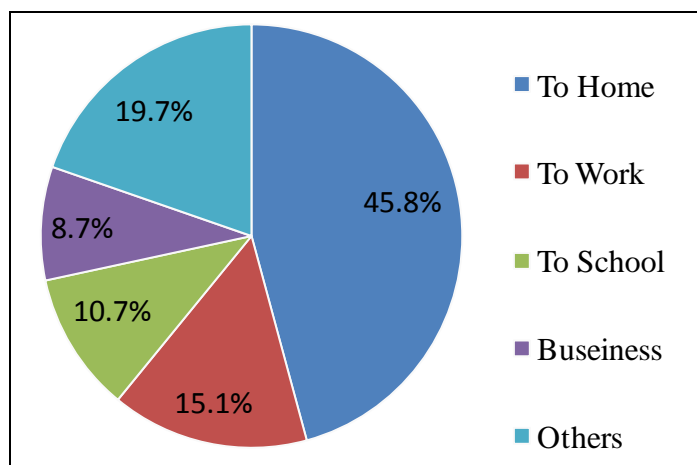
Figure 2.4-27 Sector Type

(5) Person Trip Rate

The total number of person trips per day is 1,348,582 trips and the average number of trips per person is 2.11.

(6) Trip Purpose

Trip composition by purpose is shown in Figure 2.4-28, in which the “To home” trips have a share of 46.0%, “To work” with a share of 15.0% and “To school” with a share of 11%, and “Others” which included Shopping, Social, and others with a share of 20%.



Source: JICA STUDY TEAM

Figure 2.4-28 Trip Purpose

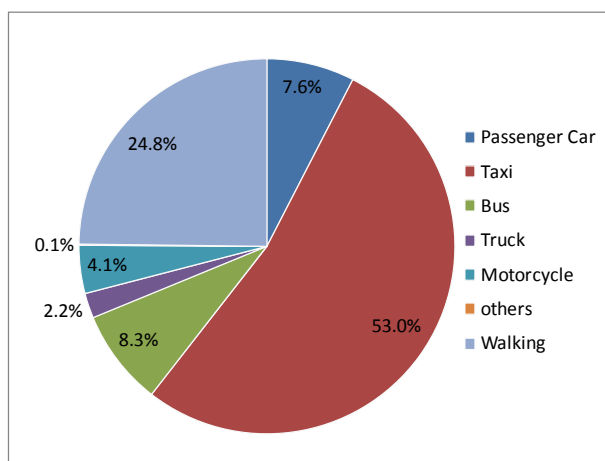
(7) Travel Mode

Twelve (12) travel modes are applied in the Survey. The 12 categories were integrated into seven (7) categories as shown in Table 2.4-24.

Table 2.4-24 Category of Travel Mode

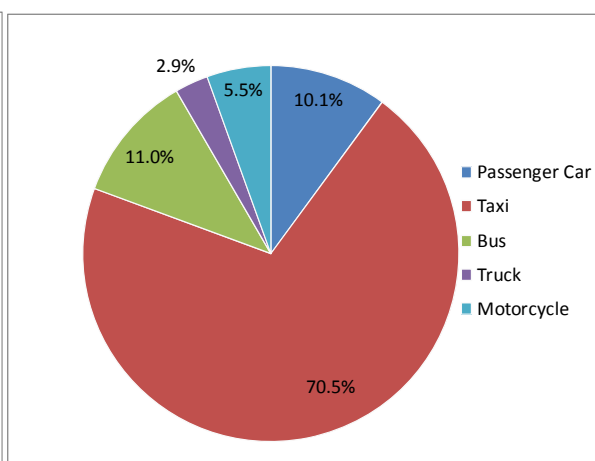
Integrated Mode		Original Mode	
1	Passenger Car	1	Sedan/Station Wagon (Private Car)
		2	Pickup/Van (Private Car)
2	Taxi	3	Taxi
3	Bus	4	Mini Bus
		5	Large Bus
4	Truck	6	Light Truck (2 Axle)
		7	Heavy Truck (3 Axle More)
		8	Trailer
5	Motor Cycle	9	Motor Cycle/private /commercial
6	Others	10	Bicycle
		12	Others
7	Walking	11	Walking

Trip composition by travel mode is shown in Figure 2.4-29 and Figure 2.4-30 respectively. Trip by Taxi has the highest share of 53%, while walking trips are 25.0%. Figure 2.4-30 excluding the walking and others trip shows that taxi has a modal share of 70%. Monrovia is highly dependent on Taxis.



Source: JICA STUDY TEAM

**Figure 2.4-29 Trip Purpose
(Including Walking and Others)**



Source: JICA STUDY TEAM

**Figure 2.4-30 Trip Purpose
(Excluding Walking and Others)**

2.4.6 Issues on Road and Transportation Sector

As results of field survey and reviewing the existing studies, the problems and issues on road and transportation sectors are summarized in Table 2.4-25.

Table 2.4-25 Issues and Future Direction on Road and Transport Sectors

Sub-sector	Issues	Future Direction
General issue	<ul style="list-style-type: none"> ✓ Rapid increase in car ownership and use due to recovered economic activity. ✓ Population increase by internally displaced persons and other refugees in Greater Monrovia 	Producing the comprehensive road and transportation plan interacting with city and land use plan
Road Network	<ul style="list-style-type: none"> ✓ The main road network consists of few primary and secondary road with bad surface condition even though the road rehabilitation has been stated. ✓ Feeder roads directly connect to primary and secondary roads, and most of these are dead-end tracks. This causes all the movements to concentrate on the main roads. ✓ Some communities have feeder roads with bad status. In rainy seasons, such communities are being isolated. 	Developing hieratical road network Connecting missing link
Road	<ul style="list-style-type: none"> ✓ The road condition will be improved through ongoing 	Rapid improving road

Sub-sector	Issues	Future Direction
Condition	<p>rehabilitation works in central Monrovia and some major road sections.</p> <ul style="list-style-type: none"> ✓ Most feeder roads in Monrovia are unpaved, and made of lateristic materials. During the rainy season, segments of these roads become partially or completely impassable causing not only substantially higher transport costs of passengers but also total isolation of adjacent communities. 	surface condition and periodical maintenance system
Road Maintenance	<ul style="list-style-type: none"> ✓ During the war both agencies concerned with road and transportation sectors lost their capacity to manage, provide and maintain these mandates. ✓ The two agencies lost most of their data and documentation and materials. They have not been able to undertake regular road condition assessments. 	Rebuild Road maintenance system, facilities and institutes
Road Congestion	<ul style="list-style-type: none"> ✓ The road network was never expanded to allow normal traffic growth while a large number of internally displaced persons and other refugees in Greater Monrovia added to the congested conditions. ✓ The road capacity in the major urbanized area, such as CBD as well as Red Light, Waterside, Duala and other places, has been reduced by road side parking and public bus stops, street vending and pedestrians who are compelled to walk on the carriageways as most of the walkways are full of parked vehicles and petty businesses. 	Expand the road capacity by expanding the lane and improve the road surface and cross section design
Public Transport Service	<ul style="list-style-type: none"> ✓ At present, public transport share of the market in Monrovia is negligible. Most of the people without private car still rely on taxi services, although MTA stated the scheduled bus service. ✓ The quality of public transport is very poor with permit holders using imported secondhand vehicles and they lack or has poor condition of bus stops/transit terminal facilities. ✓ There is no traffic safety enforcement. Monrovia already experiences traffic congestion every day. This could be alleviated with the introduction of larger vehicles for public transport. 	Building trunk public transport service interacting with existing taxi and mini bus services
Traffic Safety	<ul style="list-style-type: none"> ✓ Greater Monrovia has faced the problem of high rate of road traffic accidents, which result in significant economic damage. ✓ The number of death and injured persons are adding year after year according to increase of number of accident cases. ✓ The un-safe situation in the urbanized area has also been caused by lack of public education and awareness, and poor traffic management. 	Implementing traffic management system, traffic signal, traffic enforcement and education system
Traffic Control Management Facility	<ul style="list-style-type: none"> ✓ As many roads and bridges were seriously damaged during the war, traffic control and safety facilities were either damaged or destroyed. ✓ Traffic signals were installed in main intersections, but all the signals were damaged and are now out of work. Most of the other facilities such as traffic signs, pedestrian crossing, and bus stop facilities, have disappeared during the war. 	Installing traffic management facilities with suitable road cross section and facilities , such as parking space, signal, signs and sidewalks.