

CHAPTER 8 ECONOMIC AND FINANCIAL ANALYSIS

8.1 Economic Evaluation

The economic analysis has been implemented to assess the economic indicators of each sector projects in the short and medium term programs.

8.1.1 Road Sector

In order to achieve the objective of the Study, the following steps have been carried out:

- Step 1: Traffic demand forecast for With and Without Project case
- Step 2: Estimation of economic benefits based on the traffic demand on the Project Road and unit vehicle operating cost
- Step 3: Estimation of economic costs based on the estimated financial cost
- Step 4: Economic evaluation using economic benefits and economic costs
- Step 5: Sensitivity analysis considering various factors that influence the economic indicator of the project, with varying range of input data

Table 8.1 Vehicle Operating Cost (VOC)

Vehicle Type	Running (USD/1000km)	Fixed (USD/hr)	Time (USD/hr)
Passenger Car	108	0.32	1.58
Taxi	130	0.84	0.31
Mini Bus	291	0.96	0.81
Large Bus	527	1.19	2.16
Light Truck	376	1.52	0.00
Motorcycle	29	0.04	0.26

8.1.2 Water Supply Sector

With the implementation of the project, significant benefits, both direct and indirect, can be attained. Direct benefits were calculated based on the following two considerations in this study.

- Resource cost savings from the existing volume of water supply replaced by pipe water from selected project. Measurement shall be in terms of the difference in price between the existing unit cost and new water rate, “willingness to pay”, based on public awareness survey.
- Time cost saving on water collection, assumed at 30 minutes per day per household based on public awareness survey. This comes to count the average of 51.5% which extracted from World Bank study for the economic activities.

Indirect benefits are increased productivity of the residents in the service area and residents obtaining stable, safe and sufficient supplies with ease, and accordingly the improvement of living environment and sanitation.

8.1.3 Sanitation Sector

Obtaining/deriving reliable quantitative data of the benefit is difficult in this sector. Therefore, the study team assumed the part of social benefit as the benefits of the project in this study for the economic evaluation of the project.

Reduction of water borne disease, a part of social impact, is applied to quantify the benefits. Based on public awareness survey, people of the study area are suffered/afflicted with waterborne disease at the rate of 46% of household annually, spending a significant part of their incomes as the medical expenses. Because of the waterborne diseases in the community, it causes two kinds of economic costs; (i) medical cost, and (ii) opportunity cost, which is the cost of time spent by a hospitalized patient. It is difficult to estimate the cost of time spent by patient so that the study team considered

only the medical cost saving due to improved health condition in the household.

8.2 Financial Evaluation

The financial benefit-cost analysis is to assess the financial viability of the requested project, the “Project for Emergency Development of Water Supply System at Paynesville in Greater Monrovia” in this study.

The project capital shall be funded by grant aid scheme, so it do not occur the financial interest to be considered.

The project net benefit is the difference between the project revenues and project costs. The net benefit stream during the lifetime of the project, 25 years, shows the project worth.

The profitability of the selected project to the entity is indicated by the project FIRR. The NPV was calculated using a discount rate of 12% in financial analysis.

The water revenues cover the only O & M expenses and the replacement of equipments cost according to the financial results. The proposed project capital would be funded by grant aid so that it is considered to be financially viable.

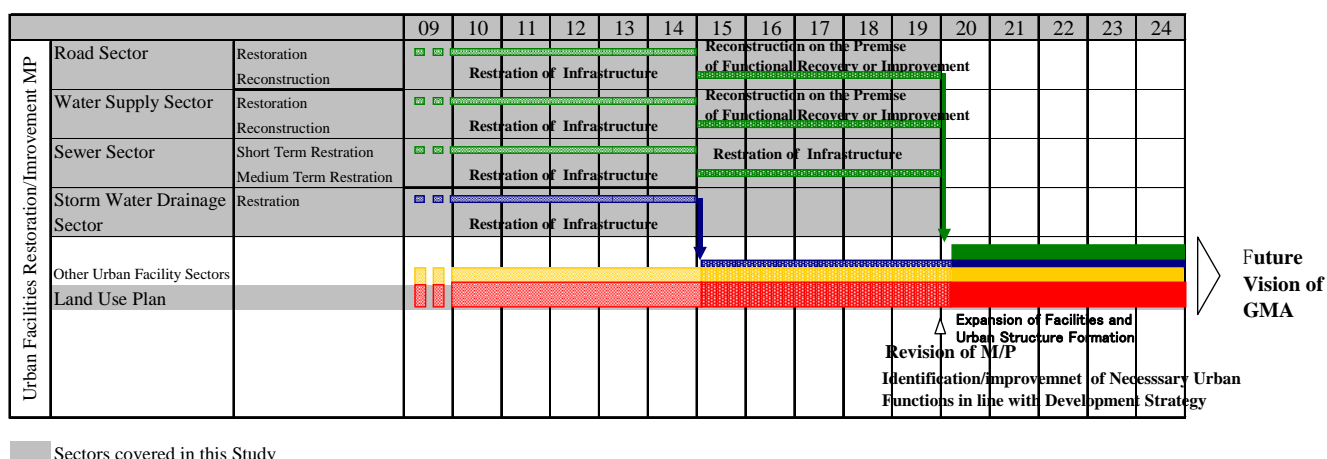
CHAPTER 9 FORMULATION OF COMPREHENSIVE MASTER PLAN ON URBAN FACILITIES RESTORATION AND IMPROVEMENT

9.1 Strategy of Comprehensive Master Plan

9.1.1 Principles for Master Plan Formulation

This Study formulated a comprehensive urban facilities restoration and improvement master plan with different emphasis on each sector in accordance with the characteristics and condition of each sector.

Table 9.1 Sectoral Restoration/Reconstruction Plan in Time Schedule



Followings are the major points to which attention was paid in the formulation of this Master Plan.

- No.1 Restoration/Improvement Plan based on the Needs Required
- No.2 Packaged Project Formulation Based on the Restoration/Improvement Needs
- No.3 Project Formation at Community Level
- No.4 Project Formation for Residents within UCA
- No.5 Adjustment of Implementation among Relevant Projects

Community development projects were historically conducted by NGOs relatively on a small scale and also by international agencies as a labor-intensive project.

Recently importance of such community development is recognized among international donor agencies and organizations including TICAD*, and new schemes are already provided. Implementation of this project shall be promoted through positive utilization of donor schemes of international organizations and NGOs. Also promotion of local construction industry and labor-based construction for job creation shall be encouraged in the planning and construction through competition to economize project cost.

*TICAD: Tokyo International Conference on African Development

International conference on the development of African countries from 1993 initially advocated by the Japanese Government and held jointly by UN, UNDP, WB. TICAD process is focusing on assistances of following sectors.

1 Comprehensive "Glocal" (Global and Local) community Development

2 Development community base approach utilizing the hub function in the community

9.1.2 Relationship Between Master Plan and PRS

The Master Plan in this Study shows the future vision corresponding to 3 pillars out of the 4 pillars shown in the PRS, excluding Security. In the economic analysis of the projects in this Study, both positive and negative externalities were examined from environmental-social aspects with more positive consideration of environmental-social sector project. This is because the Master Plan is required to be formulated with view to not only restoration/improvement but also improvement of longer planning period of this Study. Therefore, project for economic externality is regarded indispensable in the formulation of the Master Plan whether it is included or not included. MDGs are adopted in the Master Plan with minor modification because of the difference of time horizons and areas of this Study.

9.1.3 Detailed Future Visions and Goals

Table 9.2 Future Vision and Goals by Area from Infrastructure Restoration and Reconstruction Aspect (2019)

		Future Vision by area from infrastructure restoration and improvement (2019)	
		Old Districts*	Urbanizing Districts
Poverty Reduction Issues	Basic living condition improvement	<ul style="list-style-type: none"> ○ Improvement of living conditions in old districts (including built-up informal settlement) <ul style="list-style-type: none"> • Restoration/improvement of infrastructure to accommodate population density increase • Establishment of operation and maintenance system of road • Safe water supply and establishment of operation and maintenance system • Expansion of sanitation system coverage area by restoration/improvement of existing sanitation system and establishment of operation and maintenance system • Restoration and improvement of storm water drainage (• Power supply) 	<ul style="list-style-type: none"> ○ Improvement of living conditions of existing communities <ul style="list-style-type: none"> • Restoration/improvement of infrastructure to accommodate population density increase • Community road restoration/improvement as all year round road (improvement of access to schools, hospitals etc.) • Public transport service supply at low price • Safe water supply and establishment of operation and maintenance system • Expansion of sanitation system coverage area by on-site facilities (• Construction of schools and educational facilities) (• Power supply)
		Goals <ul style="list-style-type: none"> • Pop density (227/ha) • To raise restored road pavement rate of secondary roads to 100% • To raise restored road pavement rate of tertiary roads to 100% • To raise water service coverage ratio to 100% • Approx. 64% of population with sanitation 	Goals <ul style="list-style-type: none"> • Pop density (84/ha) for Urbanization Promotion Areas • To raise restored road pavement rate of secondary roads to 100% • To raise restored road pavement rate of tertiary roads to 100% • To raise water service coverage ratio to 100% • Approx. 70% of population with sanitation
	Economic Recovery	<ul style="list-style-type: none"> ○ Restoration and improvement of existing urban functions and industrial functions <ul style="list-style-type: none"> • Restoration/improvement of trunk road network and IT infrastructure (Restoration improvement of access to Freeport and CBD, and streets within old districts) • Enhancement of traffic fluidity (• Elimination of Illegal occupants at industrial sites) (• Power supply) 	<ul style="list-style-type: none"> ○ Coordinated restoration and improvement of industrial functions (regeneration of old industrial area and rearrangement of commercial functions) <ul style="list-style-type: none"> • Restoration/improvement of trunk road network and IT infrastructure (Restoration improvement of access to Freeport CBD) • Enhancement of traffic fluidity near large market (• Regeneration of abandoned industrial area) (• Power supply)

		Future Vision by area from infrastructure restoration and improvement (2019)	
		Old Districts*	Urbanizing Districts
		Goals • To raise restored road pavement rate of primary roads to 100%	Goals • To raise restored road pavement rate of primary roads to 100%
	Governance enhancement	Recovery of governmental functions	Self-supportive community empowerment
	Environmental-Social consideration	○Restoration of swampy area (restoration of urbanizing swampy area to original swampy area) • Preparation of alternative land for relocation of illegal residents) (○Shore protection)	○Restoration of swampy area (restoration of urbanizing swampy area to original swampy area) • Preparation of alternative land for relocation of illegal residents)
		Goals • To restrict population increase at informal settlement	
Project Implementation		Attention to job creation	

* Old districts : New Kru Town, Logan Town, Clara Town, West Point, Central Monrovia A, Central Monrovia B, Sinkor, Lakpazee, Old Road, and Congo Town

9.2 Formulation of Master Plan (Short and Medium Term)

9.2.1 Cost and Available Fund

Required costs for the proposed projects in the urban facility sectors in this Study are shown below. The yearly required costs are estimated by apportioning the project cost to each year in the project period.

Table 9.3 Required Costs for the Proposed Projects

(Unit: mln USD)

Sector/Projects		Total Cost	Year										(Unit: mln USD)
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Estimated Cost for Road and Transport													
TR-0	Emergency Infrastructure Project (MPW, LRTF, on-going)	18.60	6.20	6.20	6.20								
TR-1	Johnson Street Bridge Improvement Project (Undecided)	24.00		3.60	3.60	8.40							
TR-2	Somalia Drive Reconstruction Project (Undecided)	21.10		5.28	5.28	10.55							
TR-3	Reconstruction of Bridges on Missing Link (Undecided)	10.64		2.66	2.66	5.32							
TR-4	Road Rehabilitation Project (Undecided)	48.28				4.83	4.83	4.83	6.76	6.76	6.76	6.76	6.76
TR-5	Intersection Improvement Project (Undecided)	5.30				0.44	0.44	0.44	0.80	0.80	0.80	0.80	0.80
TR-6	Bus Terminal & Bus Stop Facilities Construction Project (Undecided)	6.80		0.34	0.34	0.34	0.34	0.34	1.02	1.02	1.02	1.02	1.02
TR-7	Traffic Safe Management Project (Undecided)	2.00						0.20	0.60	0.60	0.60		
TR-8	Vai Town Bridge Reconstruction (WB, Grant, on-going)	15.00	5.00	5.00	5.00								
TR-9	Rehabilitation of Monrovia City Streets Project (WB, Grant, on-going)	17.60	5.87	5.87	5.87								
TR-10	Caldwell Bridge Construction Project (WB, Grant, on-going)	7.00		3.15	3.15	0.70							
	Cotton Tree - Buchanan Corridor Project (WB)	45.00		9.00	9.00	9.00	9.00	9.00					
	Monroia - Ganta/Guinea Border Corridor Project (WB)	100.00		20.00	20.00	20.00	20.00	20.00					
	Performance-based Road Contract for Rehabilitation of specified Monrovia City Streets (WB)	17.00	7.08	8.50	1.42								
	Rehabilitation and Maintenance of the Monrovia-Ganta and Airport-Buchanan road (WB)	60.00		12.00	12.00	12.00	12.00	12.00					
	Feeder Road in Bong, Lofa and Nimba Counties (WB)	6.27	0.63	1.25	1.25	1.25	1.25	0.63					
	Rehabilitation of the Suakoko-Kaflee-Yaundewoun Road (Ongoing)	0.11	0.05	0.05									
	Rehabilitation of the Saniquellie-Ganta Road (Ongoing)	0.04	0.02	0.02									
Estimated Cost for Projects Proposed in this M/P		118.12	0.00	11.88	11.88	29.88	14.01	5.81	9.17	9.17	9.17	8.57	8.57
Total Estimated Cost for Road and Transport		404.73	24.85	82.92	75.76	72.83	56.26	47.44	9.17	9.17	9.17	8.57	8.57
Estimated Cost for Water Supply													
WS-1	Monrovia Water and Sanitation Rehabilitation Program (Ongoing)	38.50	4.75	9.75	24.00								
WS-2	Monrovia Expansion and Rehabilitation of Three County Capitals	19.24	3.00	8.12	8.12								
WS-3	Project for Emergency Development of Water Supply System at Paynesville in Greater Monrovia (PEDW)	16.60		2.50	7.10	7.00							
WS-4	Expansion Project of White Plains Water Supply System (EPWS)	128.63					17.09	17.09	25.17	22.66	22.67	15.87	8.08
	Expansion of Treatment Plant Phase I	15.93					5.30	5.30	5.33				
	Expansion of Treatment Plant Phase II	23.34								7.78	7.78	7.78	
	Expansion of Rising Main Line	33.96					6.79	6.79	6.79	6.79	6.80		
	Expansion of Distribution Main Line	40.44							8.09	8.09	8.09	8.09	8.08
	Service Reservoir Installation	14.96					5.00	5.00	4.96				
WS-5	Project for Expansion of Water Supply System at Paynesville in Greater Monrovia (PEWS) Phase II (Undecided)	22.87				2.07	6.76	4.68	4.68	4.68			
WS-6	Technical Cooperation Project of Groundwater Management (Undecided)	0.32				0.10	0.11	0.11					
WS-7	Technical Cooperation Project of Non-Revenue Water (Undecided)	1.50				0.50	0.50	0.50					
	Capacity Building for LWSC (Ongoing)	5.00	1.67	1.67	1.67								
	Assistance on Program Management (Ongoing)	7.00	2.33	2.33	2.33								
	Assistance on Sector Reform (Ongoing)	2.00	0.67	0.67	0.67								
Estimated Cost for Projects Proposed in this M/P		169.92	0.00	2.50	7.10	9.67	24.46	22.38	29.85	27.34	22.67	15.87	8.08
Total Estimated Cost for Water Supply		241.66	12.42	25.04	43.89	9.67	24.46	22.38	29.85	27.34	22.67	15.87	8.08
Estimated Cost for Sewer													
SN-1	Monrovia Water and Sanitation Rehabilitation Program	15.00	5.00	5.00	5.00								
SN-2	Urban Infrastructure Construction and Rehabilitation of Monrovia Sewerage Network Pumping Stations (WB, ongoing)	4.80	0.80	2.00	2.00								
SN-3	Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan for 2014 (Undecided)	18.11			4.53	4.53	4.53	4.53					
SN-4	Project for Reconstruction of Sewerage Treatment & Sludge Treatment Plant (Undecided)	74.20							14.84	14.84	14.84	14.84	14.84
SN-5	Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan for 2019 (Undecided)	23.38							4.68	4.68	4.68	4.68	4.68
Estimated Cost for Projects Proposed in this M/P		115.69	0.00	0.00	4.53	4.53	4.53	4.53	19.52	19.52	19.52	19.52	19.52
Total Estimated Cost for Sewer		135.49	5.80	7.00	11.53	4.53	4.53	4.53	19.52	19.52	19.52	19.52	19.52
Estimated Cost for Storm Water Drainage													
	Special Project Monrovia (Ongoing)	0.20	0.20										
SW-1	Improvement of Drainage System in Monrovia Core Area (Undecided)	12.26			1.14	4.26	4.72	2.13					
	Drainage System Improvement (Central Monrovia)	1.62			0.54	1.08							
	Drainage System Improvement (Sinkor)	3.97				1.98	1.98						
	Drainage System Improvement (Bushrod Island)	3.07					1.53	1.53					
	(Admin, ES, Contingency, etc.)	3.60			0.60	1.20	1.20	0.60					
SW-2	Equipment Supply for Drainage Pipes Cleaning (Undecided)	1.33			0.67	0.67							
	Procurement of Equipment	0.93			0.47	0.47							
	(Admin, ES, Contingency, etc.)	0.40			0.20	0.20							
SW-3	Technical Cooperation Programme (Undecided)	0.28			0.14	0.14							
Estimated Cost for Projects Proposed in this M/P		13.86	0.00	0.00	1.94	5.07	4.72	2.13	0.00	0.00	0.00	0.00	0.00
Total Estimated Cost for Storm Water Drainage		14.07	0.20	0.00	1.94	5.07	4.72	2.13	0.00	0.00	0.00	0.00	0.00
Estimated Cost for Community Infrastructure Improvement													
CM-1	Community Infrastructure Improvement Project (Undecided)	27.79				3.20	4.16	3.73	3.92	3.92	2.96	2.96	2.96
	Road Rehabilitation	16.09				1.61	1.61	1.61	2.25	2.25	2.25	2.25	2.25
	Water Supply	4.69				0.43	1.38	0.96	0.96	0.96			
	Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement	7.01				1.16	1.16	1.16	0.70	0.70	0.70	0.70	0.70
Estimated Cost for All Projects Proposed in this M/P		445.38	0.00	14.38	25.45	52.35	51.87	38.58	62.46	59.95	54.32	46.92	39.13
Total Estimated Cost for All Sectors		823.74	43.27	114.96	133.12	95.30	94.12	80.21	62.46	59.95	54.32	46.92	39.13

Yearly budget of MPW was actually USD 16-20mln.. Out of MPW budget, capital investment was around USD 12mln. level. On the contrary total amount of four infrastructure sectors covered in this Study from international grant aid projects in 2008 when international donor assistance became active was almost same as total MPW budget. It should be noted that the figure of capital investment by MPW includes those outside of Greater Monrovia Area.

Although the maximum fund required per year reached USD 60 mln. in this Master Plan, it becomes USD 30 mln. if the amount of projects to generate revenue in water supply and sanitation sector is deducted from maximum fund required and on the average it becomes some USD 10 mln.. As stated in section 9.1, despite some discrepancy between fund requirement to implement this Master Plan and the affordable budget of MPW, the projects proposed in each sector are included and integrated as the Master Plan.

Meanwhile, conditions to receive bi-lateral projects and loan projects shall be prepared, as loan projects start to substitute grant aid projects and bi-lateral projects will gradually become important when the amount of grants from international donor organizations will fall after the initial stage of international cooperation.

9.2.2 Formulation of Master Plan (Short and Medium Term)

In the program formulation, following evaluation criteria was applied to comprehensively adjust implementation schedule of each projects.

- | | |
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| 1. Urgency: | Urgency from the seriousness of problem, or humanitarian aid aspect |
| 2. EIRR: | Feasibility of the project from the national economy aspect |
| 3. Beneficial population: | The size of beneficial population |
| 4. Maturity: | Possibility of early implementation because of the project maturity |
| 5. Necessity of socio-environmental consideration: | Easiness of project implementation because of necessity of socio-environmental consideration |
| 6. Relevance with other project: | Necessity to adjust implementation schedule in consideration of other relevant project |
| 7. Other important matters: | |
| 8. Overall evaluation: | |

Proposed Master Plan Program (Short and Medium Term) is shown below.

Table 9.4 Master Plan Program (Short and Medium Term)

Sector	Projects	Year											
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Socio-economic Frame	Population of Greater Monrovia												
	GNI per capita (USD) (Liberia)												
	Industry of Greater Monrovia (increase of points compared to 2008 figure)												
	Distribution of Population of Greater Monrovia												
Land Use	Land Demand Forecast/ Land Use Zoning												
	Land Demand Forecast based on Future Socio-economic Frame and Population Distribution												
	Population Distribution based on Future Socio-economic Frame and Population Distribution												
	Demand Forecasts for Each Sector based on Population Distribution and Land Demand Forecast												
Transportation/ Road	Goals												
	To recover and enhance the economic activity throughout improving the road infrastructure, keeping the stable transport network and reducing traffic congestion, mainly by road and bridge rehabilitation												
	To reduce poverty and raise living standard throughout implementing the fundamental public transportation services and managing traffic control and safety												
Water Supply	Goals												
	To raise water service coverage ratio to 50% by 2011 in overall Liberia												
	To raise water service coverage ratio to 100% in Greater Monrovia												
Sanitation	Goals												
	To raise sanitary service coverage ratio to 40% by 2011 in overall Liberia												
	To raise sanitary service coverage ratio to about 80% in Greater Monrovia												
Storm Water Drainage	Goals												
	To strengthen the capacity of operation and maintenance by supply of cleaning vehicle of underground drainage and preparation of operation and maintenance manual												
	To strengthen the drainage capacity by drainage channel construction												
Community Infrastructure Improvement	Goals												
	To enhance community living standard												
	To create jobs												
	To rehabilitate damaged community roads in Grater Monrovia												

CHAPTER 10 SOCIAL AND ENVIRONMENTAL ASSESSMENT

10.1 Liberian EIA System

10.1.1 Environmental Protection Agency

The principal agency for the management of the environment in Liberia is the Environmental Protection Agency (EPA). The Act creating EPA was approved on 26th November 2002. The EPA has been officially functional since February 2004 under an interim management team, but not fully operational until 2006, after the inauguration of Madam Ellen Johnson-Sirleaf as the President of Liberia.

10.1.2 Other Key Information other than the Mandate of EPA

- **Designated Ramsar Sites:** Liberia presently has five sites designated as Wetlands of International Importance with a surface area of 95,879 hectares
- **Historical Heritage:** Liberian historical heritage finds expressions in buildings, monuments, sites, and archives. Most of them are locating in the city of Monrovia.
- **Buildings of Historical Significance:** Two historical buildings which were constructed from the middle of the nineteenth century with American south design are locating in the urban center. One of them is the Residence of President William David Coleman located on Gurley and Sao Boso Sterrets and another is the Law Library on Ashmun Street.
- **Historic Sites:** Like historic buildings, many of the historic sites are found in urban centers along the coast as result of the Americo-Liberians as shown below.

10.1.3 Land Issue

Although land ownership was communal, the system of registration of communal right has existed since 1822. But because land was never viewed as a saleable commodity, the idea of a title ownership was alien to the indigenous people. With the expansion of agricultural settlement and development of the rural economy, however, illegal land occupation for the purpose of economic activity, squatters for resident purpose and conflicts over ownership and land-use are increased. The administration and management of land is the statutory responsibility of some Ministries and Agencies of Government.

10.2 Measures to Clear Requirements

Under the Annex 1 (Section 6) of Environment Protection Law, those Construction and expansion/upgrading of Roads, Waste Water Treatment on Municipality Sewage and Water Supply projects are considerable to require EIA. However, according to the comments made by the environment specialist of MPW, full scale of EIA will not be required those the rehabilitation/improvement of existing facility are planned, and process from the preparation to prepare EMP is required.

SIU is under the management of Deputy Minister of Technical Services and SIU is responsible for all projects in MPW. Eight officials are engaged in the service.

The procedure on EIA application and role of each stakeholder is illustrated below

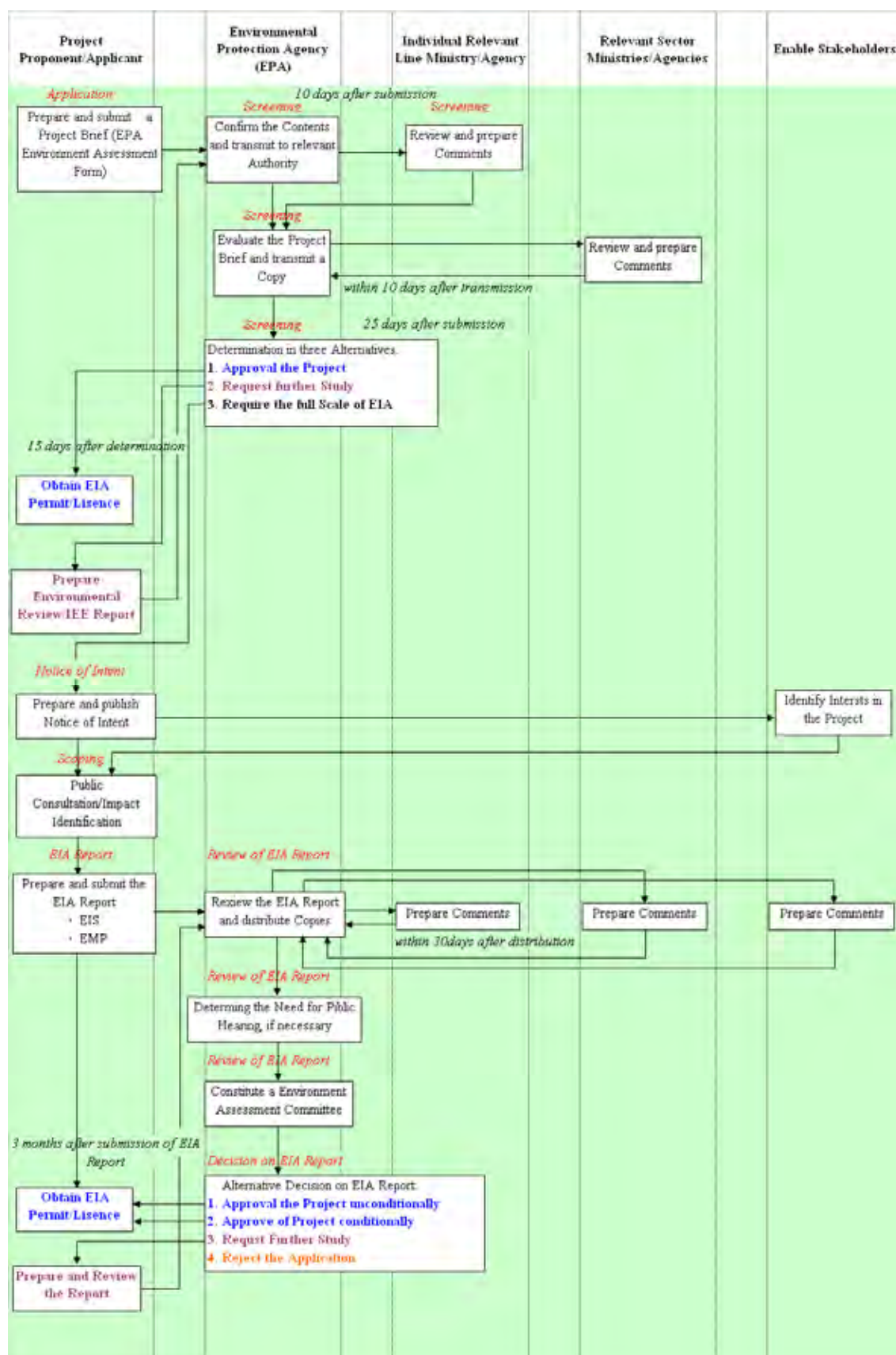


Figure 10.1 Illustrated Procedure on EIA Application

10.3 IEE on Selected Projects

IEE has carried out to the selected Projects those had resulted from the Master Plan Study.

Table 10.1 Comprehensive IEE on selected Projects

Projects	Source of Funds	Types of Projects	Impacts	Category
1. Road Sector				
1.1 Johnson Street (Gabriel Tucker) Bridge Improvement Project	Requested	Facility	<input type="radio"/> Improve the travel speed and mitigate CO2 emission gas <input type="radio"/> Improve the accessibility to social/public facilities <input checked="" type="radio"/> Involuntary resettlement is required in Clara Town <input checked="" type="radio"/> Possible negative impact against Mesurado wetland	A
1.2 Somalia Drive Reconstruction Project	Requested	Facility	<input type="radio"/> Improve the travel speed and mitigate CO2 emission gas <input type="radio"/> Improve the accessibility to social/public facilities <input type="radio"/> Enhance the economic activity <input checked="" type="radio"/> Involuntary resettlement such as permanent structures, temporary kiosks and vendors those locate within ROW will be is required along the alignment	A
1.3 Reconstruction of Bridges on Missing Link Project	Requested	Facility	<input type="radio"/> Improve the living standard of village people <input type="radio"/> Improve the accessibility to social/public facilities for residents <input checked="" type="radio"/> Specific negative impact is not found.	B
1.4 Road Rehabilitation Project	Proposed	Facility	<input type="radio"/> Improve the living standard of village people <input type="radio"/> Improve the accessibility to social/public facilities for residents <input checked="" type="radio"/> Negative impact to Mesurado wetland at Package 3 <input checked="" type="radio"/> Land acquisition to build new road or widening activity	A and B
1.5 Intersection Improvement Project	Proposed	Facility	<input type="radio"/> Reduce the traffic congestion and mitigate CO2 emission gas <input type="radio"/> Improve the traffic safety on road users <input checked="" type="radio"/> Land acquisition or involuntary resettlement due to the improvement of corner is required	B
1.6 Bus Terminal & Bus Stop Facilities Construction Project	Proposed	Facility	<input type="radio"/> Improve the public transport service <input type="radio"/> Enhance to mitigate CO2 emission gas <input type="radio"/> Reduce the traffic congestion caused by taxis <input checked="" type="radio"/> Loss of job opportunity for the taxi drivers <input checked="" type="radio"/> Partial land acquisition adjacent to the bus terminal boundary is assumed	B
1.7 Traffic Safety Management Project	Proposed	Technical Cooperation	<input type="radio"/> Improve the traffic safety <input checked="" type="radio"/> Specific negative impact is not found	
1.8 Vai Town Bridge Reconstruction Project	WB, On-going	Facility	<input type="radio"/> Improve the travel speed and mitigate CO2 emission gas <input type="radio"/> Improve the accessibility to social/public facilities <input checked="" type="radio"/> Involuntary resettlement is required <input checked="" type="radio"/> Possible negative impact against Mesurado wetland	
1.9 Rehabilitation of Monrovia City Street Project	WB, On-going	Facility	<input type="radio"/> Improve the travel speed and mitigate CO2 emission gas <input type="radio"/> Improve the accessibility to social/public facilities <input type="radio"/> Enhance the economic activity <input checked="" type="radio"/> Specific negative impact is not found.	
1.10 Caldwell Bridge Construction Project	WB, Committed	Facility	<input type="radio"/> Improve the living standard of residents <input type="radio"/> Improvement of accessibility to social/public facilities for residents <input checked="" type="radio"/> Land acquisition and involuntary resettlement are necessary due to the new approach road.	
2. Water Supply Sector				
2.1 Monrovia Water and Sanitation Rehabilitation Program	WB, EU, DIFID, AfDB, On-going	Facility		
2.2 Monrovia Expansion and Rehabilitation of Three County Capitals	AfDB, On-going	Facility		
2.3 The Project for Emergency Development of Water Supply System at Paynesville in Greater Monrovia (Phase 1)	Requested to Japan Gov.	Facility		B
2.4 The Project for Expansion Development of the White Plain Water supply System and isolation of service areas	Proposed	Facility		B
2.5 Assistance on Groundwater Management Plan	Proposed	Technical Cooperation	<input type="radio"/> Improve the capacity on management <input checked="" type="radio"/> Specific negative impact is not found	
2.6 Non-revenue Water Improvement	Proposed	Technical	<input type="radio"/> Improve the capacity on management	

Projects	Source of Funds	Types of Projects	Impacts	Category
Plan		Cooperation	● Specific negative impact is not found	
2.7 The Project for Emergency Development of Water Supply System at Paynesville in Greater Monrovia (Phase 2)	Proposed	Facility		B
3. Sanitation Sector				
3.1 Monrovia Water and Sanitation Rehabilitation Program	WB, EU, DIFID, AfDB, On-going	Facility	○ Improve the sanitation ● Specific negative impact is not found	
3.2 Urban Infrastructure Construction and Rehabilitation of Monrovia Sewerage Network Pumping Stations	WB	Facility	○ Improve the sanitation ● Possible land acquisition for service pumping station	B
3.3 Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan	Proposed	Facility & Procurement	○ Improve the sanitation ● Specific negative impact is not found	C
3.4 The Project for Reconstruction of Sewage Treatment & Sludge Treatment	Proposed	Facility	○ Improve the sanitation ● Involuntary resettlement within the Facility ● Possible negative impact against Mesurado wetland due to the reconstruction of outlet structure	A
3.5 Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan	Proposed	Facility & Procurement	○ Improve the sanitation ● Specific negative impact is not found	C
4. Storm Water Drainage Sector				
4.1 Improvement of Drainage System of Core Area	Proposed	Facility	○ Improve the sanitation ● Specific negative impact is not found	C
4.2 Equipment Supply of Drainage Pipes Cleaning	Proposed	Procurement	○ Improve the sanitation ● Specific negative impact is not found	C
4.3 Establishment of Operation and Maintenance Management System	Proposed	Technical Cooperation	○ Improve the capacity on management ● Specific negative impact is not found	

○ Positive Impact ● Negative Impact

CHAPTER 11 OPERATION AND MAINTENANCE

11.1 Road and Transportation Sector

The MPW is planning to re-organize maintenance system at present. New organization will consist of 5 Maintenance Regions, which will have responsibility for 3 counties each. Each Region has one base camp setting up construction equipments for individual operation. The feeder roads are managed by Feeder Road Division under Bureau of Construction. However, the density of road network in Greater Monrovia is high and the labor force of the Ministry is too small to look after all roads in Monrovia. Therefore, other maintenance system is necessary to cover the whole network.

11.1.1 Operating System

First, it is necessary to develop a data base of roads where the Ministry is responsible of maintaining. The number of road sections in Monrovia may be over few thousands and it is necessary to judge during the preparation of the list whether the road is public asset or private utilization. NTPS states that community roads, including roads, tracks, paths within the village and those providing access from the village to farms and other socio-economic activities, shall be taken care of by village council or community based organization (communal or private).

The introduction of private sector instead of MPW's own labor force for the operation of maintenance work in each zone is recommended. The advantage of private sector involvement can be perceived in term of lower running costs, increasing efficiency in performance and reducing investment to the equipment. One contract may cover one zone for a year or reasonable period by performance base remuneration. It will also contribute to the growth of construction industry of Liberia and realize adequate competitive bidding system.

The recommendation of this study is the utilization of private sector in Greater Monrovia and the operation by the labor force of each Maintenance Region outside of Monrovia. The management of maintenance work will be the task of the central station.

11.1.2 Financing Plan

The following four (4) measures are recommended to be adopted and/or firmly controlled by the Government for the purpose of self-financing for the maintenance and development of road infrastructure. The introduction of these taxes shall be coordinate with related officials such as Ministry of Finance, Ministry of Transport, Monrovia City Corporation, Liberia National Police, etc.

- Fuel Tax : Specific tax limited to utilize road infrastructure
- On-Street Parking Fee : Pay parking fee for the private occupancy.
- Vehicle Tax : Registration fee of the vehicle
- Transit Fee : Road user tax for international traffic

11.2 Water Sector

11.2.1 Satellite Water Supply System

(1) Role and Responsibilities of Relevant Organization

LWSC is entirely responsible for the satellite water supply system and the White Plains water supply system, both of which are properties of LWSC. In terms of some troubles such as clogging on the wells, LWSC takes countermeasures in cooperation with MLME.

(2) Preparation to be Done prior to the Beginning of Water Supply Operation

Table 11.1 Actions of LWSC

Actions	Purpose
• Support beneficiaries to establish communal water committee.	• Establish water committee of community level
• Define water service area for each kiosk, and prepare water service area map.	• Equalize number of water users at kiosks
• Establish water tariff system (unit price)	• Sustain water supply system by community level
• Prepare forms of record (for water tariff collection, and fuel procurement and other data)	• Collect water tariff systematically and check fuel procurement, etc.
• Train manager and staff of water committee about operation, maintenance and water tariff collection.	• Operate and maintain the water supply system by community level

Source: JICA Study Team

Table 11.2 Actions of Community

Actions	Purpose
• Establish communal water committee	• Operate water supply system and collect water tariff
• Select manager for O&M, and staff for each kiosk, and representative staff for kiosk management	• Operate water supply system and collect water tariff
• Establish water fund in communal water committee	• Collect initial cost of fuel at the beginning of operation and repair the water supply system
• Purchase fuel and calcium-hypochlorite	• Regularly operate the water supply system

Source: JICA Study Team

(3) O&M Cost Estimates

Unit cost of O&M accounts for USD 0.31 per 100 gal (USD 0.81 per m³) and USD 0.26 per 100 gal (USD 0.68 per m³) in 2014 and 2019 respectively.

11.2.2 White Plains Water Supply System

(1) Role and Responsibilities of Relevant Organization

Operation Division of LWSC is responsible for all of the O&M of the White Plains water supply system. General activities of the communal water committee are proposed as follows:

- a. Weekly pay LWSC water tariff collected from dwellers depending on kiosks.
- b. Daily inspect and keep security of all the water supply system.
- c. Daily record revenue and water flow at kiosk.
- d. Report on trouble of water supply system to LWSC.

(2) Preparation by Community to be Newly Served

Table 11.3 Actions of Community

Actions	Purpose
• Establish communal water committee	• Sustain water supply system
• Select staff for each kiosk, and representative staff for kiosk management	• Collect water tariff

Source: JICA Study Team

(3) O&M Cost Estimates

Unit cost of O&M accounts USD 0.31 per 100gal (USD0.81 per m³) and USD 0.26 per 100gal (USD 0.68 per m³) in 2014 and 2019 respectively.

11.2.3 Recommendation on Water Supply Management

- a. Improvement on Water Quality Analysis
- b. Improvement on Rate of Revenue Water
- c. Reform of Water Tariff System
- d. Improvement of Water Tariff Collection Rate
- e. Rationalization of LWSC staff

11.3 Sanitation Sector

11.3.1 Communal Sanitary Committee and Public Toilet Committee

(1) Communal Sanitary Committee

In order to conduct proper maintenance of community sanitation system, communal sanitary committee shall be established in each community sanitation system. The committee will make an agreement with LWSC for tariff collection and maintenance. One household will have to pay 0.55 USD/month.

(2) Public Toilet Committee

In order to conduct proper maintenance of public toilets, public toilets committee shall be established in each public toilet. The committee will make an agreement with LWSC for tariff collection and maintenance. One household will have to pay 1.05 USD/month.

11.3.2 Proposed Organization for O&M of Sewerage Facilities in LWSC

(1) Required Staff for O & M

Required staff members for future facilities are proposed as follows:

Table 11.4 Required Staff Members for Future Facilities

Facility	2014	2019
Fiama Sewage & Sludge Treatment Plant	0	13
Sewer Relay & Lifting Pump Stations	4	4
Sewer Network	8	8
Community Sanitation Systems and Public Toilets	18	32
Total	30	57

Source: JICA Study Team

Table 11.5 Required Number of LWSC Staff for O&M in Future

Item	At Present (2009)	2014	2019
Total staff	140	260	400
O&M staff	43	78	120
O&M staff for sanitation sector	8	30	57

Source: JICA Study Team

(2) Proposed Organization

Organization for LWSC in the sanitation section is proposed taking into account the restoration of Fiama sewage & sludge treatment plant, pumping stations, sewer network and construction of community sanitary systems & public toilets.

11.3.3 Estimation of O&M Cost

O&M cost for the year 2019 is estimated at USD 2.83mln. for the above facilities:

11.4 Storm Water Drainage Sector

11.4.1 Staff Requirements and Budget

The staffing plan and budget for the operation and maintenance is developed and proposed to support activities aiming to keep existing assets for cleaning of surface drainage channels and underground pipes. The running cost for the vehicles of vacuum truck, jet cleaning truck, and water tank truck etc. for sludge dredging of the channel and underground pipes cleaning is estimated at some USD195,000 a year.

Table 11.6 Staffing Plan and Budget for Operation and Maintenance

	Engineer	Accountant	Technician	Laborer
Monrovia	1	1	15	9

11.4.2 Recommendation for Establishment of Operation and Maintenance Unit

(1) Organization

To perform the drainage structures, a sustainable organization shall be established as soon as possible, considering the following points:

- A system to cope with emergencies should be established.
- Positive consideration should be given to the possibility of consigning O&M work and local residents' participation.

(2) Drainage System Inventory and Records

It is recommended to prepare and manage storage and updating inventories and management records so that they can be referenced any time.

(3) Operations and Maintenance of Drainage Channels (Waterways)

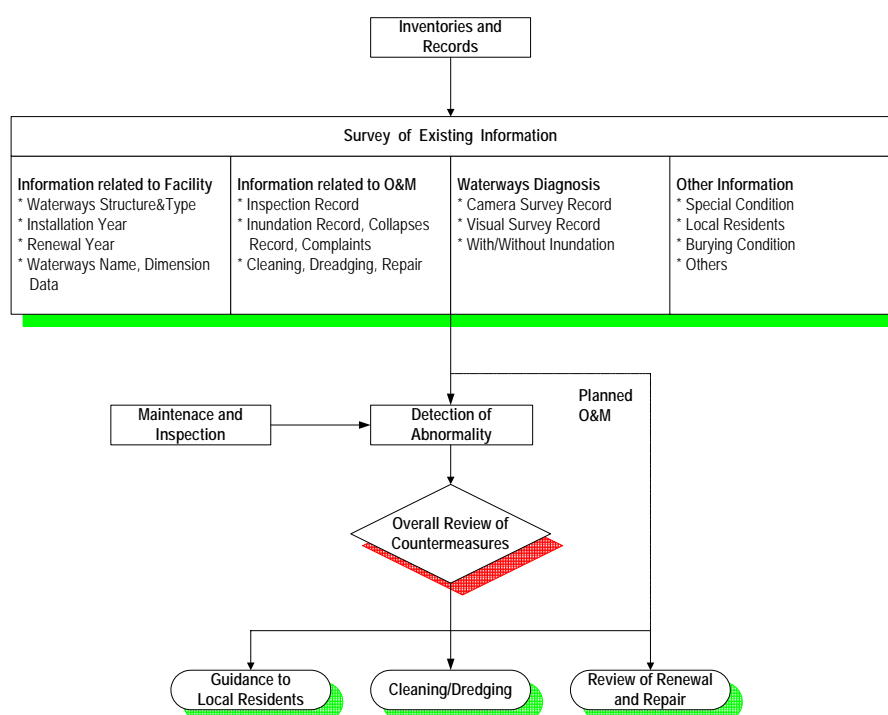


Figure 11.1 Operation and Maintenance Flow

CHAPTER 12 CONCLUSION AND RECOMMENDATION

12.1 Conclusion

12.1.1 Overall Master Plan

A new land use zoning map proposing Urbanization Promotion Area and Urbanization Control Area was prepared as a base for restoration and improvement Master Plan to replace the previous zoning map lost during the strife. In this Study urban facilities restoration and improvement plan in the confined sectors including road and transportation, water supply, sanitation and storm water drainage to attain MDGs, and community based/multi-sectoral project was proposed.

It was clarified that still a large additional amount of fund for the project implementation is required. However it should be noted that the Master Plan is confined to sectors excluding the power sector and environmental sector.

12.1.2 Road and Transportation Sector

Road restoration and improvement plan was formulated targeting 100% of road restoration and reconstruction rate.

For the attainment of the two goals to restore and reconstruct roads to meet basic human needs and to recover dilapidated economy, some projects to be urgently implemented are identified and emphasized.

12.1.3 Water Supply Sector

Water supply restoration and improvement plan was formulated targeting 100% coverage of households within Greater Monrovia Area by river water supply system and ground water supply system for the target year of 2019.

Water supply plan by deep well is formulated for Paynesville area because of high ground water potential. For other areas water supply plan by river water supply system is formulated due to insufficient underground water potential as a result of the analysis of data acquired from surveys including VES survey.

12.1.4 Sanitation Sector

Sanitation restoration plan was formulated targeting 68% (MDGs achievement base) coverage of households within the Greater Monrovia Area by off-site system for old districts/urbanizing districts and on-site facilities for peripheral areas in 2019. After 2019 the coverage area shall be gradually expanded.

Sanitation restoration plan by off-site system for old districts/urbanizing districts and on-site sanitation facilities for peripheral areas are proposed. Expansion of sanitation coverage area after 2019 shall basically depend on on-site facilities.

12.1.5 Storm Water Drainage Sector

Restoration plan of drainage facilities (open channels, underground drainage pipes and manholes) for the old districts centered by Central Monrovia up to 2014 is proposed. For the flood prone peripheral areas, restoration plan to construct drainage facility (culverts) in the road rehabilitation project is proposed.

12.2 Recommendations

12.2.1 Recommendations Related to Planning/ Implementation

- (1) Authorization of the Master Plan and Reflection into National/Regional Development Plan
- (2) Timely Implementation of Feasibility Studies
- (3) Securing/Raising of Funds
- (4) Adoption of Labour-based Construction for Job Creation
- (5) Execution of Adequate Maintenance
- (6) Promotion of Local Construction Industries
- (7) Amendment of the Plan According to Situation Changes

12.2.2 Recommendations Related to Social and Environmental Considerations

- (1) Conduct of Social and Environmental Assessments
- (2) Authorization of Land Use Plan
- (3) Reconsideration of Ramsar Site

12.2.3 Recommendations for Institutional Matters


- (1) Enhancement of Administrative Organization and Capacity Building
- (2) Taxation Preferences to Construction Equipment/Materials

12.2.4 Recommendations for Community Development

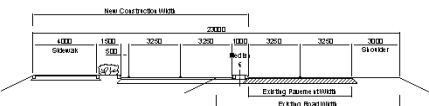
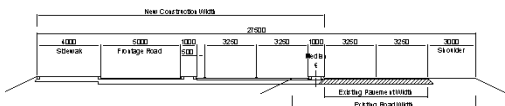
- (1) Formulation of Own Community Development Plan
- (2) Communities' Participation in Government Projects

ANNEX

Project Profile

Project No. and Project Name: TR-1, Johnson Street Bridge Improvement Project										
Background of the Project						Effects of the Project				
The existing bridge is located at the entrance of Central Monrovia where the most developed Central Business District (CBD) is located. The access to CBD is only allowed by UN Drive from northern area and Tubman Boulevard from eastern area. Both approaching roads of the bridge have multi lanes for one direction, but the bridge does not have enough width for multi lane operation, so the carriageway is divided to provide one lane for one direction. This narrowed section is the bottle neck of the traffic. Another bridge, called Vai Town Bridge located on UN Drive, for access to CBD collapsed in 2006. The reconstruction project is scheduled to complete in 2010. Although this new bridge will be provided, the capacity of the two bridges is insufficient according to the traffic forecast. The traffic congestion of the roads on both sides of the bridge will be worse near future.						Target Beneficiaries: <ul style="list-style-type: none">• Whole population of Greater Monrovia of about 1 million Effects: <ul style="list-style-type: none">• Vehicle operation cost savings and travel time reduction• Exact operation of public transport• Reduction of energy loss and exhaust fume				
Objectives of the Project <ul style="list-style-type: none">• To mitigate traffic congestion• To provide favorable and acceptable road service at crossroad of Mesurado marshland						Evaluation of the Project				
Location of the Project <ul style="list-style-type: none">• Central Monrovia and Clara Town District in Greater Monrovia						Economic Viability: <ul style="list-style-type: none">• Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. NPV : USD 17.6 mln B/C : 1.85 EIRR: 22.37 % Financial Soundness: <ul style="list-style-type: none">• Requested Japan’s Grant Aid Environmental Impact: Category A <ul style="list-style-type: none">• Positive Impacts Improve travel speed and mitigate CO2 emission gas Improve accessibility to social/public facilities• Negative Impacts Involuntary resettlement is required in Via Town Negative impact against Mesurado wetland				
Scope of the Project						External Conditions				
Construction of: <ul style="list-style-type: none">• New Bridge parallel to the existing bridge: 450 m• Approach Road: 400 m						<ul style="list-style-type: none">• Good peace and order is maintained.• Responsible agency for operation and maintenance has sufficient capacity.				
Agencies Responsible <ul style="list-style-type: none">• Project Implementation : Ministry of Public Works• Operation : Ministry of Public Works• Maintenance : Ministry of Public Works						Preconditions <ul style="list-style-type: none">• Road right-of way is secured.• Market and vendors within the right-of-way are removed.• Necessary fund is prepared.				
						Relationship with other projects <ul style="list-style-type: none">• “Vai Town Bridge Reconstruction Project” will provide better access to CBD together with this project.• “Rehabilitation of Monrovia City Street Project” will be the precondition of increasing traffic from the bridge.				
Estimated Cost <ul style="list-style-type: none">• Detailed Design & Supervision Cost: USD 2.2 mln.• Construction: Bridge: USD 20.9 mln. Approach Road: USD 0.9 mln.• Total Cost: USD 24.0 mln.										
Implementation Schedule										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Design & bid										
Bridge										
Approach Road										

Project Profile

Project No. and Project Name: TR-2 Somalia Drive Reconstruction Project																																													
Background of the Project	Effects of the Project																																												
Somalia Drive is one of the busiest primary roads in Greater Monrovia. This road was rehabilitated by the World Bank grant in 2008. The original road width had 4 lane carriageway, but only 2 lanes were rehabilitated. The road is located to the north of Mesurado marshland. The land use of the roadside is mainly commercial including the Ma-juah market, nearby stalls and some open garages. The vicinity consists of many narrow community alleys which connect directly to Somalia Drive, thereby causing congestion as vehicles from such community alleys try accessing the Somalia Drive. The congestion has caused severe economic losses over time, and is projected to increase by 2014. Therefore, the upgrade of road capacity to secure smooth traffic flow is necessary, as it completes the ring road in Greater Monrovia Area that connects with Tubman Boulevard.	Target Beneficiaries : <ul style="list-style-type: none">Whole population of Greater Monrovia of about 1 million Effects: <ul style="list-style-type: none">Vehicle operation cost savings and travel time reductionExact operation of public transportReduction of energy loss and exhaust fume																																												
Objectives of the Project	Evaluation of the Project																																												
<ul style="list-style-type: none">To mitigate traffic congestionTo provide favorable and acceptable road service at ring road around Mesurado marshland	Economic Viability <ul style="list-style-type: none">Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case.NPV : USD 47.4 mlnB/C : 3.12EIRR: 20.72 % Financial Soundness <ul style="list-style-type: none">Requested Japan’s Grant Aid Environmental Impact: Category A <ul style="list-style-type: none">Positive Impacts<ul style="list-style-type: none">Improve travel speed and mitigate CO2 emission gasImprove accessibility to social/public facilitiesEnhance economic activityNegative Impacts<ul style="list-style-type: none">Involuntary resettlement such as permanent structures, temporary kiosks, vendors located within ROW is required along the Project road																																												
Location of the Project	External Conditions <ul style="list-style-type: none">Good peace and order is maintained.Responsible agency for operation and maintenance has sufficient capacity. Preconditions <ul style="list-style-type: none">Clear the road reserve and relocate the people making business within Right of WayNecessary fund is prepared. Relationship with other projects <ul style="list-style-type: none">“Vai Town Bridge Reconstruction Project” and “Johnson Street Bridge Improvement Project” will mitigate the traffic congestion at Free Port Intersection.“Road Rehabilitation Project” will create adequate road network and reduce the direct access from small alleys to Somalia Drive.																																												
Scope of the Project																																													
Construction of: <ul style="list-style-type: none">Expanding carriage way to 4 lanes for 13 km stretchAdditional Bridge on Stockton BridgeRehabilitation of existing Double BridgeImprovement of major intersections																																													
Agencies Responsible																																													
<ul style="list-style-type: none">Project Implementation : Ministry of Public WorksOperation : Ministry of Public WorksMaintenance : Ministry of Public Works																																													
Estimated Cost																																													
<ul style="list-style-type: none">Detailed Design & Supervision Cost: USD 1.91 mln.Construction:<ul style="list-style-type: none">Earth Work: USD 2.285 mln.Pavement: USD 9.790 mln.Road Facilities: USD 3.515 mln.Bridge: USD 3.600 mln.Total Cost: USD 21.10 mln.																																													
Implementation Schedule																																													
<table><tr><th></th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>Design & bid</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Road</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Bridge</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Design & bid											Road											Bridge											 <p>General Section</p>  <p>Typical Section at Commercial Zone</p>
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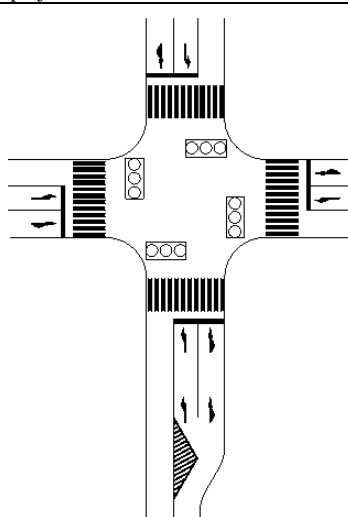
Project Profile

Project No. and Project Name: TR-3 Reconstruction of Bridges on Missing Link																																																						
Background of the Project						Effects of the Project																																																
<p>After civil strife, the primary roads were rehabilitated with the assistance of several donors, and some secondary roads and urban streets rehabilitation works are going to be implemented as well. However recovery and maintenance of feeder roads have not been carried out enough so far. The condition of road is getting worse by heavy rain, and the damaged roads are becoming impassable by vehicle.</p> <p>There are several reasons for this impassability, such as washing away of the road embankment, large gap by deep erosion, inundation on road, muddy surface, no appropriate crossing across the water stream and so on. The damage of the feeder roads that directly support the daily activities of residents makes the movement of the people difficult, as transport service is only available on the main road. The recovery of missing link to/from the communities is an important issue for commuters and neighborhoods.</p>						Target Beneficiaries :																																																
						<ul style="list-style-type: none">Approximately 550 thousand people living in the northern 5 districts																																																
<p>Objectives of the Project</p> <ul style="list-style-type: none">To secure passable road even during rainy seasonTo secure the daily activities of suburb residentsTo improve farm to market accessibility						<p>Effects:</p> <ul style="list-style-type: none">Utilization of sustainable road serviceExchange of social & economic activities between villagesImprovement of convenience & time saved for travelProvide opportunities to access market business																																																
Evaluation of the Project						Economic Viability																																																
<p>Location of the Project</p> <ul style="list-style-type: none">New Georgia, Gardnersville, Barnersville, Caldwell and Paynesville District in Greater Monrovia						<ul style="list-style-type: none">Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case.																																																
						NPV : USD 26.4 mln B/C : 3.69 EIRR: 32.7 %																																																
<p>Scope of the Project</p> <p>Construction of:</p> <ul style="list-style-type: none">11 bridges on Missing LinksApproach road of bridges						Financial Soundness																																																
						<ul style="list-style-type: none">Requested Japan’s Grant Aid																																																
<p>Agencies Responsible</p> <ul style="list-style-type: none">Project Implementation : Ministry of Public WorksOperation : Ministry of Public WorksMaintenance : Ministry of Public Works						Environmental Impact: Category B																																																
						<ul style="list-style-type: none">Positive Impacts Improve the living standard of suburb residents Improve the accessibility to social/public facilities for residentsNegative Impacts Specific negative impact is not found.																																																
Estimated Cost						External Conditions																																																
<p>Implementation Schedule</p> <table><tr><th></th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>Design & bid</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Bridge</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Approach</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>							2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Design & bid											Bridge											Approach											<ul style="list-style-type: none">Good peace and order is maintained.Responsible agency for operation and maintenance has sufficient capacity.				
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Design & bid																																																						
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<p>Estimated Cost</p> <ul style="list-style-type: none">Detailed Design & Supervision Cost: USD 1.00 mln.Construction: Bridge: USD 9.15 mln. Approach: USD 0.49 mln.Total Cost: USD 10.64 mln.						Preconditions																																																
						<ul style="list-style-type: none">Securing the land as Right of WayRehabilitation of access road to the siteNecessary fund is prepared.																																																
<p>Relationship with other projects</p> <ul style="list-style-type: none">“Road Rehabilitation Project” will rehabilitate access road to the missing links from/to the main road.																																																						
<p>Implementation Schedule</p> <table><tr><th></th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>Design & bid</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Bridge</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Approach</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>							2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Design & bid											Bridge											Approach															
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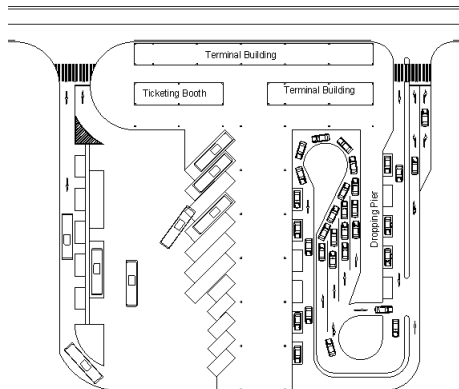
Project Profile

Project No. and Project Name: TR-4 Road Rehabilitation Project	
Background of the Project	Effects of the Project
<p>During the civil conflict, the Ministry of Public Works lost their capacity to manage their respective functions. Almost no road maintenance has been carried out from 1986 to 2006. As a result, most roads are in very poor condition and some roads are impassable at present.</p> <p>This project includes not only primary and secondary road but also tertiary roads. The road sections under this project are 182 sections in total and these sections are divided into three (3) package depending on the criteria. Primary and secondary roads are set up in Package 1 due to the importance of the road function with the total network. In addition, missing links of tertiary roads also included in Package 1 because of the urgency to recovery to adequate condition. Total number of Package 1 is 42 sections. Basically, tertiary roads are classified into Package 2 and total number is 108 sections.</p> <p>Package 3 is set up for the necessity of special consideration on the environmental issue. The roads located within the Ramsar site of Mesurado wetlands belong to this package to separate the implementation schedule from roads of normal condition in other areas. Total number is 22 sections</p>	<p>Target Beneficiaries :</p> <ul style="list-style-type: none">• Whole population of Greater Monrovia of about 1 million <p>Effects:</p> <ul style="list-style-type: none">• Vehicle operation cost savings & travel time reduction• Reduction of damages on vehicle• Improvement of accessibility• Increase of maintainable road sections
Objectives of the Project	Evaluation of the Project
<ul style="list-style-type: none">• To rehabilitate damaged roads in Greater Monrovia• To improve primary and secondary road network• To promote social and economic activities• To secure access from/to village	<p>Economic Viability</p> <ul style="list-style-type: none">• Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. <p>NPV : USD 307.9 mln B/C : 4.08 EIRR: 42.4 %</p> <p>Financial Soundness</p> <ul style="list-style-type: none">• Necessary budget allocation <p>Environmental Impact: Category B for Package 1 & 2, Category A for Package 3</p> <ul style="list-style-type: none">• Positive Impacts Improve the living standard of suburb residents Improvement of accessibility to social/public facilities for residents• Negative Impacts Negative impact against Mesurado wetland by Package 3 Land acquisition to build new road or widening activity
Location of the Project	
<ul style="list-style-type: none">• Whole area of Greater Monrovia	
Scope of the Project	External Conditions
Construction of:	<ul style="list-style-type: none">• Good peace and order is maintained.• Responsible agency for operation and maintenance has sufficient capacity.
<ul style="list-style-type: none">• 182 road sections	Preconditions
	<ul style="list-style-type: none">• Necessary fund is prepared.
Agencies Responsible	Relationship with other projects
<ul style="list-style-type: none">• Project Implementation : Ministry of Public Works• Operation : Ministry of Public Works• Maintenance : Ministry of Public Works	<ul style="list-style-type: none">• “Rehabilitation of Monrovia City Street Project” will be a part of rehabilitation program.
Estimated Cost	
<ul style="list-style-type: none">• Construction:	
<ul style="list-style-type: none">• Total Cost: USD 48.28 mln.	
Implementation Schedule	

Project Profile

Project No. and Project Name: TR-5 Intersection Improvement Project																																													
Background of the Project	Effects of the Project																																												
<p>Intersections are critical point to be considered when improving traffic flow in general. In Monrovia, traffic signals were destroyed during civil conflict and traffic congestion are observed at many intersection. Although policemen are controlling the traffic flow at major intersections, traffic conditions are yet to be solved.</p> <p>The primary roads with busy traffic, i.e. Tubman Boulevard, Ganta Highway and UN Drive, have connections with secondary roads and major feeder roads. Most intersections are not provided with channelization and/or left turn lane. In particular waiting vehicles for turning left narrows the number of carriageway and disturb smooth traffic flow on the main roads. The geometric improvement shall be recommended to solve such problems.</p> <p>Inside the Central Business District (CBD), there are many major intersections and minor junctions. However, no traffic signal is re-installed yet. The unsustainable power supply is also the problem of signal operation. Therefore this project is formulated for the medium term target.</p>	<p>Target Beneficiaries :</p> <ul style="list-style-type: none">• Whole population of Greater Monrovia of about 1 million <p>Effects:</p> <ul style="list-style-type: none">• Vehicle operation cost savings and travel time reduction• Exact operation of public transport• Increase of safe at intersection• Reduction of energy loss and exhaust fume																																												
Objectives of the Project	Evaluation of the Project																																												
<ul style="list-style-type: none">• To mitigate traffic congestion• To provide safe at intersection for road users	<p>Economic Viability</p> <ul style="list-style-type: none">• Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. <p>NPV : USD 6.1 mln B/C : 2.16 EIRR: 23.4 %</p> <p>Financial Soundness</p> <ul style="list-style-type: none">• Necessary budget allocation <p>Environmental Impact: Category B</p> <ul style="list-style-type: none">• Positive Impacts Reduce traffic congestion and mitigate CO2 emission gas Improve traffic safety on road users• Negative Impacts Land acquisition or involuntary resettlement due to the improvement of corner is required																																												
Location of the Project																																													
<ul style="list-style-type: none">• Central Monrovia, Sinkor, Old Town, Congo Town, New Kru Town, Logan Town and Paynesville District in Greater Monrovia																																													
Scope of the Project	External Conditions																																												
<p>Construction of:</p> <ul style="list-style-type: none">• Expanding carriage way to provide left turn lane• Installation of traffic signal• Provide proper road marking	<ul style="list-style-type: none">• Good peace and order is maintained.• Responsible agency for operation and maintenance has sufficient capacity.																																												
Agencies Responsible	Preconditions																																												
<ul style="list-style-type: none">• Project Implementation : Ministry of Public Works• Operation : Ministry of Public Works• Maintenance : Ministry of Public Works	<ul style="list-style-type: none">• Necessary fund is prepared.																																												
Estimated Cost	Relationship with other projects																																												
<ul style="list-style-type: none">• Construction:<div><div>Intersection:USD 0.70 mln.</div><div>Traffic Signal:USD 4.60 mln.</div></div>• Total Cost:USD 5.30 mln.	<ul style="list-style-type: none">• “Somalia Drive Improvement Project” will be cover the improvement of intersections along that road.• “Rehabilitation of Monrovia City Streets Project” will be effective to improve traffic condition inside CBD together with this project.																																												
Implementation Schedule																																													
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Design & bid																																													
Intersection																																													
Signal																																													


Project Profile

Project No. and Project Name: TR-6 Bus Terminal & Bus Stop Facilities Construction Project										
Background of the Project						Effects of the Project				
<p>Taxis are the most popular transport mode in Monrovia at present. But buses shall become the most common public transport to increase person trip and reducing traffic congestion in near future.</p> <p>The facilities for bus service are not yet well-developed. In fact, there is no bus terminal for inter city bus and long distance bus. In addition, the bus stop facilities are very poor. This is one of the reasons why people prefer to use taxis. The lack of bus stops causes disturbance of traffic flow on main lane and facilitates traffic congestion. Therefore, development of facilities for bus services is strongly suggested.</p> <p>Introduction of lay-by for the bus stops will separate stopping bus from main lane to clear the carriageway to avoid choking traffic flow. The introduction of bus terminal creates new users of bus service by enhancing convenient transfer from taxis to buss and vice-versa. The shift of transport mode will promote better public transport, traffic flow and environmental condition.</p>						<p>Target Beneficiaries :</p> <ul style="list-style-type: none">• Whole population of Greater Monrovia of about 1 million <p>Effects:</p> <ul style="list-style-type: none">• Provision of convenient bus service• Mitigation of traffic congestion• Reduction of energy loss and exhaust fume				
Objectives of the Project						Evaluation of the Project				
<ul style="list-style-type: none">• To provide better public transport service• To create movement to shift of transport mode						<p>Economic Viability</p> <ul style="list-style-type: none">• Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. <p>NPV : USD 0.7 mln</p> <p>B/C : 1.21</p> <p>EIRR: 28.1%</p> <p>Financial Soundness</p> <ul style="list-style-type: none">• Necessary budget allocation <p>Environmental Impact: Category B</p> <ul style="list-style-type: none">• Positive Impacts<ul style="list-style-type: none">Improve public transport serviceEnhance to mitigate CO2 emission gasReduce traffic congestion caused by taxies• Negative Impacts<ul style="list-style-type: none">Loss of job opportunity for the taxi driversPartial land acquisition adjacent to the bus terminal boundary is assumed				
Location of the Project						<p>External Conditions</p> <ul style="list-style-type: none">• Good peace and order is maintained.• Responsible agency for operation and maintenance has sufficient capacity. <p>Preconditions</p> <ul style="list-style-type: none">• Expand sustainable bus services• Necessary fund is prepared. <p>Relationship with other projects</p> <ul style="list-style-type: none">• “Somalia Drive Improvement Project” will be covered the construction of bus stop facilities along the road.				
<ul style="list-style-type: none">• Whole area in Greater Monrovia										
Scope of the Project										
<p>Construction of:</p> <ul style="list-style-type: none">• Lay-by for bus stop and shade for waiting passengers, 101 locations• Bus terminal including taxi bay and shopping booth, 3 locations										
Agencies Responsible										
<ul style="list-style-type: none">• Project Implementation : Ministry of Public Works• Operation : Ministry of Transport• Maintenance : Ministry of Transport										
Estimated Cost										
<ul style="list-style-type: none">• Construction:Bus Stop: USD 3.20 mln.Bus Terminal: USD 1.40 mln.• Total Cost: USD 4.60 mln.										
Implementation Schedule										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Design & bid										
Bus Terminal										
Bus Stop										


Project Profile

Project No. and Project Name: TR-7 Traffic Safe Management Project											
Background of the Project						Effects of the Project					
<p>The number of registered vehicles is increasing year by year in Liberia. Most of these vehicles are operating in Greater Monrovia and the traffic is concentrated on major roads and in the Central Business District (CBD). The Government has implemented improvement and rehabilitation measures for major roads and deteriorated road condition. The running speed of vehicles on the primary roads became higher than before. However, traffic control facilities and safety facilities on the roads, i.e. traffic signal, road marking, road sign, guard fence and so on, are very poor.</p> <p>The increased traffic and heavily congesting road condition enhanced the stress of the road users, and moral & manner of drivers are worsened. Given this situation, the increase in traffic accidents is one of the most important social issues.</p> <p>To solve these problems, a good traffic management is required by the Liberia National Police and Ministry of Public Works. However, their knowledge and experience of management were absent during civil conflict period. Therefore, capacity development of the staffs of related agencies is necessary. Through the training of staffs, execution of proper traffic management, fair enforcement and installation of adequate facilities are expected.</p>						<p>Target Beneficiaries :</p> <ul style="list-style-type: none">Counter Part, i.e. Ministry of Public Works, Ministry of Transport & Liberia National PoliceWhole population of Greater Monrovia of about 1 million <p>Effects:</p> <ul style="list-style-type: none">To improve engineering capacity of traffic managementTo improve education capacity for traffic safety trainingTo improve enforcement ability for traffic regulation & safety instruction					
Objectives of the Project						Evaluation of the Project					
<ul style="list-style-type: none">To reinforce the ability to execute regulation of traffic, control of intersection and education of drivers by the agencies.						<p>Economic Viability</p> <ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the transport system for residents, decrease traffic congestion, ensure traffic safety and improve social environment. <p>Financial Soundness</p> <ul style="list-style-type: none">Necessary budget allocation <p>Environmental Impact</p> <ul style="list-style-type: none">Positive Impact Improve the traffic safetyNegative Impacts Specific negative impact is not found					
Location of the Project											
<ul style="list-style-type: none">Whole area in Greater Monrovia											
Scope of the Project						External Conditions					
<p>Technical transfer of:</p> <ul style="list-style-type: none">Traffic control management at intersectionKnow-how of education for traffic safety and educational activitiesRegulation of traffic and instruction of traffic safety						<ul style="list-style-type: none">Good peace and order is maintained.Counter part agencies for the project have sufficient capacity to get training.					
Agencies Responsible						Preconditions					
						<ul style="list-style-type: none">Necessary fund is prepared.					
<ul style="list-style-type: none">Project Implementation : Monrovia City CorporationCounter Part : Ministry of Public Works, Ministry of Transport & Liberia National PoliceOperation : Ministry of Public Works, Ministry of Transport & Liberia National Police						Relationship with other projects					
						<ul style="list-style-type: none">“Intersection Improvement Project” will be implemented by counterpart of this project by using the knowledge and experience.					
Estimated Cost											
<ul style="list-style-type: none">Project Implementation: USD 2.00 mln.Total Cost: USD 2.00 mln.											
Implementation Schedule											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Engineering											
Enforcement											
Education											


Project Profile

Project No. and Project Name: TR-8 Vai Town Bridge Reconstruction Project										
Background of the Project						Effects of the Project				
<p>Vai Town Bridge was the only way linking the city center and the northern suburban areas until 1978 and was an economic life-blood, an asset, and a crucial factor of people’s livelihood. Also during the civil conflict, the Bridge allowed the flow of people and goods.</p> <p>In late 2006, the important Vai Town Bridge collapsed. The bridge was operated together with Gabriel Tucker Bridge. These two bridges were the only ways to cross over the Mesurado wetland.</p> <p>Fortunately, Gabriel Tucker Bridge is still in good condition and the access to CBD crossing the wetland is secured. All road users are concentrated on Gabriel Tucker Bridge at present and the Bridge is congested not only by vehicles but also by pedestrians during the whole day time. In particular, a long queue of the vehicles coming from the northern areas is observed during morning peak hours. Original carriageway was 2 lanes for both directions, but the lanes are now divided into 3 lanes, 2 lanes for south direction and 1 lane for north direction, in the morning on weekday. The traffic volume of the bridge is already beyond its capacity.</p> <p>Given this traffic situation, the recovery of original double-bridge operation is urgently required to solve the present heavy traffic congestion. Therefore, reconstruction of Vai Town Bridge is necessary to recover the capital function including economic activities and social environment.</p>						<p>Target Beneficiaries :</p> <ul style="list-style-type: none">• Whole population in Greater Monrovia of about 1 million <p>Effects:</p> <ul style="list-style-type: none">• Recovery of original road network around CBD• Mitigation of traffic congestion between CBD and Free Port• Reduction of energy loss and exhaust fume				
Objectives of the Project						Evaluation of the Project				
<ul style="list-style-type: none">• To recover the original road network around city center.						<p>Economic Viability</p> <ul style="list-style-type: none">• Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. NPV : USD 10.5 mln B/C : 1.65 EIRR: 22.8 %• <p>Financial Soundness</p> <ul style="list-style-type: none">• Committed Grant by World Bank <p>Environmental Impact</p> <ul style="list-style-type: none">• Positive Impacts Improve travel speed and mitigate CO2 emission gas Improve accessibility to social/public facilities• Negative Impacts Involuntary resettlement is required in Via Town Negative impact against Mesurado wetland				
Location of the Project						<p>Preconditions</p> <ul style="list-style-type: none">• Necessary land is secured.• Construction site can be occupied				
<ul style="list-style-type: none">• Central Monrovia and Clara Town Districts in Greater Monrovia										
Scope of the Project						External Conditions				
<p>Construction of:</p> <ul style="list-style-type: none">• Demolish debris and existing bridge• 240 m bridge on the same alignment with broken bridge• Approach road on both sides of bridge						<ul style="list-style-type: none">• Good peace and order is maintained.• Responsible agency for operation and maintenance has sufficient capacity.				
Agencies Responsible						Relationship with other projects				
<ul style="list-style-type: none">• Project Implementation : Ministry of Public Works• Maintenance : Ministry of Public Works• Operation : Ministry of Public Works						<ul style="list-style-type: none">• “Johnson Street Bridge Improvement Project” will reinforce the road network around CBD and mitigate traffic congestion.				
Estimated Cost										
<ul style="list-style-type: none">• Construction <div><div>Bridge :</div><div>USD 11.50 mln.</div></div> <div><div>Approach :</div><div>USD 1.00 mln.</div></div> <div><div>Demolish of Bridge :</div><div>USD 2.50 mln.</div></div>										
<ul style="list-style-type: none">• Total Cost: <div><div></div><div>USD 15.00 mln.</div></div>										
Implementation Schedule										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Sub structure										
Superstructure										
Approach Road										
*Project was commenced in 2009										

Project Profile

Project No. and Project Name: TR-9 Rehabilitation of Monrovia City Street s Project											
Background of the Project						Effects of the Project					
<p>During the civil conflict, the Ministry of Public Works lost their capacity to manage its functions. Almost no road maintenance has been carried out from 1986 to 2006. As a result, most roads are in very poor condition even in the Central Business District (CBD) of Monrovia city.</p> <p>Aging pavement in the CBD has many cracks and potholes. The potholes are becoming lager and deeper day by day, especially during rain seasons. Drivers of vehicles drive zigzag beyond center line to avoid such holes on the road. Such road condition gives damage to the vehicles and many old cars suffer troubles frequently.</p> <p>This project will rehabilitate major city streets. Number of streets is 23 sections and total length is close to 24 km, which formulate the city center streets network.</p> <p>The streets basically need asphalt concrete (AC) overlay over improved base course, while in some places there is need to remove present AC, repair the drainage and sewerage pipes and overlay it again. The works will also include major items related to repair of sidewalks, specifically where there are major pedestrian movements.</p>						<p>Target Beneficiaries :</p> <ul style="list-style-type: none">• Whole population in Greater Monrovia of about 1 million <p>Effects:</p> <ul style="list-style-type: none">• Recovery of city streets network in CBD• Reduction of vehicle repair cost• Improvement of safe and convenience of pedestrians• Reduction of energy loss and exhaust fume					
Objectives of the Project						Evaluation of the Project					
<ul style="list-style-type: none">• To provide the city streets network in good condition						<p>Economic Viability</p> <ul style="list-style-type: none">• Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. <p>NPV : USD 33.7 mln</p> <p>B/C : 2.48</p> <p>EIRR: 26.7 %</p> <p>Financial Soundness</p> <ul style="list-style-type: none">• Committed Grant by World Bank <p>Environmental Impacts</p> <ul style="list-style-type: none">• Positive ImpactsImprove travel speed and mitigate CO2 emission gasImprove accessibility to social/public facilitiesEnhance economic activity• Negative ImpactsSpecific negative impact is not found.					
Location of the Project						<p>External Conditions</p> <ul style="list-style-type: none">• Good peace and order is maintained.• Responsible agency for operation and maintenance has sufficient capacity. <p>Preconditions</p> <ul style="list-style-type: none">• Traffic control and temporal regulation shall be approved.					
<ul style="list-style-type: none">• Central Monrovia in Greater Monrovia											
Scope of the Project						Relationship with other projects					
<p>Construction of:</p> <ul style="list-style-type: none">• Rehabilitation of 23 streets in city center• Repair of buried pipes• Repair of sidewalks						<ul style="list-style-type: none">• “Johnson Street Bridge Improvement Project” and “Vai Town Bridge Reconstruction Project” will bring larger traffic to CBD.					
Agencies Responsible											
<ul style="list-style-type: none">• Project Implementation : Ministry of Public Works• Maintenance : Ministry of Public Works• Operation : Ministry of Public Works											
Estimated Cost											
<ul style="list-style-type: none">• Construction USD 16.00 mln.• Consulting Service: USD 1.60 mln.• Total Cost: USD 17.60 mln.											
Implementation Schedule											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Construction											
Consulting											
*Project was commenced in 2009.											

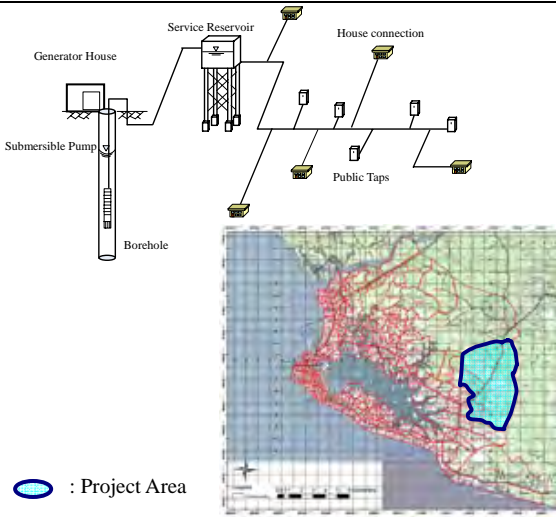
Project Profile

Project No. and Project Name: TR-10 Caldwell Bridge Construction Project											
Background of the Project						Effects of the Project					
<p>Caldwell bridge is located on the Caldwell Road and crosses the Stockton Creek. Although the Caldwell Road has wide carriageway for each direction, the bridge does not have enough width to provide 2 lanes. Therefore, single lane operation is insufficient. Vehicles are enforced to wait at the foot of the bridge until the vehicles passing from the opposite side are cleared from the bridge.</p> <p>In addition, the bridge has a similar structure as the collapsed Vai Town Bridge, that is the capacity of traffic load may be smaller than the expected vehicle load. The steel members are rusted and may be dilapidated, and hence collapse may occur in the near future.</p> <p>Given this situation, the existing bridge, about 120 m long, has been closed by the government for heavy vehicles i.e. trucks and heavy equipment, and only light vehicles, pedestrians and bicycle are allowed to use the bridge. The bridge connects two major sections of Monrovia City and its closure presents a major disturbance to the trade and commerce in this area of the City</p> <p>A tentative identification of the candidate location of the bridge has been already selected among several alternatives and is close to the existing bridge. The new bride will also require a new alignment for the bridge approach, each of about 300 to 500 m long.</p>						<p>Target Beneficiaries :</p> <ul style="list-style-type: none">Population of Caldwell , Barnesville and Johnsonville Zones of about 66 thousand <p>Effects:</p> <ul style="list-style-type: none">To ensure permanent road service at Caldwell BridgeTo secure social and economic activities					
Objectives of the Project						Evaluation of the Project					
<ul style="list-style-type: none">To secure traffic crossing across Stockton Creek on Caldwell Road						<p>Economic Viability</p> <ul style="list-style-type: none">Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. <p>NPV : USD 9.8 mln</p> <p>B/C : 2.58</p> <p>EIRR: 24.8 %</p> <p>Financial Soundness</p> <ul style="list-style-type: none">Committed Grant by World Bank <p>Environmental Impacts</p> <ul style="list-style-type: none">Positive ImpactsImprove the living standard of residentsImprovement of accessibility to social/public facilities for residentsNegative ImpactsLand acquisition and involuntary resettlement are necessary at the new approach road.					
Location of the Project											
<ul style="list-style-type: none">Caldwell District in Greater Monrovia											
Scope of the Project						External Conditions					
<p>Construction of:</p> <ul style="list-style-type: none">New bridge crossing Stockton CreekNew approach road on both sides of bridge						<ul style="list-style-type: none">Good peace and order is maintained.Responsible agency for operation and maintenance has sufficient capacity.					
						Preconditions					
<p>Agencies Responsible</p> <ul style="list-style-type: none">Project Implementation : Ministry of Public WorksMaintenance : Ministry of Public WorksOperation : Ministry of Public Works						<ul style="list-style-type: none">“Road Rehabilitation Project” will improve Caldwell Road and connecting several roads to develop the road network around this area.					
Estimated Cost											
<ul style="list-style-type: none">Construction USD 6.00 mln.Consulting Service: USD 1.00 mln.Total Cost: USD 7.00 mln.											
Implementation Schedule											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Construction											
Consulting											

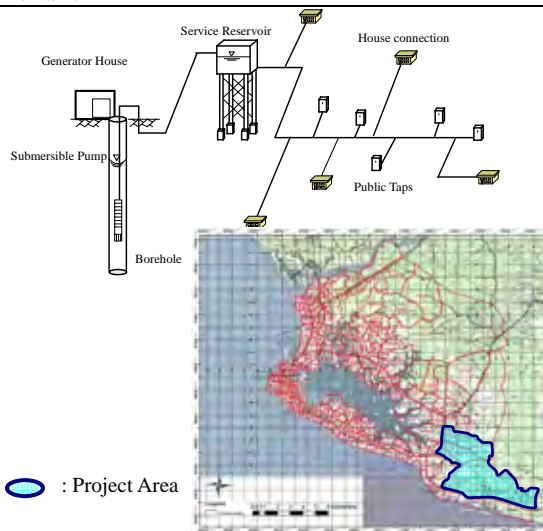
Project Profile

Project No. and Project Name: WS-1 Monrovia Water and Sanitation Rehabilitation Program (WSRP)																									
Background of the Project	Effects of the Project																								
The existing water supply facilities in Greater Monrovia were damaged and the associated equipments were stolen by thieves, and therefore the facilities have become inoperative. Whereas, the White Plains purification treatment plant was constructed in 1966 and 1982, and the rising and distribution facilities were laid from 1950 to 1970 so that some parts of facilities have been deteriorated. Based on this background, in order to urgently recover the function of the existing water supply facilities, LWSC has been carrying out this project since 2008.	a) Target Beneficiaries : • About 750,000 inhabitants in Greater Monrovia																								
	b) Effects of the Project : • Reduction of water-borne disease • Improvement of quality of life • Promotion of work activities																								
	Evaluation of the Project																								
Objectives of the Project	Economic Viability: • NPV : USD 90.0 mln B/C : 2.51 EIRR : 36.0%																								
	Financial Soundness: • Committed by WB, EU, DIFID, AfDB																								
	Environmental Impact: • Positive Impacts Improve hygiene service and living standard • Negative Impacts Specific negative impact is not found																								
Location of the Project	External Conditions																								
• Greater Monrovia																									
Scope of the Project																									
The project includes the following items : • Rehabilitation of intake pumps • Rehabilitation of the White Plains treatment plant (especially, replacement of mechanical equipments) • Rehabilitation of booster pump stations • Rehabilitation of rising main and distribution pipelines • Cleaning of two (2) service reservoirs • Procurement of generators in the White Plains treatment plant	• O&M cost of the water supply system shall be covered by beneficiaries.																								
Agencies Responsible	Preconditions																								
• Project Implementation: Liberia Water and Sanitation Corporation (LWSC) • Operation: LWSC • Maintenance: LWSC	• LWSC have sufficient capabilities for operating and maintaining the White Plains water supply system. • Good peace and order is maintained.																								
Estimated Cost	Relationship with other projects																								
• Implementation/Construction Cost (including design, construction supervision cost) : USD 38.50 mln. • Total Cost : USD 38.50 mln.	• There are five (5) projects for supplying safe and stable water to Greater Monrovia. This project is one of them for the year of 2011.																								
Implementation Schedule	Remarks																								
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>WSRP</td><td>4.75</td><td>9.75</td><td>24.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> <p>Unit: mln USD</p>	Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	WSRP	4.75	9.75	24.00									<div><div></div> : Project Area <div></div> : Project Area requested to Japanese side in 2009 <div></div> : Project Area under study by AfDB</div>
Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019														
WSRP	4.75	9.75	24.00																						



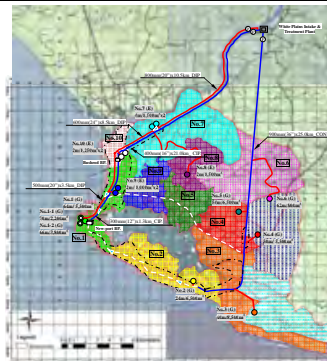
Project Profile

Project No. and Project Name: WS-2 Monrovia Expansion and Rehabilitation of Three County Capitals (ERTC)																													
Background of the Project						Effects of the Project																							
<p>The capacity of the existing White Plains Water Supply System will be restored to be about 16MGD (60,000m³/day) by 2011 through Monrovia Water and Sewer Rehabilitation Program (WSRP), which is currently being conducted by the funding of W.B., AfDB and other donors. However, water production is about 3MGD (11,000m³/day) short of the estimated water demand for overall Greater Monrovia in 2014. Water shortage in Paynesville especially becomes a serious problem, as Paynesville is predicted to be developed as residential areas based on the urban planning in this Master Plan Study without a distribution network except for the pipelines along trunk road. Accordingly, water supply system utilizing rich groundwater which does not depend on the White Plains water supply system is urgently required in Paynesville zone.</p> <p>LWSC commenced a study with the fund of AfDB targeting four (4) communities in the northern parts of Paynesville zone in 2009.</p>						a) Target Beneficiaries :																							
						<ul style="list-style-type: none">About 70,000 inhabitants in Paynesville zone																							
						b) Effects of the Project :																							
						<ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of quality of lifePromotion of work activities																							
Objectives of the Project						Evaluation of the Project																							
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.						Economic Viability:																							
						<ul style="list-style-type: none">NPV : USD 1.3mlnB/C : 0.92EIRR : 8.9%																							
						Financial Soundness:																							
						<ul style="list-style-type: none">Committed by AfDB																							
Location of the Project						Environmental Impact:																							
<ul style="list-style-type: none">Paynesville Zone						<ul style="list-style-type: none">Positive ImpactsImprove hygiene service and living standardNegative ImpactsAlternative well site must be provided when the considerable decrease of groundwater level is serious																							
Scope of the Project						External Conditions																							
<p>The project includes the following items :</p> <ul style="list-style-type: none">Construction of 85 boreholes with about 60 submersible pumps and generators (20-30kVA)Construction of 35 elevated water tanks with a capacity of 70m³Laying of rising pipelines from boreholes to service reservoirs and distribution pipelines from service reservoirs to public taps and households (PVC/GS, 100-200mm x 120km)Installation of about 230 taps (6 faucets per tap)						<ul style="list-style-type: none">O&M cost of the water supply system shall be covered by beneficiaries.Land acquisition for boreholes and service reservoirs (elevated water tanks)Initial fund shall be established in water committees.																							
						Preconditions																							
						<ul style="list-style-type: none">Responsible organizations such as LWSC and water committees of served communities have sufficient capabilities for operating and maintaining water supply system.Good peace and order is maintained.																							
Agencies Responsible						Relationship with other projects																							
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: Communities to be servedMaintenance: LWSC and communities to be served						<ul style="list-style-type: none">There are five (5) projects for supplying safe and stable water to Greater Monrovia. This project is one of them but focuses on Paynesville zone for the year of 2014.																							
Estimated Cost						Remarks																							
<ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 16.28 mln.Contingency: USD 2.96 mln.Total Cost : USD 19.24 mln.																													
Implementation Schedule																													
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>ERTC</td><td>3.00</td><td>8.12</td><td>8.12</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	ERTC	3.00	8.12	8.12		
Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019																		
ERTC	3.00	8.12	8.12																										
Unit: mln USD																													

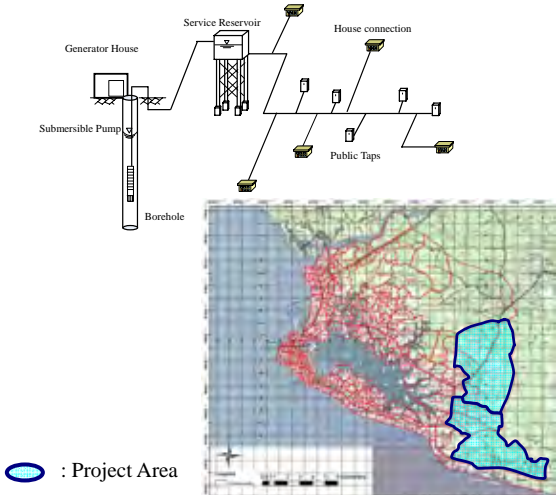
Project Profile

Project No. and Project Name: WS-3 Project for Emergency Development of Water Supply System at Paynesville in Greater Monrovia (PEDW)																								
Background of the Project	Effects of the Project																							
<p>The capacity of the existing White Plains Water Supply System will be restored to be about 16MGD (60,000m³/day) by 2011 through Monrovia Water and Sewer Rehabilitation Program (WSRP), which is currently being conducted by the funding of W.B., AfDB and other donors. However, water production is about 3MGD (11,000m³/day) short of the estimated water demand for overall Greater Monrovia in 2014. However, water production is about 3MGD (11,000m³/day) short of the estimated water demand for overall Greater Monrovia in 2014. Water shortage in Paynesville especially becomes a serious problem, as Paynesville is predicted to be developed as residential areas based on the urban planning in this Master Plan Study without a distribution network except for the pipelines along trunk road. Accordingly, development of water supply system utilizing rich groundwater which does not depend on the White Plains water supply system is urgently required in Paynesville zone. LWSC made a request to Japanese side for developing water supply system targeting five (5) communities in South parts of Paynesville zone in 2009.</p>	<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">About 60,000 inhabitants in Paynesville zone <p>b) Effects of the Project :</p> <ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of quality of lifePromotion of work activities																							
Objectives of the Project	Evaluation of the Project																							
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.	<p>Economic Viability:</p> <ul style="list-style-type: none">NPV : USD 1.3 mlnB/C : 0.90EIRR : 8.4%FIRR : 3.33% <p>Financial Soundness:</p> <ul style="list-style-type: none">Requested Japan's Grant Aid <p>Environmental Impact: Category B</p> <ul style="list-style-type: none">Positive Impacts Improve hygiene service and living standardNegative Impacts Alternative well site must be provided when the considerable decrease of groundwater level is serious																							
Location of the Project	External Conditions																							
<ul style="list-style-type: none">Paynesville Zone	<ul style="list-style-type: none">O&M cost of the water supply system shall be covered by beneficiaries.Land acquisition for boreholes and service reservoirs (elevated water tanks)Initial fund shall be established in water committees.																							
Scope of the Project	Preconditions																							
<p>The project includes the following items :</p> <ul style="list-style-type: none">Construction of 73 boreholes with about 50 submersible pumps and generators (20-30kVA)Construction of 26 ground service reservoirs and two (2) elevated water tanksLaying of rising pipelines from boreholes to service reservoirs and distribution pipelines from service reservoirs to public taps and households (PVC/GS, 100-200mm x 100km)Installation of about 200 taps (6 faucets per tap)	<ul style="list-style-type: none">Responsible organizations such as LWSC and water committees of served communities have sufficient capabilities for operating and maintaining water supply system.Good peace and order is maintained.																							
Agencies Responsible	Relationship with other projects																							
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: Communities to be servedMaintenance: LWSC and communities to be served	<ul style="list-style-type: none">There are five (5) projects for supplying safe and stable water to Greater Monrovia. This project is one of them but focuses on Paynesville zone for the year of 2014.																							
Estimated Cost	Remarks																							
<ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 14.00 mln.Contingency: USD 2.50 mln.Capacity building: USD 0.10 mln.Total Cost : USD 16.60 mln.																								
Implementation Schedule																								
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>PEDW</td><td>---</td><td>2.50</td><td>7.10</td><td>7.00</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr></table> <p>Unit: mln USD</p>		Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PEDW	---	2.50	7.10	7.00	---	---	---	---	---	---
Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019													
PEDW	---	2.50	7.10	7.00	---	---	---	---	---	---	---													

Project Profile

Project No. and Project Name: WS-4 Expansion Project of White Plains Water Supply System (EPWS)											
Background of the Project						Effects of the Project					
<p>The capacity of the existing White Plains Water Supply System will be restored to be about 16MGD (60,000m³/day) by 2011 through Monrovia Water and Sewer Rehabilitation Program (WSRP), which is currently being conducted by the funding of WB., AfDB and other donors.</p> <p>In addition, in order to supply water of about 2.4 MGD (9,000m³/day) to about 70% of the total population of Paynesville zone with the highest population out of Greater Monrovia zones, two projects such as Monrovia Expansion and Rehabilitation of Three County Capitals (ERTC) and Project for Emergency Development of Water Supply System in Paynesville in Greater Monrovia (PEDW) have been planned for the target year of 2014. However, even if ERTC and PEDW are implemented as scheduled for the year of 2014, water production is about 12MGD (45,000m³/day) short of the estimated water demand for overall Greater Monrovia in 2019. Since the amount of was for the un-served dwellers of Paynesville zone accounts for about 2.0MGD (7,500m³/day) out of 12MGD of water demand for the total population of the zone., development of the satellite water supply system like PEDW and ERTC utilizing groundwater shall be considered for supplying water of 2.0MGD to Paynesville zone for the year of 2019.</p> <p>Accordingly, water production for the balance of 10MGD (38,000m³/day) is required for covering future water demand through the expansion of the capacity of the White Plains water supply system. At the same time, in order to supply stable water, isolation of the existing service area is required with more service reservoirs in addition to the existing service reservoirs.</p>						<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">About 1.1million inhabitants in Greater Monrovia <p>b) Effects of the Project :</p> <ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of quality of lifePromotion of work activities					
Objectives of the Project						Evaluation of the Project					
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.						<p>Economic Viability:</p> <ul style="list-style-type: none">NPV : USD 103.3 mlnB/C : 1.97EIRR : 21.3% <p>Financial Soundness:</p> <ul style="list-style-type: none">Necessary the budget allocation <p>Environmental Impact: Category B</p> <ul style="list-style-type: none">Positive ImpactsImprove hygiene service and living standardNegative ImpactsLand acquisition for the new service station will be required					
Location of the Project						External Conditions					
<ul style="list-style-type: none">Greater Monrovia						<ul style="list-style-type: none">O&M cost of the water supply system shall be covered by beneficiaries.Land acquisition for service reservoirs is required.					
Scope of the Project						Preconditions					
<p>The project includes the following items :</p> <ul style="list-style-type: none">Expansion of the White Plains treatment plant and intake (Max. capacity: 32MGD)Expansion of rising main pipelines of 500-800mm (about 44.0km)Expansion of six (6) ground service reservoirs (Capacity: 800-8,500m³) and seven (7) elevated storage tanks (Capacity: 1,000-1,500m³)Expansion of centrifugal surface pumps of 3MGD x 4sets and 4MGD 2sets, and generators (2,500kVA)Expansion of distribution main pipelines of 40-600mm (about 215km)						<ul style="list-style-type: none">Responsible organizations such as LWSC and water committees of served communities have sufficient capabilities for operating and maintaining water supply system.Intentional budgetary arrangements for construction are required annually.Good peace and order is maintained.					
Agencies Responsible						Relationship with other projects					
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: LWSCMaintenance: LWSC						<ul style="list-style-type: none">There are five (5) projects for supplying safe and stable water to Greater Monrovia. This project is one of them for the year of 2019.					
Estimated Cost						Remarks					
<ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 98.94 mln.Contingency: USD 29.68 mln.Total Cost : USD 128.62 mln.						<p>The following areas are exclusive of this project area.</p> <div> : Project Area that was requested to Japan</div> <div> : Project Area that AfDB is studying</div> <div></div>					
Implementation Schedule											
Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
EPWS	---	---	---	---	17.09	17.09	25.17	22.66	22.67	15.87	8.08
Unit: mln USD											

Project Profile

Project No. and Project Name: WS-5 Project for Expansion of Water Supply System at Paynesville in Greater Monrovia (PEWS) Phase II																																			
Background of the Project						Effects of the Project																													
<p>In order to supply water of about 2.4 MGD (9,000m³/day) to about 70% of the total population of Paynesville zone with the highest population iout of Greater Monrovia zones, two (2) projects such as Monrovia Expansion and Rehabilitation of Three County Capitals (ERTC), and Project for Emergency Development of Water Supply System in Paynesville in Greater Monrovia (PEDW) have been planned for the year of 2014. Further water production of about 1.9MGD (7,000m³/day) is required for covering all the population in Paynesville zone for the year of 2019. Out of 1.9MGD, it is proposed that water production of about 1.4MGD (5,200m³/day) is covered by this project, while about 0.5MGD (1,800m³/day) is covered by the CM-1 Community Infrastructure Reconstruction Project.</p> <p>Paynesville zone has also the largest area in Greater Monrovia, but water pipelines have not been developed yet in most of areas. Therefore, even if sufficient water is produced from Saint Paul river, which is currently being utilized through the White Plains water supply system, it will take time to lay the rising main and distribution pipelines in Paynesville zone.</p> <p>Accordingly, development of water supply system utilizing rich groundwater which does not depend on the White Plains water supply system is urgently required, in Paynesville zone for the year of 2019.</p>						a) Target Beneficiaries :																													
						<ul style="list-style-type: none">• About 80,000 inhabitants in Paynesville zone																													
<p>Objectives of the Project</p> <ul style="list-style-type: none">• To raise the living standard of the residents.• To improve environmental hygiene of residents.						b) Effects of the Project :																													
						<ul style="list-style-type: none">• Reduction of water-borne disease• Improvement of the quality of life• Promotion of work activities																													
Location of the Project						Evaluation of the Project																													
<ul style="list-style-type: none">• Paynesville Zone						Economic Viability:																													
						<ul style="list-style-type: none">• NPV : USD 5.1 mln• B/C : 0.76• EIRR : 7.5%																													
Scope of the Project						Financial Soundness:																													
<p>The project includes the following items :</p> <ul style="list-style-type: none">• Construction of 100 boreholes with about 70 submersible pumps and generators (20-30kVA)• Construction of 40 elevated water tanks with a capacity of 70m³• Laying of rising pipelines from boreholes to service reservoirs and distribution pipelines from service reservoirs to public taps and households (PVC/GS, 100-200mm x 140km)• Installation of about 290 taps (6 faucets per tap)						<ul style="list-style-type: none">• Necessary budget allocation																													
						Environmental Impact: Category B																													
Agencies Responsible						<ul style="list-style-type: none">• Positive Impacts• Improve hygiene service and living standard• Negative Impacts																													
<ul style="list-style-type: none">• Project Implementation: Liberia Water and Sanitation Corporation (LWSC)• Operation: Communities to be served• Maintenance: LWSC and communities to be served						Alternative well site must be provided when the considerable decrease of groundwater level is serious																													
Estimated Cost						External Conditions																													
<ul style="list-style-type: none">• Implementation/Construction Cost (including design, construction supervision cost) : USD 19.35 mln.• Contingency: USD 3.52 mln.• Total Cost : USD 22.87 mln.						<ul style="list-style-type: none">• O&M cost of the water supply system shall be covered by beneficiaries.• Land acquisition for boreholes and service reservoirs (elevated water tanks)• Initial fund shall be established in water committees.																													
Implementation Schedule						Preconditions																													
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>PEWS (Phase II)</td><td></td><td></td><td></td><td>2.5</td><td>8.14</td><td>5.64</td><td>5.64</td><td>5.64</td><td></td><td></td><td></td></tr></table> <p>Unit: mln USD</p>						Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PEWS (Phase II)				2.5	8.14	5.64	5.64	5.64				<ul style="list-style-type: none">• Responsible organizations such as LWSC and water committees of served communities have sufficient capabilities for operating and maintaining water supply system.• Good peace and order is maintained.					
						Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019																		
PEWS (Phase II)				2.5	8.14	5.64	5.64	5.64																											
						Relationship with other projects																													
						<ul style="list-style-type: none">• Water service coverage of Paynesville zone shall be improved to 100% in 2019 by this project after implementation of 'Monrovia Expansion and Rehabilitation of Three County Capitals (ERTC)' and 'Project for Emergency Development of Water Supply System in Paynesville in Greater Monrovia (PEDWW)', which were targeted for 2014.																													
						Remarks																													
																																			

Project Profile

Project No. and Project Name: WS-6 Technical Cooperation Project of Groundwater Management (TCPGM)												
Background of the Project							Effects of the Project					
<p>Conventionally, shallow and dug wells have been used by the dwellers in Greater Monrovia as an alternative water source of the White Plains water supply system. Most of such wells were developed for residential purpose as an emergency measures during the civil conflict or later on. However, their wells are not registered or monitored by LWSC and MLME, due to lack of registration system. Therefore, well conditions such as water quality, water production yield, groundwater level, etc. have not been verified by responsible organizations such as LWSC and MLME.</p> <p>For the future, since development of public water supply system such as Monrovia Expansion and Rehabilitation of Three County Capitals (ERTC), Project for Emergency Development of Water Supply System in Paynesville in Greater Monrovia (PEDW), and Project for Expansion of Water Supply System at Paynesville in Greater Monrovia (PEWS) are planned, groundwater management is crucial to sustain the performance of the wells appropriately.</p>							a) Target Beneficiaries :					
							<ul style="list-style-type: none">• About 1.5million inhabitants (for the target year of 2019) in Paynesville zone					
							b) Effects of the Project :					
Objectives of the Project							Evaluation of the Project					
<ul style="list-style-type: none">• To raise the living standard of the residents.• To improve environmental hygiene of residents.• To enhance capabilities of operation & maintenance in responsible organization							Economic Viability:					
							<ul style="list-style-type: none">• Although no economic analysis is done, it is expected to improve the groundwater system and environmental hygiene for citizens.					
							Financial Soundness:					
Location of the Project							External Conditions					
<ul style="list-style-type: none">• Greater Monrovia							<ul style="list-style-type: none">• LWSC has fundamental capability for operating and maintaining water supply system.					
							Preconditions					
							<ul style="list-style-type: none">• Staff of the technical, operation division of LWSC and hydrogeology division of MLME is required to be involved in the project.• Good peace and order is maintained.					
Scope of the Project							Relationship with other projects					
<p>The project includes the following items :</p> <ul style="list-style-type: none">• Training on the regular monitoring of static water level of boreholes and its evaluation measurements.• Training on a regular analysis of water quality such as pH, total E-Coli, Turbidity, Color, EC, etc., and its evaluation measurements.• Training on an establishment of rules and regulations on registration required for developing groundwater.							<ul style="list-style-type: none">• In order to sustain public water supply system, which might be developed through Monrovia Expansion and Rehabilitation of Three County Capitals (ERTC), and the Project for Emergency Development of Water Supply System at Paynesville in Greater Monrovia (PEDWW), these projects shall be followed up by this technical cooperation.					
							Remarks					
Agencies Responsible												
<ul style="list-style-type: none">• Project Implementation: Liberia Water and Sanitation Corporation (LWSC) Ministry of Land, Mines and Energy (MLME)												
Estimated Cost												
<ul style="list-style-type: none">• Technical cooperation for groundwater and water quality control: USD 0.20 mln.• Water quality analysis equipments, operating expenses, etc: USD 0.12 mln.• Total Cost : USD 0.32 mln.												
Implementation Schedule												
Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
TCPGM	---	---	---	0.10	0.11	0.11	---	---	---	---	---	
Unit: mln USD												

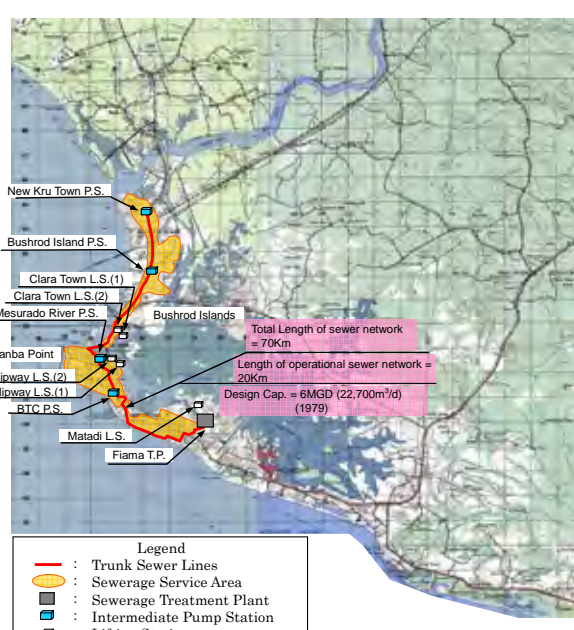
Project Profile

Project No. and Project Name: WS-7 Technical Cooperation Project of Non-Revenue Water (TCPNR)																																			
Background of the Project						Effects of the Project																													
<p>LWSC has faced serious problems on large amount of non-revenue water which has been caused by leakage on the existing pipelines of the White Plains water supply system, defection on water tariff system, faulty meters, etc. Hence, that the rate of revenue water in 2008 was extremely at low level of about 19%.</p> <p>Through Monrovia Water and Sewer Rehabilitation Program (WSRP) which is currently being conducted by the fund of WB., AfDB and other donors, water leakage is expected to reduce. In addition, water tariff system is inadequate for sustaining financial management, as there are no water meters and/or even if there are water meters, they are inoperative. Therefore, non-revenue water is assumed to come from the gap between flat water rate and actual water consumption as well as water leakage. In order to sustain sound management of LWSC, countermeasures such as leakage detection, improving water tariff system, etc. are required for non-revenue water reduction.</p>						<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">About 1.5million inhabitants (for the target year of 2019) in Greater Monrovia <p>b) Effects of the Project :</p> <ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of quality of lifeSound management of LWSCContribution for formulating the future water supply rehabilitation plan																													
Objectives of the Project						Evaluation of the Project																													
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.To enhance capabilities of operation & maintenance in responsible organization						<p>Economic Viability:</p> <ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the groundwater system for citizens and environmental hygiene. <p>Financial Soundness:</p> <ul style="list-style-type: none">Necessary budget allocation																													
Location of the Project						<p>External Conditions</p> <ul style="list-style-type: none">LWSC has fundamental capability for operating and maintaining water supply system. <p>Preconditions</p> <ul style="list-style-type: none">Staff of the technical, operation and finance division of LWSC is required to be involved in the project.Good peace and order is maintained. <p>Relationship with other projects</p> <ul style="list-style-type: none">After completion of Monrovia Water and Sanitation Rehabilitation Program (WSRP), it is important for LWSC to examine the effect of the rehabilitation program through this project.As the results of examination, some problems have to be issued and taken into consideration for making the future water supply improvement plan <p>Remarks</p>																													
<ul style="list-style-type: none">Greater Monrovia																																			
Scope of the Project																																			
<p>The project includes the following items :</p> <ul style="list-style-type: none">Analysis of current situation such as water production, distribution water, non-revenue waterVerification on location of the existing network pipelinesSelect pilot project.Digitize network pipelines in pilot plot project area using GIS software.Site reconnaissance for checking network pipelines.Check installation condition of the existing water meters in pilot project area.Check the minimum water flow at night in pilot project area.Carry out leakage detection in pilot project areaRepair leakage points in pilot project area.Check minimum water flow at night in pilot project area after repair of leakage points.Improve water tariff system																																			
Agencies Responsible																																			
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)																																			
Estimated Cost																																			
<ul style="list-style-type: none">Technical cooperation for non-revenue reduction program, leakage detection ,management of water production and distribution water: USD 0.60 mil.Equipments such as ultrasonic flow meter, ground detector, leakage detector, etc and operating expenses: USD 0.90 mln.Total Cost : USD 1.50 mln.																																			
Implementation Schedule																																			
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>TCPNR</td><td>---</td><td>---</td><td>---</td><td>0.50</td><td>0.50</td><td>0.50</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr></table>												Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	TCPNR	---	---	---	0.50	0.50	0.50	---	---	---	---	---
Project	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019																								
TCPNR	---	---	---	0.50	0.50	0.50	---	---	---	---	---																								
Unit: mln USD																																			

Project Profile


Project No. and Project Name: SN-1 Monrovia Water and Sanitation Rehabilitation Program (WSRP)																								
Background of the Project	Effects of the Project																							
<p>The existing sewerage treatment plant with sludge lagoon constructed in 1979 is located in the wetland in the southern part of Greater Monrovia. Not only wastewater of households which is connected to sewer system, but also night soil drawn by vacuum tracks from other households that cannot use sewer system has been discharged into the sewerage treatment plant. However, the operation of sewerage treatment plant has been suspended for a long period and the wastewater and night soil have flown into the stabilization pond without any treatment. The channel for discharging night soil is small hand trench which is dug in cultivation land. The content of rehabilitation work, in order to facilitate a disposal of night soil discharged from vacuum tracks is restoration for the inlet of the stabilization pond of 26,000m² as immediate rehabilitation of the sewerage plant.</p> <p>In addition, the rehabilitation programs are composed of construction of 11 public toilets, rehabilitation of 30 existing public toilets, procurements of maintenance equipments such as vacuum tracks and jet cleaning vehicles.</p>	<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">• About 280,000 inhabitants in Bushrod Islands, Central Monrovia <p>b) Effects of the Project :</p> <ul style="list-style-type: none">• Reduction of water-borne disease• Improvement of the quality of life• Promotion of work activities																							
	Evaluation of the Project																							
	<p>Economic Viability:</p> <ul style="list-style-type: none">• NPV : USD 90.0 mln• B/C : 2.51• EIRR : 36.0% <p>Financial Soundness:</p> <ul style="list-style-type: none">• Committed by WB, EU, DIFID, AfDB <p>Environmental Impact:</p> <ul style="list-style-type: none">• Positive Impacts Improve the hygiene service and living standard• Negative Impacts Specific negative impact is not found																							
Objectives of the Project	External Conditions																							
<ul style="list-style-type: none">• To raise the living standard of the residents.• To improve environmental hygiene of residents.	<ul style="list-style-type: none">• LWSC have sufficient capabilities for operating and maintaining the sewerage treatment system																							
Location of the Project	Preconditions																							
<ul style="list-style-type: none">• Central Monrovia	<ul style="list-style-type: none">• O&M cost of the sewerage treatment system shall be covered by beneficiaries.																							
Scope of the Project	Relationship with other projects																							
<p>The project includes the following items :</p> <ul style="list-style-type: none">• Construction of receptacle for septage• Rehabilitation of screen channel with use of new pipe connection to link facultative pond• Rehabilitation of ponds for sewage and septage• Interconnection pipe work	<ul style="list-style-type: none">• There are five (5) projects for sewerage and sanitary system for Greater Monrovia. This project is one of them for the year of 2011.																							
Agencies Responsible	Remarks																							
<ul style="list-style-type: none">• Project Implementation: Liberia Water and Sanitation Corporation (LWSC)• Operation: LWSC• Maintenance: LWSC	<p>Legend</p> <ul style="list-style-type: none">— : Trunk Sewer Lines■ : Sewerage Service Area■ : Sewerage Treatment Plant■ : Intermediate Pump Station■ : Lifting Station																							
Estimated Cost																								
<ul style="list-style-type: none">• Implementation/Construction Cost (including design, construction supervision cost) : USD 2.9 mln.• Total Cost : USD 2.9 mln.																								
Implementation Schedule																								
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th></tr><tr><td>NO.1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0.96</td><td>0.96</td><td>0.98</td><td></td><td></td><td></td><td></td></tr></table> <p>Unit: mln USD</p>		Project	2009	2010	2011	2012	2013	2014	2015	NO.1									0.96	0.96	0.98			
Project	2009	2010	2011	2012	2013	2014	2015																	
NO.1																								
	0.96	0.96	0.98																					

Project Profile

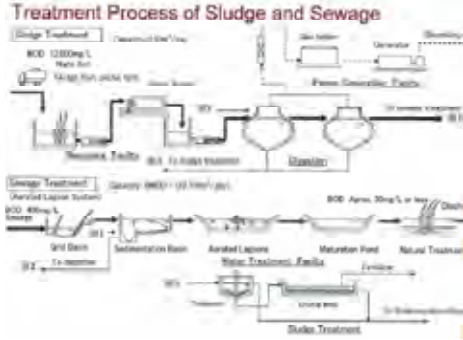
Project No. and Project Name: SN-2 Urban Infrastructure Construction and Rehabilitation of Monrovia Sewerage Network Pumping Stations																
Background of the Project	Effects of the Project															
<p>The existing sewerage facilities were constructed in the 1950s and late 1960s. The sewer pipes were mainly laid in Bushrod Islands (New Kru Town, Logan Town, Clara Town), Central Monrovia, Sinkor and Old Road.</p> <p>Sewage generated from each area was transmitted through 4 pump stations of the New Kru Town (Duala) pump station, the Bushrod Island (Sayon Town) pump station (Sayon town pump station), Mesurado River pump station and BTC pump station, and finally treated in the Fiama sewerage treatment plant (Design Capacity: 6MGD/day) located at Sinkor.</p> <p>However, most of the pump stations in the sewerage system have been seriously damaged and are not operative at present, because the pumps in four intermediate pump stations as mentioned above were stolen during the civil conflict. Then, most of the sewer pipes are blocked with sludge and debris.</p> <p>Accordingly, rehabilitation of the existing sewerage facilities such as 4 pump stations including 5 small size lifting stations and also de-sludge and cleaning the clogged pipelines is urgently required. SIU of MPW and LWSC commenced a study with the fund of WB to analyze the situations mentioned above.</p>	<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">About 280,000 inhabitants in Paynesville zone <p>b) Effects of the Project :</p> <ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of quality of lifePromotion of work activities															
	Evaluation of the Project															
	<p>Economic Viability:</p> <ul style="list-style-type: none">NPV : USD 10.3 mlnB/C : 2.53EIRR : 28.4% <p>Financial Soundness:</p> <ul style="list-style-type: none">Committed by WB <p>Environmental Impact:</p> <ul style="list-style-type: none">Positive Impacts Improve hygiene service and living standardNegative Impacts Possible resettlement at pumping stations where illegally occupied by vendors and kiosks															
	External Conditions															
	<ul style="list-style-type: none">LWSC have sufficient capabilities for operating and maintaining the sewerage treatment system															
	Preconditions															
	<ul style="list-style-type: none">O&M cost of the sewerage facilities shall be covered by beneficiaries.															
Objectives of the Project	Relationship with other projects															
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.	<ul style="list-style-type: none">There are five (5) projects for sewerage and sanitary system for Greater Monrovia. This project is one of them for the year of 2011.															
Location of the Project	Remarks															
<ul style="list-style-type: none">Paynesville Zone																
Scope of the Project																
<p>The project includes the following items :</p> <ul style="list-style-type: none">De-sludge, cleaning and rehabilitation of the existing clogged pipeline in Bushrod Islands (New Kru Town, Logan Town), Central Monrovia, Sinkor and Old Road areas.Rehabilitation of 4 pump stations of the New Kru Town (Duala) pump station, the Bushrod Island (Sayon Town) pump station (Sayon town pump station), Mesurado River pump station and BTC pump station including 5 small lifting stations.																
Agencies Responsible																
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: Communities to be servedMaintenance: LWSC and communities to be served																
Estimated Cost																
<ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 4.1 mln.Contingency: USD 0.7 mln.Total Cost : USD 4.8 mln.																
Implementation Schedule																
<table><tr><th>Project</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th></tr><tr><td>NO.2</td><td>0.8</td><td>2.0</td><td>2.0</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>		Project	2009	2010	2011	2012	2013	2014	2015	NO.2	0.8	2.0	2.0	-	-	-
Project	2009	2010	2011	2012	2013	2014	2015									
NO.2	0.8	2.0	2.0	-	-	-	-									
Unit: mln USD																

Project Profile

Project No. and Project Name: SN-3 Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan for 2014							
Background of the Project				Effects of the Project			
<p>Current severe problems are observed in congested low-standard housing areas in Bushrod Islands and Central Monrovia to Sinkor. Most of these areas have no access to the sewer network and their means of service is limited to pit latrines or no facilities. During the wet seasons, the latrines are mostly flooded and cannot be used.</p> <p>The majority of residents in high density areas does not have access to facilities at all and are forced to waste by open defecation in the field and riverbed surrounding their houses due to the lack of public toilets.</p> <p>Most of the low-density areas are served by septic tanks. This system is an adequate solution for the wastewater disposal in areas with low population density and was found to operate effectively.</p> <p>Therefore, mostly in the areas where it is difficult to have private toilet, more public toilets shall be installed and also community sanitation system shall be installed in the area where are provided with private toilet in community.</p> <p>Accordingly, provision of vacuum trucks to transfer night soil and sludge generated from public toilets and community sanitation system to the sludge treatment plant is urgently required.</p> <p>This Project is planned to provide necessary public toilets, community sanitation systems and vacuum trucks urgently for the target year of 2014 for Greater Monrovia including the areas surrounding Bushrod Islands and Central Monrovia to Sinkor area to cover approx. 50% of population with sanitation in Greater Monrovia.</p>				a) Target Beneficiaries :			
				<ul style="list-style-type: none">About 270,000 inhabitants in Greater Monrovia			
				b) Effects of the Project :			
				<ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of the quality of lifePromotion of work activities			
				Evaluation of the Project			
Economic Viability:							
<ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the sewerage system for citizens and environmental hygiene.							
Financial Soundness:							
<ul style="list-style-type: none">Necessary budget allocation							
Environmental Impact: Category C							
<ul style="list-style-type: none">Positive Impacts<ul style="list-style-type: none">Improve hygiene service and living standardNegative Impacts<ul style="list-style-type: none">Specific negative impact is not found							
External Conditions							
<ul style="list-style-type: none">Responsible organizations such as LWSC and Committees of served communities have sufficient capabilities for operating and maintaining sanitary systems.							
Preconditions							
O&M cost of the sanitary systems shall be covered by beneficiaries.							
Objectives of the Project							
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.							
Location of the Project							
<ul style="list-style-type: none">Greater Monrovia							
Scope of the Project							
The project includes the following items :							
<ul style="list-style-type: none">Construction of 66 Community Sanitary Systems (One Community size: approx. 3,000 houses)Construction of 225 public toilets (One toilets size: 8 seats)Provision of 8 vacuum trucks (Capacity of one vehicle: approx. 7m³)							
Agencies Responsible							
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: Communities to be servedMaintenance: LWSC and Communities to be served							
Estimated Cost							
<ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 18.1 mln.Contingency: USD 3.3 mln.Total Cost : U SD21.4 mln.							
Implementation Schedule							
Project	2009	2010	2011	2012	2013	2014	2015
NO.3	---	---	5.35	5.35	5.35	5.35	---
Unit: mln USD							





Project Profile

Project No. and Project Name: SN-4 Project for Reconstruction of Sewerage Treatment & Sludge Treatment Plant						
Background of the Project				Effects of the Project		
<p>The existing sewerage treatment plant with sludge lagoon constructed in 1979 is located in the wetland in the southern part of Greater Monrovia. Not only wastewater of households which is connected to sewer system, but also night soil drawn by vacuum trucks from other households that cannot use sewer system has been discharged into the sewerage treatment plant. However, the operation of sewerage treatment plant has been suspended for a long period and the wastewater and night soil have flown into the stabilization pond without any treatment.</p> <p>Therefore, rehabilitation of the existing sewerage facilities including pipelines, pump stations and sewerage treatment plant for Central Monrovia areas is urgently required.</p> <p>The rehabilitation of sewerage pipelines and pump stations in Bushrod islands and Central Monrovia to Sinkor area to recover the condition of pre-war are planned by WB as shown in Project File No.2 mentioned above.</p> <p>On the other hand, sludge and night soil generated from the Community Sanitary Systems and the public toilets in Greater Monrovia which are planned as mentioned in Project File No.3 and No.5 shall be urgently treated.</p> <p>Accordingly, construction of the sewerage and sludge treatment plants is urgently required.</p>				<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">About 910,000 inhabitants in Greater Monrovia <p>b) Effects of the Project :</p> <ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of the quality of lifePromotion of work activities		
				Evaluation of the Project		
				Economic Viability: <ul style="list-style-type: none">NPV : USD 17.1 mlnB/C : 0.72EIRR : 6.4%		
				Financial Soundness: <ul style="list-style-type: none">Necessary budget allocation		
				Environmental Impact: Category A <ul style="list-style-type: none">Positive Impacts<ul style="list-style-type: none">Improve the hygiene service and living standardNegative Impacts<ul style="list-style-type: none">Possible resettlement of commune locating within Fima treatment plantPossible negative impact to Mesurado Wetland		
Objectives of the Project				External Conditions		
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.				<ul style="list-style-type: none">Responsible organization LWSC has sufficient capabilities for operating and maintaining treatment plants.		
Location of the Project				Preconditions		
<ul style="list-style-type: none">Greater Monrovia				<ul style="list-style-type: none">O&M cost of the treatment plants shall be covered by beneficiaries.Land use in Fima sewerage treatment plant is required.		
Scope of the Project				Relationship with other projects		
<p>The project includes the following items :</p> <p>1) Reconstruction of the sewerage treatment plant</p> <ul style="list-style-type: none">Capacity of 6 MG/day (22,700m³/day) lagoon type treatment system to recover the condition of pre-war level taking into consideration that the existing sound underground pipelines will be left as it is without increasing pipe size after rehabilitation, de-sludge and cleaning. <p>2) Construction of sludge treatment plant</p> <ul style="list-style-type: none">Capacity of 230m³/day sludge treatment plant shall be planned to treat sludge generated from Community Sanitary Systems and Public Toilets. <p>Both sewerage and sludge treatment plants will be constructed in the area for Fima sewerage treatment plant.</p>				<ul style="list-style-type: none">There are five (5) projects for sewerage and sanitary system for Greater Monrovia. This project is one of them for the year of 2019.		
Agencies Responsible				Remarks		
<ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: LWSCMaintenance: LWSC						
Estimated Cost						
<ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 63 mln.Contingency: USD 11.3 mln.Total Cost : USD 74.2 mln.						
Implementation Schedule						
Project	2014	2015	2016	2017	2018	2019
NO.4	---	14.84	14.84	14.84	14.84	14.84
Unit: mln USD						



Project Profile

Project No. and Project Name: SN-5 Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan for 2019														
Background of the Project	Effects of the Project													
This Project has a close relation to No.3 Project mentioned above. This Project is planned to provide the necessary public toilets, community sanitation systems and vacuum trucks for the target year of 2019 for Greater Monrovia including the areas surrounding Central Monrovia and Bushrod islands to cover approx. 80% of population with sanitation in Greater Monrovia.	a) Target Beneficiaries : <ul style="list-style-type: none">About 590,000 inhabitants in Greater Monrovia													
	b) Effects of the Project : <ul style="list-style-type: none">Reduction of water-borne diseaseImprovement of the quality of lifePromotion of work activities													
	Evaluation of the Project													
Objectives of the Project <ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.	Economic Viability: <ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the sewerage system for citizens and environmental hygiene. Financial Soundness: <ul style="list-style-type: none">Necessary budget allocation													
	Environmental Impact: Category C <ul style="list-style-type: none">Positive Impacts Improve the hygiene service and living standardNegative Impacts Specific negative impact is not found													
	External Conditions <ul style="list-style-type: none">Responsible organizations such as LWSC and Committees of served communities have sufficient capabilities for operating and maintaining sanitary systems.													
Location of the Project <ul style="list-style-type: none">Greater Monrovia	Preconditions													
Scope of the Project														
The project includes the following items : <ul style="list-style-type: none">Construction of 93 Community Sanitary Systems (One Community size: approx. 3,000 houses)Construction of 86 public toilets (One toilets size: 8 seats)Provision of 7 vacuum trucks (Capacity of one vehicle: approx. 7m3)														
O&M cost of the sanitary systems shall be covered by beneficiaries.	Relationship with other projects													
Agencies Responsible <ul style="list-style-type: none">Project Implementation: Liberia Water and Sanitation Corporation (LWSC)Operation: Communities to be servedMaintenance: LWSC and Communities to be served														
Estimated Cost <ul style="list-style-type: none">Implementation/Construction Cost (including design, construction supervision cost) : USD 22.5 mln.Contingency: USD 4.1 mln.Total Cost : USD 26.6 mln.														
Remarks	General Layout of Proposed System in Greater Monrovia													
Implementation Schedule														
<table><thead><tr><th>Project</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr></thead><tbody><tr><td>NO.5</td><td>---</td><td>5.32</td><td>5.32</td><td>5.32</td><td>5.32</td><td>5.32</td></tr></tbody></table> <p>Unit: mln USD</p>		Project	2014	2015	2016	2017	2018	2019	NO.5	---	5.32	5.32	5.32	5.32
Project	2014	2015	2016	2017	2018	2019								
NO.5	---	5.32	5.32	5.32	5.32	5.32								


Project Profile

Project No. and Project Name: SW-1 Improvement of Drainage System in Monrovia Core Area																						
Background of the Project	Effects of the Project																					
The storm water drainage system in Monrovia was constructed in the period 1955 to 1957. The immigrants moved into the empty spaces in town, building their houses without considering the natural drainage pattern. Along the Mesurado River and its southern branches, the houses have been built up even in the very low-lying areas which have always been subjected to inundation. During the civil conflict, the drainage structures almost has damaged and lost its drainage function. The Emergency Rehabilitation Programme is implemented by World Bank, and some rehabilitation of drainage structures is still ongoing. For the acceleration of restoration, additional improvement of drainage system in Monrovia Core Area (Bushrod Island, Central Monrovia, Sinkor, Lakpazee and Old Road zones) is required for the development economic activity of Capital Monrovia.	a) Target Beneficiaries : <ul style="list-style-type: none">About 430,000 inhabitants in Monrovia Core Area b) Effects of the Project : <ul style="list-style-type: none">Development of capital function of Greater MonroviaImprovement of the quality of lifePromotion of work activities																					
Objectives of the Project	Evaluation of the Project																					
<ul style="list-style-type: none">To accelerate economic activity in Monrovia Core AreaTo raise the living standard of the residents.To improve environmental hygiene of residents.	Economic Viability: <ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the drainage system for citizens and environmental hygiene. Financial Soundness: <ul style="list-style-type: none">Necessary the budget allocation Environmental Impact: Category C <ul style="list-style-type: none">Positive Impacts<ul style="list-style-type: none">Improve the hygiene service and living standardNegative Impacts<ul style="list-style-type: none">Specific negative impact is not found																					
Location of the Project	External Conditions																					
<ul style="list-style-type: none">Monrovia Core Area (Bushrod Island, Central Monrovia, Sinkor, Lakpazee, Old Road)	<ul style="list-style-type: none">																					
Scope of the Project	Preconditions																					
The project includes the following items : <ul style="list-style-type: none">Cleaning and replace/repair of drainage pipesFurnishing of locally made inlet gratingCleaning and repair of manholesReplacement of concrete manhole coverConcrete lining of existing open channelsConstruction of concrete channels	<ul style="list-style-type: none">Operation Bureau, MPW is only drainage structures management authority in Monrovia.																					
Agencies Responsible	Relationship with other projects																					
<ul style="list-style-type: none">Project Implementation: Ministry of Public Works (MPW)Operation: MPWMaintenance: MPW	<ul style="list-style-type: none">Urban Infrastructure Construction and Rehabilitation of Monrovia Sewerage Network Pumping Stations, including drainage improvement is ongoing. The proposed project is supplementary to solve the inundation.																					
Estimated Cost	Remarks																					
<ul style="list-style-type: none">Construction Cost USD 8.7 mln.Others (Administration, ES, Contingency etc) USD 3.6 mln.Total Cost USD 12.3 mln.	 <p> : Project Area</p>																					
Implementation Schedule																						
<table><tr><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019										
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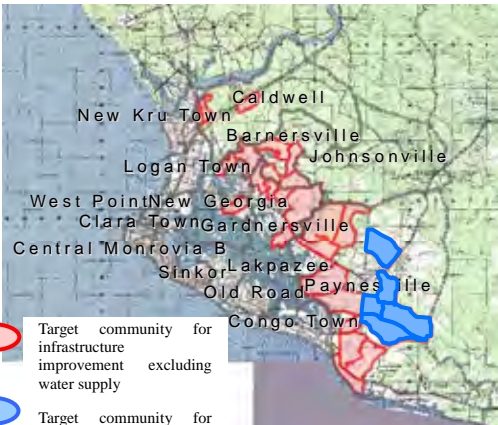
Project Profile

Project No. and Project Name: SW-2 Equipment Supply of Drainage Pipes Cleaning																							
Background of the Project	Effects of the Project																						
In Monrovia Core Area, there are approximately 27 km underground pipes. After the civil conflict, the maintenance work of the pipes has not been sustained. In result, there are many blockages and damages in the underground pipes and manholes. During the rainy season, the drainage water flowing on the road surface by the blockage of the drain structures causes degradation of living environment for the inhabitants and breaching of the city road pavement. In addition, the commercial activity of the Core Area has been disturbed due to lack of drainage around the commercial buildings. For the keeping original function of the piped drainage, the equipment supply of drainage pipes cleaning is primary required. The capacity building of operation and maintenance activity is strengthened to the staff of MPW through the Project.	a) Target Beneficiaries : <ul style="list-style-type: none">About 160,000 inhabitants in Monrovia Core Area b) Effects of the Project : <ul style="list-style-type: none">Reduction of inundationImprovement of the quality of lifePromotion of commercial activity																						
Objectives of the Project	Evaluation of the Project																						
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.To strengthen the capacity building of operation and maintenance.	Economic Viability: <ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the drainage system for citizens and environmental hygiene. Financial Soundness: <ul style="list-style-type: none">Necessary the budget allocation Environmental Impact: Category C <ul style="list-style-type: none">Positive Impacts Improve the hygiene service and living standardNegative Impacts Specific negative impact is not found																						
Location of the Project	External Conditions																						
<ul style="list-style-type: none">Monrovia Core Area (Bushrod Island, Central Monrovia, Sinkor, Lakpazee, Old Road) Zone	<ul style="list-style-type: none">Responsible organizations such as LWSC and water committees of served communities have sufficient capabilities for operating and maintaining water supply system.																						
Scope of the Project	Preconditions																						
The project includes the following items : <ul style="list-style-type: none">Procurement of equipment for drainage cleaning and others 4 tons water jet cleaner :219L/min x 19.6 Mpa (1 unit) 4 tons vacuum cleaner (lift type) :21 m³/min x 97 Kpa (1 unit) 4 tons water tank :4.5 m³, Hauling Dump Truck, 4 tons Truck, and others (generator, pump)Preparation of drainage pipes cleanings planTraining of equipment operation	<ul style="list-style-type: none">Equipment operator shall be prepared by MPW.The space of garage and parking with roof shall be prepared by MPW.Fuel cost shall be fully supplied by MPW.																						
Agencies Responsible	Relationship with other projects																						
<ul style="list-style-type: none">Project Implementation: Ministry of Public Works (MPW)Operation: MPWMaintenance: MPW	<ul style="list-style-type: none">Urban Infrastructure Construction and Rehabilitation of Monrovia Sewerage Network Pumping Stations under WB, including drainage improvement is ongoing. The proposed project is out of the scope of WB project.																						
Estimated Cost	Remarks																						
<ul style="list-style-type: none">Procurement of Equipment USD 0.9 mln.Others (Administration, ES, Contingency etc) USD 0.4 mln.Total USD 1.3 mln.	 <div> Project area</div>																						
Implementation Schedule																							
<table><tr><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019												
2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019													

Project Profile

Project No. and Project Name: SW-3 Establishment of Operation and Maintenance Management System																																																																			
Background of the Project	Effects of the Project																																																																		
<p>Primary function of the drainage is to flow the storm water in the rainy season. However, some blocking and drained water stagnation in the channel by the sludge and debris often can be seen in Soniwein River and it makes poor hygiene for living environment of the inhabitants. The cleanings of the channel or demolish of the solid waste shall be required before the rainy season starting.</p> <p>Generally, operation and maintenance work on a routine basis shall be done to achieve the objectives of drainage system through fulfilling of functions of drainage facilities such as drainage channel, underground drainage pipes, manholes and culverts.</p> <p>To perform the operation and maintenance work, the technical cooperation programme to strengthen the capacity of the organization of Operation Bureau, MPW shall be required.</p>	<p>a) Target Beneficiaries :</p> <ul style="list-style-type: none">About 430,000 inhabitants in Monrovia Core Area <p>b) Effects of the Project :</p> <ul style="list-style-type: none">Reduction of inundationImprovement of the quality of lifePromotion of work activities																																																																		
Objectives of the Project	Evaluation of the Project																																																																		
<ul style="list-style-type: none">To raise the living standard of the residents.To improve environmental hygiene of residents.To reduce the inundation	<p>Economic Viability:</p> <ul style="list-style-type: none">Although no economic analysis is done, it is expected to improve the drainage system for citizens and environmental hygiene. <p>Financial Soundness:</p> <ul style="list-style-type: none">Necessary the budget allocation <p>Environmental Impact: Category C</p> <ul style="list-style-type: none">Positive Impacts Improve the hygiene service and living standardNegative Impacts Specific negative impact is not found																																																																		
Location of the Project	External Conditions																																																																		
<ul style="list-style-type: none">Monrovia Core Area (Bushrod Island, Central Monrovia, Sinkor, Lakpazee, Old Road)																																																																			
Scope of the Project	Preconditions																																																																		
<p>The project includes the following items :</p> <ul style="list-style-type: none">Preparation of operation and maintenance manual and guidancePreparation of drainage structures inventoryPreparation of recording on maintenance workPlan preparation of public relations activities	<ul style="list-style-type: none">Operation Bureau, MPW has the fully responsibility of operation and maintenance activity for the drainage structures in Monrovia.																																																																		
Agencies Responsible	Relationship with other projects																																																																		
<ul style="list-style-type: none">Project Implementation: Ministry of Public Works (MPW)Operation: MPWMaintenance: MPW	<ul style="list-style-type: none">Urban Infrastructure Construction and Rehabilitation of Monrovia Sewerage Network Pumping Stations under WB, including drainage improvement is ongoing. The proposed project is out of the scope of WB project.																																																																		
Estimated Cost	Remarks																																																																		
<ul style="list-style-type: none">Personal Cost USD 0.2 mln.Others (Per diem, etc) USD 0.08 mln.Total USD 0.28 mln.	 <p>Project area</p>																																																																		
Implementation Schedule																																																																			
<table><tr><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019												2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019												2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019												
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2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019																																																									
2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019																																																									

Project Profile

Project Name: CM-1 Community Infrastructure Improvement Project																																											
Background of the Project						Effects of the Project																																					
<p>Restoration/improvement and improvement needs of the infrastructure of water supply, sanitation and road falls into the category of basic social service improvement of communities. Multi-components (road, water supply and sanitation) are integrated into one packaged program as Community Infrastructure Reconstruction Project so that timely implementation and effective procedure of the implementation can be achieved.</p> <p>On the other hand, community-based project implementation is expected to contribute to enhance skills of residents, community empowerment, and job creation.</p> <p>The project can also be divided into small projects according to area to make NGOs and donor country participate in its implementation.</p>						<p>Target Beneficiaries :</p> <ul style="list-style-type: none">The residents living in the communities where the Project is implemented. (approximately 240,00 residents) <p>Effects:</p> <ul style="list-style-type: none">Vehicle operation cost savings & travel time reductionReduction of damages on the vehicleImprovement of accessibilityIncrease of maintainable road sectionsImprovement of sanitary conditionImprovement of safe water accessJob creationSkill up of community workersCommunity empowerment																																					
						<p>Objectives of the Project</p> <ul style="list-style-type: none">To enhance community living standardCommunity empowermentTo create jobsTo rehabilitate damaged community roads in Greater MonroviaTo secure the access from/to villageTo secure safe water supplyTo secure sanitation																																					
<p>Location of the Project</p> <ul style="list-style-type: none">Communities in the urbanizing area with gross population density of 40 - 80 pop./ha.						<p>Evaluation of the Project</p> <p>Economic Viability</p> <ul style="list-style-type: none">Total benefits including vehicle-km and vehicle-hour are calculated in the “without” and “with” case. <p>NPV : USD 123 mln</p> <p>B/C : 0.76 - 4.08</p> <p>EIRR: 7.5 - 42.4 %</p> <p>Financial Soundness</p> <ul style="list-style-type: none">Necessary budget allocation <p>Environmental Impact: Category B</p> <ul style="list-style-type: none">Positive ImpactsImprove sanitation condition of the communityImprovement of accessibility to social/public facilities for residentsNegative ImpactsLand acquisition to build new road or to widen roads, to construct deep well and toilet																																					
<p>Scope of the Project</p> <p>Construction of:</p> <ul style="list-style-type: none">100 road sections20 deep wells and public kiosk138 Public toilet <p>Technical cooperation shall be included.</p>						<p>External Conditions</p> <ul style="list-style-type: none">A good peace and order situation is maintained.Responsible community for operation and maintenance has sufficient capacity																																					
<p>Agencies Responsible</p> <ul style="list-style-type: none">Project Implementation : Ministry of Public Works, LWSC and CommunityOperation : CommunityMaintenance : Community						<p>Preconditions</p> <ul style="list-style-type: none">Necessary fund is prepared. <p>Relationship with other projects</p> <ul style="list-style-type: none">“TR-4 Road Network Rehabilitation” , “WS-5 Project for Expansion of Water Supply System at Paynesville in Greater Monrovia”, “SN-3 Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan for 2014”, and “SN-5 Community Sanitary System and Public Toilet Installation & Vacuum Truck Procurement Plan for 2019”																																					
<p>Estimated Cost</p> <ul style="list-style-type: none">Construction:<ul style="list-style-type: none">Road: USD 16.09 mln.Water supply: USD 4.69 mln.Sanitation: USD 7.01 mln.Total Cost: USD 27.79 mln.						<p>Target Communities for the Project</p>  <p>Target community for infrastructure improvement excluding water supply</p> <p>Target community for infrastructure</p>																																					
<p>Implementation Schedule</p> <table><thead><tr><th></th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr></thead><tbody><tr><td>Technical Cooperation</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Construction</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>												2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Technical Cooperation											Construction										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019																																	
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