Appendix 1

Scope of Work

SCOPE OF WORK

FOR

THE STUDY

ÔN

CITY MASTER PLAN AND URBAN DEVELOPMENT PROGRAM OF ULAANBAATAR CITY

IN

MONGOLIA

AGREED UPON BETWEEN

MINISTRY OF CONSTRUCTION AND URBAN DEVELOPMENT AND JAPAN INTERNATIONAL COOPERATION AGENCY

Mr. Janlav NARANTSATSRALT Minister for Construction and Urban Development, Mongolia

June

Mr. Tsegmed TSENGEL Minister for Road, Transport and Tourism, Mongolia

Mr. Tsogt BATEAYAR Capital City Governor and Mayor of Ulaanbaatar

ULAANBAATAR, November 9, 2006

Mr. Tsutomu MORIYA Resident Representative Japan International Cooperation Agency Mongolia Office

I INTRODUCTION

In response to the request of the Government of the Mongolia (hereinafter referred to as "the GOM"), the Government of Japan (hereinafter referred to as "the GOI") decided to conduct "The Study on City Planning Master Plan and Urban Development Program of Ulaanbaatar City in Mongolia (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the GOJ, will undertake the Study in close cooperation with the authorities concerned of the GOM.

On the part of GOM, Ministry of Construction and Urban Development (hereinafter referred to as "MCUD") shall act as the representative of counterpart agencies to the Japanese study team and also as the coordinating body in relation with other concerned government and non-governmental organizations for the smooth implementation of the Study.

II OBJECTIVE OF THE STUDY

The objectives of the Study are as follows:

- 1) the revision of the current master plan of Ulaanbaatar City in the target year of 2030
- the preparation for short and midterm action plans as urban development program and implementing methods in the above revised master plan.
- 3) the recommendation of city planning legal system for the implementation of the above revised master plan

III STUDY AREA

The Study area shall cover the Ulaanbaatar City administrative area including Bagamur and Bagakhangai at regional planning level and the area shown in Attachment 1 including Nalaikh is set as a study area at city planning level.

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IV SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover following items.

- 1. Formulation of data base for city planning utilizing GIS
 - To take the aerial photographs.
 - To produce the digital topographic maps that will be base maps of GIS.
- 2. Survey and Review of basic data as city planning
 - 2.1. To review the existing master plan and urban development plans
 - 2.2. To survey and review the necessary data and information for city planning (population structure and distribution, economic structure, existing land use, existing environmental pollution, existing infrastructure, existing traffic congestion, existing disaster risks etc.)
 - 2.3. To analyze the institutional bodies and their capacities as urban development administration
 - 2.4. To analyze the current city planning system and relevant laws

- 2.5. To identify the present urban problems and issues
- 3. Revision of the master plan of Ulaanbaatar City
 - 3.1. To survey and collect of necessary data and information
 - 3.2. To finalize the concept for the city planning
 - 3.3. To revise the master plan of Ulaanbaatar City
 - 3.4. To formulate the project plans to realize the master plan
 - 3.5. To evaluate the project cost for the above project plans in 3.4
 - 3.6. To assess the socio-economic impact
 - 3.7. To assess the social and environmental impact
- 4. Analysis of the information of the priority road projects which have been requested as Japan's ODA loans
 - 4.1. To survey and collect necessary transportation data and information of target roads
 - 4.2. To make the preliminary design of the road projects
 - 4.3. To implement the preliminary evaluation of the road projects
- 5. Formulation of short and midterm action plans in the above revised master plan as urban development program

In the course of the Study, the JICA study team will implement technical transfer on analysis and planning to counterpart officials, especially Ulaanbaatar City Government officials who are expected to take part in the whole planning process in order to make the Study proper.

IV STUDY SCHEDULE

The Study will be implemented in accordance with the tentative schedule as shown in Attachment 2. The schedule, including report submission dates stated in the next clause (V), is tentative and subject to be modified when both sides agree upon and any necessity arises in the course of the Study.

V REPORTS AND FINAL PRODUCTS

JICA shall prepare and submit the following reports in English.

1.	Inception Report	
	Thirty (30) copies	At the commencement of the Study
2.	Progress Report	
	Thirty (30) copics	Within seven (7) months after the commencement of the Study.
3.	Interim Report	
	Thirty (30) copies	Within fourteen (14) months after the commencement of the Study.
4.	Draft Final Report	
	Thirty (30) copies	Within twenty two (22) months after the commencement of the Study.
		The written comments on the Draft Final Report from Ministry of
		Construction and Urban Development shall be submitted to JICA within

one (1) month after submission of the report.

- 5. Final Report
 Thirty (30) copies
 Within one (1) month after the receipt of the comments on the Draft Final Report.
- Aerial Photographs
- 7. Digital topographic maps and GIS data

VI UNDERTAKING OF THE GOM

- 1. To facilitate the smooth conduct of the Study, the GOM shall take the following necessary measures:
 - 1) To secure the safety of the Study Team;
 - To permit the members of the Study Team to enter, leave and sojourn in the Mongolia for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees;
 - To exempt the members of the Study Team from taxes, duties and any other charges on equipment, machinery and other material brought into the Mongolia for the implementation of the Study;
 - 4) To exempt the members of the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowance paid to the members of the Study Team for their service in connection with the implementation of the Study;
 - To provide necessary facilities to the Study Team for the remittance as well as utilization of the funds introduced into Mongolia from Japan in connection with the implementation of the Study,
 - 6) To facilitate legal entry with permission (or, to secure permission for the Study Team for entry) into private properties and restricted areas for the implementation of the Study;
 - 7) To secure permission for the Study Team to take all data related to the Study out of Mongolia; and
 - To secure necessary permission for aerial photography by aircraft for the implementation of the Study.
- 2. The GOM shall bear claims, if any arises, against the members of the Study Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study Team.
- 3. The GOM shall, at its own expense, provide the Study Team with the following:
 - 1) available data and information related to the Study;
 - 2) security-related information on as well as measures to ensure the safety of the Study Team;
 - 3) information on as well as support in obtaining modical service;
 - 4) counterpart personnel;
 - 5) suitable office space with necessary office equipment and fumiture;
 - credentials or identification cards;

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VII UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

- 1) To dispatch, at its own expense, the Study Team to Mongolia; and
- 2) To pursue technology transfer to Mongolia counterpart personnel in the course of the Study.

VII OTHERS

- 1) JICA and GOM shall consult with each other in respect of any matter that may arise from or in connection with the Study.
- 2) The present document will become valid after authorization by JICA Headquarters.

Attachment 1 : Study area Attachment 2 : Study schedule



Attachment 2

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Study Schedule

(Urban Planning)

	Feb-07	Mar-07	Apr-07	May-07	Jun-07	70-lut	Aug-07	Sup-07	Oct-07	Nov-07	Dec-07	Jau-03.	Feb-08	Mar-08	Apt-0S	May-08	Jun-OS	Jul-08	Aug-08	Scp-03	Oct-08	Nov-03	Dec-08
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(Digital Map Production)

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Inception Report Progress Report Interim Report Draft Final Report Final Report IC/R PR/R DF/R DF/R

Legend

Appendix 2

Member List

1	Ts. Gankhuu (Chairperson)	State Secretary	Ministry of Construction and Urban
2	S. Ochirbat	Director	Policy and coordination department for Urban Development, Ministry of Construction and Urban Development
3	M. Enkhbayar	Advisor to the Minister	Ministry of Construction and Urban Development
4	D. Munkhbaatar	Director	Policy and coordination department for Land management and Assets registration, Ministry of Construction and Urban Development
5	G. Myagmar	Director	Policy and coordination department for Construction, Housing and Urban utilities and Services, Ministry of Construction and Urban Development
6	L. Galbadrakh	Director	Policy and coordination department for Finance, Investment and Economic cooperation, Ministry of Construction and Urban Development
7	T. Dorjhand	Deputy director	Loan and aids policy coordination department, Ministry of Finance
8	D. Baasankhuu	Director	Auto road department, Ministry of Roads, Transportation and Tourism
9	A. Enkhbat	Director	Strategic planning and policy coordination department, Ministry of Environment
10	Ts. Sukhbaatar	Director	Fuel and energy strategic planning and policy coordination department, Ministry of Fuel and Energy Resources
11	D. Badarch	Director	Industry policy coordination department, Ministry of Industry and Commerce
12	D. Gunibazar	Director	Construction, Roads, Hoist mechanism inspection department, State Specialized Inspection Agency
13	G. Munkhbayar	General Manager	Ulaanbaatar City
14	B. Munkhbaatar	Director	Urban Development Policy Department, UB City
15	G. Bold	Director	Urban Planning Research and Design Institute

1. Steering Committee Members (1st, 2nd)

2. Working Group Members (1st, 2nd)

1.	S. Ochirbat (Chairperson)	Director	Policy and coordination department for Urban Development, Ministry of Construction and Urban
	N. Nata a state si	Director Chief	Development
2	N. Naisaguorj	Architect	Department LIB City
2	D Bologsoikhan	Architect	Department, OB City Delicy and coordination department for Urban
5	(Secretary)		Development Ministry of Construction and Urban
	(Decretary)		Development
4	S. Namjilmaa	Officer	Policy and coordination department for Urban
			Development, Ministry of Construction and Urban
			Development
5	D. Suvdaa	Officer	Policy and coordination department for Urban
			Development, Ministry of Construction and Urban
			Development
6	Ts. Dashzeveg	Officer	Policy and coordination department for Land
			management and Assets registration, Ministry of
			Construction and Urban Development
7	Z. Lkhagvadorj	Officer	Finance, Investment and Economic Cooperation
			Department, Ministry of Construction and Urban
			Development
8	N. Bat-Erdene	Director	Urban development and design department,
			National Center for Construction, urban
			development and urban utilities and services
9	B. Tumurkhuyag	Director	Department of Land Management, UB City
10	D. Bat-Erdene	Director	Department of Roads, UB City

11	Sh. Amgalanbayar	Director	Department of Engineering, UB City
12	Ch. Erdene-Ochir	Director	Urban development Division, Department of
			Construction, Urban development and Planning,
			UB City
13	B. Purevjav	Director	Water supply and Management Agency
14	D. Byamba-Ochir	Director	Heating supply Company
15	Shaaluu	Director	Telecommunication Company of Mongolia
16	L. Byambasuren	Officer	Department of Urban Development Policy, UB City
17	Oyunbat	Deputy director	Energy distribution Company
18	G. Narangerel	Senior architect	Urban Planning Research and Design Institute
19	J. Nergui	Inspector	Construction, Roads, Hoist mechanism inspection
	-		department, State Specialized Inspection Agency
20	G. Galsanpuntsag	Director	City Specialized Inspection Agency

3. Steering Committee Members (3rd, 4th)

1	T. Purevdorj	Vice Minister	Ministry of Roads, Transportation, Construction and Urban Development
2	B. Munkhbaatar	Deputy Mayor	UB City
3	D. Belegsaikhan	Officer	Urban Development and Land Management Policy, MRTCUD
4	L. Galbadrakh	Advisor to the Minister	MRTCUD
5	S. Ochirbat	Officer	Urban Development and Land Management Policy Department, MRTCUD
6	B. Baasan	Director	Construction, Housing and Urban utility Policy Department, MRTCUD
7	D. Nemekhbayar	Director	Finance and Investment Department, MRTCUD
8	D. Naranpurev	Director	Roads and Transportation Policy Department, MRTCUD
9	T. Dorjhand	Deputy director	Loan and Aids Policy Coordination Department, Ministry of Finance
10	A. Enkhbat	Director	Strategic Planning and Policy Coordination Department, Ministry of Environment
11	D. Chimeddorj	Director	Energy Policy Department, Ministry of Minerals and Energy
12	D. Badarch	Director	Industry Policy Coordination Department, Ministry of Food, Agriculture and Light Industry
13	Ts. Ganbat	Deputy Director	Infrastructure Inspection Department, State Specialized Inspection Agency
14	Ch. Bat	General Manager	UB City
15	B. Bayanjargal	Director	Urban Development Policy Department, UB City
16	N. Natsagdorj	Chief Architect	UB City
17	E. Anar	Division Director	Construction, Urban Development and Planning Department, UB City
18	Ch. Erdene-Ochir	Director	Urban Development Division, CUDPD
19	D. Bayarkhuu	Officer	State Administration and Management Department, MRTCUD

4. Working Group Members (3rd, 4th)

1	S. Ochirbat	Director	Policy and coordination department for Urban
			Development, MRTCUD
2	N. Natsagdorj	Director	Construction and Urban Development
			Department, UB City Chief Architect
3	D. Belegsaikhan	Officer	Policy and coordination department for Urban
	-		Development, MRTCUD
4	S. Namjilmaa	Officer	Policy and coordination department for Urban
			Development, MRTCUD
5	D. Suvdaa	Officer	Policy and coordination department for Urban
			Development, MRTCUD

6	Ts. Dashzeveg	Officer	Policy and coordination department for Land
			management and assets registration, MRTCUD
7	Z. Lkhagvadorj	Officer	Finance, Investment and Economic Cooperation
			Department, Ministry of Construction and Urban
			Developm13ent
8	N. Bat-Erdene	Director	Urban development and design department,
			National Center for Construction, urban
			development and urban utilities and services
9	B. Tumurkhuyag	Director	Department of Land Management, UB City
10	D. Bat-Erdene	Director	Department of Roads, UB City
11	Sh. Amgalanbayar	Director	Department of Engineering, UB City
12	Ch. Erdene-Ochir	Director	Urban development Division, Department of
			Construction, Urban development and Planning,
			UB City
13	B. Purevjav	Director	Water supply and Management Agency
14	D. Byamba-Ochir	Director	Heating supply Company
15	Shaaluu	Director	Telecommunication Company of Mongolia
16	L. Byambasuren	Officer	Department of Urban Development Policy, UB City
17	Oyunbat	Deputy director	Energy distribution Company
18	G. Narangerel	Senior architect	Urban Planning Research and Design Institute
19	J. Nergui	Inspector	Construction, Roads, Hoist mechanism inspection
	-		department, State Specialized Inspection Agency
20	G. Galsanpuntsag	Director	City Specialized Inspection Agency

5. Technical Working Group Members

	A. Competitiveness	B. Livability	C. Environmental Sustainability	D. Financial Capability	E. Governance
1	S. Ochirbat MCUD, Policy Coordination Department for Urban Development	S. Namjilmaa MCUD, Policy Coordination Department for Urban Development	Ch. Erdene-Ochir City Construction & Urban Development Planning Department	P. Batchimeg City Construction & Urban Development Planning Department	P. Enkhbat City Governor's Office, Legal Affairs Division
2	A. Amarsaikhan Governor, Sukhbaatar district	L. Altangerel City Development Policy Division	B. Baatarkhuyag Water supply & Sewerage Authority	P. Ariunaa Mongolian Urban Development Institute	D. Narantsetseg City Women's Council
3	D. Altantsetseg Ministry of Education, Science and Culture	Sh. Amgalanbayar Mayor's Office Utility Division	Ts. Banzragch Mininstry of Nature and Environment	Batchimeg Mongol Post Bank	N. Bat-Erdene National Center for construction, urban development and urban utilities and services
4	L. Baasanjav Ministry of Food and Agriculture	D. Baatarjav City Land Office	Ch. Batsaikhan City Development Policy Division	Ch. Bayanchimeg City Statistics Depertment	G. Bolormaa MCUD, Policy & coordination Department for Land management & Assets registration
5	G. Bazargur UB Power supply network company	Kh. Battulga Deputy Governor Khan-Uul district	J. Zulzagabaatar MCUD, Policy Coordination Department for Urban Development	D. Bat-Erdene Ministry of Finance	Kh. Burentogtokh MCUD, Office of the Minister
6	L. Battsooj City Road Department	B. Bayar Urban Development Support Center	E. Dondmaa MCUD, Policy Coordination Department for Urban Development	M. Ganbaatar City Property Relations Department	L. Byambasuren City Development Policy Division
7	B. Bayaraa City Construction & Urban Development Planning Department	L. Byambasuren State Inspection Agency	L. Luvsandavaajav City Environmental Protection Department	D. Gongor City Social Insurance Department	D. Belegsaikhan MCUD, Policy Coordination Department for Urban Development
8	D. Dorjtsend Mayor's Office, Production & Services	G. Ganbaatar City Police Department	Sh. Munkhjargal UB heating supply network Co.	Ts. Doloonjin City Finance, Economy & Treasury Division	U. Ganbold City Public Administration

	Division				Management Department
9	E. Jargalsaikhan Ministry of Road, Transport and Tourism	J. Davaasuren City Development Policy Division	D. Ochirbat Governor, Chingeltei district	A. Zulgerel City Development Policy Division	R. Dagva City Public Relations Division
10	B. Lkhagva UB region Council	Ts. Dashzeveg MCUD, Land Management & Assets Registration Policy Coordination Department	E. Purev-Erdene University of Science and Technology	Z. Lkhagvadorj MCUD, Finance, Investment & International Cooperation Department	J. Jantsan UB City Council
11	D. Mijidsuren Ideal group Co.	B. Zuvtsetseg City Road Department	J. Sereeter Ministry of Road, Transportation and Tourism	T. Nergui ADB Housing Financing project	G. Manaljav Property Relations Department
12	B. Munkhbaatar City Development Policy Division	G. Myagmar ADB Improving living condition in ger area	T. Turmunkh State Inspection Agency	E. Munkh-Ochir Governor Bayanzurkh district	L. Naidan Governor Songinokhairkhan district
13	Kh. Nasanbat Ministry of Industry and Trade	N. Oyunbileg City Health Department	D. Khishigsuren Engineering Geodesy Co.	A. Tuvshin UB Mayor's Office, Tourism Department	Sh. Naran City Monitoring and Evaluation Section
14	J. Nergui State Inspection Agency	Purevjav Housing Financing Corporation	Ts. Khuyagbat NGO	E. Tumendemberel City Construction & Urban Development Planning Department	G. Narangerel Urban Planning Scientific Research Institute
15	M. Orgil University of Science and Technology	D. Sain-Er New Urbanization Co.	Kh. Kherlen UB Mayor's Office, Tourism Division	Ts. Khorloo City Construction & Urban Development Planning Department	D. Oyuntsetseg City Youth Association
16	D. Suvdaa MCUD, Policy Coordination Department for Urban Development	Saikhanbayar Public Transport Department	A. Tsogt Ministry of Fuel and Energy	S. Tsakhiur UB Found	S. Ochirbat MCUD, Policy Coordination Department for Urban Development
17	D. Khaisambuu Construction-Architectu re Corporation	U. Sukhbaatar City Construction & Urban Development Planning Department	B. Chimid UB, Greening chief specialist	M. Tserendorj City Construction & Urban Development Planning Department	Sh. Sonomdagva MCUD, Office of the Minister
18	A. Tsogt Ministry of Fuel and Energy	S. Tsogtbaatar City Disaster Management Department		KH. Chinbayar UB Bank	G. Tsolmon City Land Office
19		D. Urantsetseg City Construction & Urban Development Planning Department		P. Enkhee National Center for construction, urban development and urban utilities and services	Ya. Sharkhuu Urban Planning Scientific Research Institute
20		A. Enkhbayar City Maintenance & Public Utilities			
21		D. Enkhbayar City Government, Social Development Division			
22		Ts. Enkhbayar ADB Housing Financing project			

1	P. Enkhmandakh	MCUD
2	E. Dondmaa	MCUD
3	S. Namjilmaa	MCUD
4	Bilegsaikhan	MCUD
5	Battulga	MCUD
6	Amaraa	KOICA
7	Ts. Khuyagbat	MCUD
8	D. Suvdaa	MCUD
9	Ts. Bayarbat	National Centre for Construction, Urban Development and Public Utility
10	P. Enkhee	National Centre for Construction, Urban Development and Public Utility
11	B. Sarnai	National Centre for Construction, Urban Development and Public Utility
12	Ch. Narantsetseg	National Centre for Construction, Urban Development and Public Utility
13	Yo. Jargalsaikhan	Ministry of Road, Transport and Tourism
14	Kh. Gantumur	Ministry of Road, Transport and Tourism
15	J. Sereeter	Ministry of Road, Transport and Tourism
16	L. Battsooj	UB City Road Department
17	B. Zuvtsetseg	UB City Road Department
18	O. Enkhchimeg	MUDI
19	P. Ariunaa	
20	B. Alimaa	
21	B. Batchimeg	
22	T. Batbayar	MUDI
23	O. Gereichimeg	
24	I. Batkhuu D. Mandukhai	
25	B. Manduknai	MUDI
20	D. Javzanoulam Ch. Teodonholiir	Housing Finance Corporation
21		Lithan Dianning Scientific Research Institute
20	L Ganhat	Urban Planning Scientific Research Institute
30	G Narangerel	Urban Planning Scientific Research Institute
31	Va Sharkhuu	Urban Planning Scientific Research Institute
32	Sh Tumursukh	Urban Planning Scientific Research Institute
33	U. Regzmaa	Urban Planning Scientific Research Institute
34	B. Baigal	Urban Planning Scientific Research Institute
35	P. Solongo	Urban Planning Scientific Research Institute
36	Ts. Erdentsetseg	Urban Planning Scientific Research Institute
37	N. Naranbat	Urban Planning Scientific Research Institute
38	Sh. Dulamsuren	Urban Planning Scientific Research Institute
39	G. Nansalmaa	Urban Planning Scientific Research Institute
40	A. Chimgee	Urban Planning Scientific Research Institute
41	Khan-Uul	Urban Planning Scientific Research Institute
42	D. Gerelee	Urban Planning Scientific Research Institute
43	O. Odbayar	UB City Construction and Urban Development Planning Department
44	J. Erdenebat	UB City Construction and Urban Development Planning Department
45	P. Batchimeg	UB City Construction and Urban Development Planning Department
46	D. Urantsetseg	UB City Construction and Urban Development Planning Department
47	Is. Khorloo	UB City Construction and Urban Development Planning Department
48	Ch. Isogtsaikhan	City Development Policy Department
49	Sn. Davaasuren	City Development Policy Department
50	E Burov Erdono	Liniversity of Science and Technology
52		Shine botiilt 110
52		Road Department LIB City
54	F Ganbold	Urban Planning Scientific Research Institute
55	N Khishaee	Transportation Department LIR city
56	D Dolsoniav	Manupertation Department OD only
57	B. Bayarsaikhan	MUST
58	M. Otgonbavar	Traffic Police

6. Learning Session for Urban Planning, July 2007

59	M. Och	Traffic Police	
60	L. Undarmaa	Traffic Police	
61	Ts. Gerelmaa	Traffic Police	
62	B. Battulga	Traffic Police	
63	A. Enkhbold	Traffic Police	
64	S. Enkhbat	Traffic Police	
65	Yo. Delgermaa	UB City Road Department	
66	R. Bolormaa	MUST	
67	S. Gankhuyag		
68	O. Batjargal	Traffic Police	
69	B. Amarbayar	UB Road Maintenance Company	
70	G. Dulamsuren	Transportation Department UB city	
71	D. Dashdulam	Transportation Department UB city	
72	Sarangerel	MCUD	
73	Tserendash	GTZ	
74	Bat-Amgalan	Suruga Mongol	
75	Buren-Erdene	MNU-student	
76	S. Chinbaatar	Geographical Institute	
77	B. Ganbold	Geographical Institute	
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79	Munkhbayar	Nart design Co.	
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89 90 91 92 93 94 95	B. Mars-Od Kh. Nomin E. Ankhbayar D. Odgerel G. Gal-Erdene M. Baasanjav J. Gombo	MUST-student MUST-student MUST-student MUST-student MUST-student Art construction co. MUST	
89 90 91 92 93 94 95 96	B. Mars-Od Kh. Nomin E. Ankhbayar D. Odgerel G. Gal-Erdene M. Baasanjav J. Gombo O. Amarzaya	MUST-student MUST-student MUST-student MUST-student Art construction co. MUST Urban Planning Scientific Research Institute	
89 90 91 92 93 94 95 96 97	B. Mars-Od Kh. Nomin E. Ankhbayar D. Odgerel G. Gal-Erdene M. Baasanjav J. Gombo O. Amarzaya P. Myagmarsuren	MUST-student MUST-student MUST-student MUST-student MUST-student Art construction co. MUST Urban Planning Scientific Research Institute MNU	
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89 90 91 92 93 94 95 96 97 98 99	B. Mars-Od Kh. Nomin E. Ankhbayar D. Odgerel G. Gal-Erdene M. Baasanjav J. Gombo O. Amarzaya P. Myagmarsuren T. Ankhbileg Ts. Ikhbayar	MUST-student MUST-student MUST-student MUST-student Art construction co. MUST Urban Planning Scientific Research Institute MNU MNU-student MNU-student	
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1	Ts. Battulga	MCUD
2	Amaraa	KOICA
3	E. Dondmaa	MCUD
4	L. Battsooj	UB City Road Department
5	B. Zuvtsetseg	UB City Road Department
6	Yo. Delgermaa	UB City Road Department
7	B. Amarbayar	UB City Road Department
8	D. Khashbat	JICA Study Team
9	R. Bolormaa	MUST
10	B. Bayarsaikhan	MUST
11	S. Ganhkuyag	Road Research and Supervision Research Centre
12	N. Khishgee	UB City Road Department
13	J. Dulamsuren	UB City Transport Department
14	D. Dashdulam	UB City Transport Department
15	T. Batbayar	MUDI
16	B. Batchimeg	MUDI
17	O. Batjargal	Highway Patrol Agency
18	M. Och	Highway Patrol Agency
19	A. Enkhbold	Highway Patrol Agency
20	B. Battulga	Highway Patrol Agency
21	L. Undarmaa	Highway Patrol Agency
22	Ts. Gerelmaa	Highway Patrol Agency
23	M. Otgonbayar	Highway Patrol Agency
24	A. Enkhbold	Highway Patrol Agency
25	S. Enkhbat	Highway Patrol Agency

7. Learning Session for Transport Analysis, July 2007

8. 1st Donor Meeting, October 2007

1	Philip Cornwell	Senior Banker Municipal &	European Bank for Reconstruction	
		Environmental Infrastructure	and Development	
2	Martin Marschke	Country Director GTZ		
3	Shagdarsuren Enkhtsetseg	Project manager	UN Habitat GUSIP	
4	Ichihashi Yasuyoshi	Ambassador	Embassy of Japan	
5	Takahiro Ishizaki	First Secretary	Embassy of Japan	
6	Masaru Hirahara		Embassy of Japan	
7	Sayuri Muraki		Embassy of Japan	
8	Khaliun Khatanbaatar		Embassy of Japan	
9	Hiroyuki Kobayashi		Embassy of Japan	
10	Samdan Tuvshinkhuu	Program officer	GTZ	
11	Tumentsogt Tsevegmid	Infrastructure Operation Officer	The World Bank	
12	Arshad Sayed	Country manager	The World Bank	
13	Tsutomu Moriya	Resident Representative	JICA	
14	Ryuko Hirano	Project Formulation Adviser	JICA	
15	Shane Rosenthal	Senior Portfolio Management Specialist	ADB	

9. 2nd Donor Meeting, June 2008

1	Erlbeck Ruth	GTZ
2	Ralph Trosse	GTZ
3	Catalan Lauren	French Embassy
4	Dumas Gnegoire	French Embassy
5	S. Tserendash	GTZ
6	Tim O'Neill	USAID-EPRC
7	Fernando Berloli	USAID-EPRC
8	S. Otgonbayar	USAID-EPRC

9	Sayuri Miraki	Japanese Embassy
10	D. Odonchimeg	MCA-Mongolia
11	A. Battushig	KFW
12	Kh. Khaliun	Japanese Embassy
13	O. Dolgion	Japanese Embassy
14	S. Nergui	MCC, Embassy of USA
15	Bold Narantungalag	Mongolian Customs Office
16	Ts. Tumentsogt	WB
17	A. Tsetsegmaa	ADB
18	Sh. Rosenthal	ADB
19	Jim Arthur	ADB
20	Honger Oster	German Embassy
21	Pius Fisher	German Embassy
22	S. Udval	UN Habitat-GUSIP

10. Learning Session for Urban Planning (2nd), August 2007

1	Ts. Battulga	MCUD		
2	E. Dondmaa	MCUD		
3	S. Namjilmaa	MCUD		
4	D. Bilegsaikhan	MCUD		
5	D. Suvdaa	MCUD		
6	T. Batbayar	MUDI		
7	Alimaa	MUDI		
8	Enkhchimeg	MUDI		
9	Ch. Narantsetseg	National Centre for Construction, Urban Development and Public Utility		
10	D.Dolsonjav	"Mon Uz" Construction Design Company		
11	O. Odbayar	UB City Construction and Urban Development Planning Department		
12	G. Narangerel	Urban Planning Scientific Research Institute		
13	N. Khishgee	UB City Transportation Department		
14	L. Ganbat	Urban Planning Scientific Research Institute		
15	P.Batchimeg	UB City Construction and Urban Development Planning Department		
16	Ch.Erdene-Ochir	UB City Construction and Urban Development Planning Department		
17	B. Zuvtsetseg	UB City Road Department		
18	L. Batsooj	UB City Road Department		
19	Khashbat	JICA Study Team		
20	Delgermaa	MCUD		
21	Batsaikhan	City Development Policy Department		
22	Tsogtsaikhan	City Development Policy Department		
23	A.Zulgerel	City Development Policy Department		
24	Sain-Er	"New urbanization" Co.		
25	Sarnai	National Centre for Construction, Urban Development and Public Utility		
26	L.Ganbat	Urban Planning Scientific Research Institute		
27	Khorloo	UB City Construction and Urban Development Planning Department		
28	Erik Junge Madsen	GTZ		
29	Altangerel	City Development Policy Department		

11. Public Hearing Meeting for Road Priority Project

1	Yoshiaki Kamo	Advisor	Faculty of Chemical Technology,
			Mongolian University of Science and
			Technology/Faculty of Biology,
			National University of Mongolia
2	-	Local consultants	
3	-	Officers	Ministry of Health
4	-	Residents near Sapporo Intersection	48 participants
		in Bayangol District	
5	-	Residents near Bayanburd	42 participants
		Intersection in Chingeltei District	

1	E. Purev-Erdene	Local Consultant	Senior Lecturer, Mongolian University of Science and Technology	
2	S. Namjilmaa	MCUD Officer, Policy and Coordination Department for Urban Development, MCUD		
3	E. Dondmaa		Officer, Policy and Coordination Department for Urban Development, MCUD	
4	L. Ganbat	UB City	Director, Urban Development Division, Urban Planning Research Design Institute	
5	D. Urantseteg		Officer, Construction, Urban Development and Planning Department, UB City	
6	Ts. Tulga	1	Officer, Land Department, UB City	
7	L. Solongo	1	Officer, Urban Planning Research Design Institute	
8	L. Byambasuren		Senior Officer, City Development Policy	
9	-	Residents in Unur Ger	"New Century" local NGO of Unur Ger Area	
10	-	Area	Residents in Unur Ger Area	
11	-	Residents in	Khoroo and Kheseg leaders of 17th Khoroo,	
		Dambadarjaa Ger Area	Dambadarjaa	
12	-		Residents in Dambadarjaa Ger Area	

12. Model Area Project for Ger Area Improvement in Unur and Dambadarjaa

13. Counterpart Study Tour in Japan, 1st Fiscal Year (from 11th to 18th November 2007)

1	Tsevelsodnom GANKHUU	State Secretary	MCUD
2	Dorjgotov MUNKHBAATAR	Director	Land Management and Title Registration Policy Coordination Department, MCUD
3	Begzjav MUNKHBAATAR	Director	Urban Development and Policy Department, Mayor's Office of Ulaanbaatar City Government

14. Counterpart Study Tour in Japan, 2nd Fiscal Year (from 2nd to 11th March 2009)

1	SOROGJOO Ochirbat	Director	Urban Development and Land Affairs Policy Department, MRTCUD	
2	KHUUSHAAN Gantumur	Deputy Director	Roads and Transport Policy Department, MRTCUD	
3	TSENDAYUSH Delgermaa	Officer	Urban Development and Land Affairs Policy Department, MRTCUD	
4	TSEDENDAMBA Tungalag	Urban Planning Expert	UBMPS	
5	GALDNAA Munkhzul	Specialist	Land Management Department, Administration of Land Affair, Geodesy and Cartography	
6	BATBAATAR Batmunkh	Officer	Construction and Urban Planning Department, National Center for Construction, Urban Development and Public Utilities of Mongolia	
7	PUREVJAV Narantsetseg	Director	Public Transport Department, UB City	
7 8	PUREVJAV Narantsetseg ENKHBAT Anar	Director Head	Public Transport Department, UB City Research and Design Division, Construction Urban Development and Planning Department, UB City	
7 8 9	PUREVJAV Narantsetseg ENKHBAT Anar CHOGSOM Erdene-Ochir	Director Head Head	Public Transport Department, UB City Research and Design Division, Construction Urban Development and Planning Department, UB City Urban Development Division, Construction Urban Development and Planning Department, UB City	
7 8 9 10	PUREVJAV Narantsetseg ENKHBAT Anar CHOGSOM Erdene-Ochir LUVSANRENCHI N Ganbat	Director Head Head Head	Public Transport Department, UB City Research and Design Division, Construction Urban Development and Planning Department, UB City Urban Development Division, Construction Urban Development and Planning Department, UB City Urban Planning & Research Division, Construction Urban Development and Planning Department, UB City	
7 8 9 10 11	PUREVJAV Narantsetseg ENKHBAT Anar CHOGSOM Erdene-Ochir LUVSANRENCHI N Ganbat MYAGMARSURE N Buyandelger	Director Head Head Head Deputy Director	Public Transport Department, UB City Research and Design Division, Construction Urban Development and Planning Department, UB City Urban Development Division, Construction Urban Development and Planning Department, UB City Urban Planning & Research Division, Construction Urban Development and Planning Department, UB City Urban Development and Planning Department, UB City Administration and Management Division, Land Administration Department, UB City	

15. Embassy of Japan

1	Yasuyoshi Ichihashi	Ambassador Extraordinary and Plenipotentiary
2	Hiroyuki Kobayashi	Counselor
3	Takahiro Ishizaki	First Secretary
4	Masaru Hirahara	Third Secretary
5	Sayuri Muraki	Third Secretary

16. Japan International Cooperation Agency

1	Takeo Ochi	Senior Advisor (Urban& Regional	JICA Headquarters
		Development)	
2	Yuichi Sugano	Urban and Regional Development II, Urban	
3	Yasuhiro Suhara	and Regional Development Group,	
		Economic Infrastructure Department	
4	Yukio Ishida	Chief Representative (June 2008 ~)	JICA in Mongolia
5	Tsutomu Moriya	Resident Representative (~ June 2008)	
6	Ryuko Hirano	Project Formulation Adviser	
7	G.Enkhjargal	Program Officer	

17. JICA Study Team

1	Shizuo Iwata	Team Leaser / Comprehensive City Planning
2	Katsuhide Nagayama	Deputy Team Leader / Land Use Planning (1)
3	Toshiaki Kudo	Deputy Team Leader / Infrastructure Development Planning
4	Yoji Sakakibara	Socio-economic Analysis
5	Seiya Matsuoka	Transportation Planning
6	Alistair Knox	Public Transportation Planning
7	Tadashi Nagai	Urban Development / Housing Planning
8	Akira Hosomi	Traffic Analysis
9	Tomoko Abe	Detailed District Planning / Living Environment Planning
10	Kunihiko Ozawa	City Planning System
11	Shigehisa Matsumura	Public Facility Planning
12	Kenji Maruoka	Road Planning and Design
13	Akio Okazaki	Bridge Planning and Design
14	Hiroaki Ohashi	Natural Condition Survey / Land Use Planning (2)
15	Masayoshi Iwasaki	Implementation Plan / Cost Estimate
16	Kenichi Kuramoto	Environment Assessment
17	Rieko Sasaki	Social Survey / Social Consideration
18	Takashi Harada	Topographic Maps
19	Yoshinori Takahashi	Geographic Information System (GIS)
20	Kei Hara	Donor Coordination
21	Naoshi Okamura	Database building

18. Local Staffs of JICA Study Team

1	Ts. Tungalag	Local Consultant of Urban Planning/ Project Coordinator
2	P. Demuulen	Local Consultant of Transport
3	D. Khashbat	Local Consultant of Transport
4	Ts. Bayarsaikhan	Translator (EN)
5	G. Ankhnibayar	Translator (EN)
6	D. Uuriintuya	Translator (EN)
7	N. Onontungalag	Translator (JN)
8	T. Ankhbileg	GIS Operator
9	Ts. Jangar	Secretary
10	B. Bolor	Secretary
11	P. Uranbileg	Secretary
12	G. Zolzaya	Secretary

Appendix 3 A Study of the Preparatory Work of the Priority Road Projects

Study of the Preparatory Work of the Priority Road Projects

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8.	Environmental Consideration

Note: Based on the scope of work agreed upon by both the Mongolian and Japanese governments, this study of the Preparatory Work of the Priority Road Projects was made from April 2007 and this document was prepared in December 2007 by the JICA Study Team with a special purpose that based on the findings of this study, the Mongolian government may prepare an official request of Yen loans for the priority road project,. Since this document was written before the ministerial reform of the Mongolian government in December 2008, the names of ministries concerned and their organizational structures described in this document are different form those at the present. In likewise, through an organizational reform, Japan Bank of International Cooperation (JBIC) was unified with Japan International Cooperation Agency (JICA) in October 2008. This was also not reflected in this document.

1. INTRODUCTION

1.1 Background

Then Ministry of Road, Transport and Tourism (MRT&T), the Government of Mongolia has requested in May 2006 to the Government of Japan to provide Yen Credit for road improvement projects in Ulaanbaatar City.

MRT&T originally proposed 4 sub-projects to the Government of Japan as shown in Table 1.1.1, totaling 19.8 million \$.

No.	Road Improvement	Unit	Quantity	Cost (M. \$)
Sub-project 1:	New construction of road from the end of 3 rd Khoroolol road junction of Uildverchnii Evleliin gudamj in Tavan Shar area. 6 bridges included.	Km	3.01	3.6
Sub-project 2:	Reconstruction of road named Power Station No.4 located in Khan-Uul District. 1 bridge included.	Km	5.942	7.1
Sub-project 3:	New construction of road from junction of movement "Tank" to road junction of Narantuul international trade complex. 1 flyover included.	Km	2.2	2.6
Sub-project 4:	The improvement of Ikh Toiruu 5 intersections and 1 bridge	Lump Sum		6.5
	Total			19.8

Table 1.1.1 Original Request of Road Project for JBIC Loan

The criteria for selecting 4 sub-projects are based on priorities established by the Master Plan for Improvement and Rehabilitation of Road Network in Ulaanbaatar and City Road Plan of 2006. MRT&T had a series of meetings with Japan Bank for International Cooperation (JBIC) regarding the Project, and the content of request was revised following three sub-projects as shown in Fig. 1.1.1:

Sub-project-1: Improvement of existing road "Road to Thermal Power Station No.4" in Khan-Uul District

Existing road having 19 m in width between Ajilchin Street and Sonsgolon Road including a bridge, totaling 5.942 km in length. Improvement of road to 4-lane asphalt concrete pavement

Sub-project-2: Construction of new road in Bayanzurkh District

A new road having 19 m in width and 4-lane asphalt concrete pavement between Chinggis Avenue and Narni Street, totaling 2.2 km in length

Sub-project-3: Construction of Grade separation structures (so-called "Flyover") on Ikh Touruu

Flyover-1: Intersection between Ikh Touruu and Narni Street in the vicinity of Narantuul Central Market that is planned the ending point of Sub-project-2

Flyover-2: Intersection between Ikh Touruu and Ard Ayush Avenue

Flyover-3: Intersection between Chinggis Avenue and Zaisan Street that is planned the beginning point of Sub-project-2

Flyover-4: Intersection (so-called "East Cross") between Ikh Touruu and Peace Avenue



Figure 1.1.1 Location of Three Sub-projects

However, both governments concluded in October 2006 that the study of the preparatory work for priority road projects should be a part of the Scope of Work for "The Study on City Master Plan and Urban Development Program of Ulaanbaatar City (UBMPS)".

After UBMPS started site survey in Ulaanbaatar in March 2007, the fact was found that UB Road Department, Implementing Agency of UB City, had their own road improvement projects so-called "UB Road Improvement Project 2007/08 (UB Road 2007/08)" comprising design and construction of 69 road sections including bridges. Moreover, three sub-projects that MRT&T and JBIC had confirmed as the revised request to Yen Credit for road improvement projects were included partially in the UB Road 2007/08. It is also pointed out that UB Road 2007/08 is implementing utilizing the road rehabilitation fund and the contents of the improvement works are mainly urgent repair works that are limited to rehabilitation of pavement and bridge where neither land acquisition nor utilities relocation is required.

On the other hand, reconstruction/widening of existing roads, construction of missing links and grade separation structures in the UB Road 2007/08 are still at planning or design stage and these projects necessitate land acquisition and utilities relocation that always require sufficient time and considerable fund after due procedures are concluded. Accordingly, it can say that the implementation plan is not committed yet.

1.2 Study Approach for the Preparatory Work of Priority Road Projects

1.2.1 Transportation Development Objectives

UBMPS has confirmed to achieve the following transportation development objectives;

- 1) Provide foundation for sustainable urban growth through strategic infrastructure and coordinated operation
- 2) Promote competitive economic development and investment through integrated development
- Ensure mobility, accessibility and safety for all people including the poor and disabled through quality public transport services, barrier-free infrastructures and necessary safety net
- 4) Reduce negative impacts on environment and energy use through adequate physical measures and institutional arrangements
- 5) Enhance people's awareness on the significant role of transport and promote "Beneficiary-Pay-Principle".

1.2.2 Harmonization of Future Road Network

More road improvement works are still required to cope with chronic traffic condition although UB Road 2007/08 is underway, and accordingly more funds together with new technology will be appropriated for such purposes. Furthermore, such road improvement works should be harmonized to the proposed "Short-Term (up to 2015) Urban Transport Improvement Program (UTIP 2015)" and "Urban Transport Development Plan for 2030 (UTDP 2030)".

Although UTIP 2015 and UTDP 2030 are not finalized yet at this stage, it is sure that the improvement of traffic management and removing traffic bottlenecks can increase traffic capacity of the existing road network at the central business district of Ulaanbaatar City considerably and it contributes to the improvement of traffic congestion.

Therefore, the study of the preparatory work for the priority road projects is conducting to make a new proposal to re-package of sub-projects subject to JBIC loan in the aspects of traffic management and localized road facility improvement, considering both on-going road improvement projects and a future road network proposed by the JICA study team.

1.2.3 Concept of Future Road Network

It is sure that the development of transportation infrastructure and services brings enormous impacts on urban growth and development, and it is only a way to make a big city sustainable to promote "Public Transport Based Urban Development". The concept of integrated transportation strategies and land-use policies strongly support strategic growth management and it allows each regional community to develop its business center and neighborhoods with their own characteristics.

The concept of UBMP-2030 comprises of the following major points;

- 1) "Compact City" having population of 1.74 million (year 2030) in UB Central is envisaged as a desirable urban structure to Ulaanbaatar City that consists of a number of sub-centers to be linked with Ulaanbaatar-CBD as shown in Fig. 1.2.1.
- 2) On the other hand, the regional development context in Ulaanbaatar Metropolitan may envisage developing multi-modal transport network to ensure connectivity of UB with international market, regional growth centers and satellite cities/ urban areas by air, rail, and road. It is necessary to develop and logistics centers with adequate locations and functions to avoid mixture of intercity traffic and urban traffic as shown in Fig. 1.2.2.



1.2.4 Future Road Network

East-westward and North-southward transport corridors comprising urban mass rapid transit and arterial streets support social and economic activities at new sub-centers located in suburban and rural as shown in Figure 1.2.3.

1.2.5 Expected Roles and Functions of Priority Road Projects

Priority road projects should have the following roles and functions:

- 1) It shall be harmonized to both on-going road improvement projects and the proposed future road network.
- 2) The space of road shall be utilized multi-purposes such as mobility and accessibility of vehicular traffic, space for public transit, environmental buffer zone, footpath for pedestrian and space for utilities located in underground and on ground.
- 3) Cross-sectional configuration shall be determined to accommodate not only vehicular traffic but also pedestrian and living environment along road.

Priority road projects will be selected among possible road sections that a road is designated as arterial road/street and existing road Right-of-Way is wide enough to create a model section to demonstrate a modern street with high amenity, high utilization of road space, enhance mobility and accessibility, environmental buffer zone and traffic safety as shown in Figure 1.2.4.



Figure 1.2.3 Urban Transport Network Plan for 2030



Figure 1.2.4 Image of Model Section

2. ROAD AND TRAFFIC CONDITIONS

2.1 Intersection Survey

Traffic count survey was conducted by 12 locations and 16 hours. The survey locations are shown in Fig 2.1.1.



Fig. 2.1.1 Location of Intersection Survey

2.1.1 Volume

The traffic count survey was carried out in each direction by vehicle type. The counters recorded traffic for every fifteen-minute period.

Table 2.1.1 shows the hourly and total traffic volume at all the 12 locations.

Intersection traffic was found to be highest at IS-2 (Sapporo Avenue) with 96,000 veh/day.

Time(Hrs)	IS-1	IS-2	IS-3	IS-4	IS-5	IS-6	IS-7	IS-8	IS-9	IS-10	IS-11	IS-12
6:00 - 7:00	997	1,170	773	374	736	1,091	476	573	567	321	936	1,178
7:00 - 8:00	2,667	2,977	2,141	1,105	1,833	2,655	2,155	1,703	1,698	1,225	2,049	1,424
8:00 - 9:00	4,158	5,828	4,531	2,559	4,184	5,141	5,378	3,527	3,440	3,334	4,559	2,075
9:00 - 10:00	4,433	6,828	4,805	3,674	5,536	6,351	6,021	4,698	4,205	4,430	5,563	2,550
10:00 - 11:00	4,200	7,159	5,002	3,401	5,435	6,343	6,169	4,818	3,974	5,247	5,906	2,693
11:00 - 12:00	4,073	7,040	4,806	3,535	5,637	6,325	5,719	4,235	4,086	5,292	5,683	2,737
12:0 0 - 13:00	4,030	6,920	4,802	3,351	5,745	5,932	5,764	4,096	2,685	5,240	5,823	2,740
13:00 - 14:00	3,934	6,456	4,796	3,193	5,221	5,748	5,782	3,801	3,619	5,316	5,639	2,571
14:00 - 15:00	3,770	6,553	4,777	3,066	5,222	5,563	5,787	3,949	4,029	5,086	5,696	2,543
15:00 - 16:00	3,782	6,323	4,873	3,332	5,074	5,817	5,832	4,068	3,933	4,893	6,034	2,694
16:00 - 17:00	3,647	6,824	4,554	3,560	5,173	5,588	5,657	3,999	4,005	4,623	5,635	2,789
17:00 - 18:00	4,264	6,694	5,003	3,609	4,927	5,763	5,840	3,896	3,941	4,932	5,592	2,791
18:00 - 19:00	3,930	7,133	5,034	3,137	5,057	5,908	6,062	3,822	3,930	4,683	5,660	2,905
19:00 - 20:00	3,606	6,593	4,528	3,064	4,856	5,922	5,184	3,783	3,600	4,175	5,352	2,911
20:00 - 21:00	3,495	6,354	4,206	2,306	4,349	5,510	4,662	3,569	3,254	3,045	4,978	2,785
21:00 - 22:00	3,303	5,094	4,091	1,534	3,624	5,033	4,424	3,603	3,115	1,795	4,584	2,489
Total	58,289	95,946	68,722	44,800	72,609	84,690	80,912	58,208	54,081	63,637	79,689	39,875

Table 2.1.1 Traffic Volume at 12 intersection

2.1.2 Road Capacity (Passenger car unit)

Traffic Volume is converted into PCU. Table 2.1.2 shows the correction coefficient for computing road capacity. Table 2.1.3 shows the result of calculating based on coefficient in Table 2.1.2 (PCU).

Vehicle Type	Compensating rate	Vehicle Type	Compensating rate
Cars	1	Articulated Truck	3
Micro Bus	1.5	Large Articulated Truck	3.5
Small Bus	2.5	Tractor	2
Large Bus	3.5	motorbike	0.7
Small Rigid Truck	1.5	Bicycle	0.3
Middle Rigid Truck	1.75	Animal Cart	0.5
Large Rigid Truck	2.5	Others	1

|--|

Time(Hrs)	IS-1	IS-2	IS-3	IS-4	IS-5	IS-6	IS-7	IS-8	IS-9	IS-10	IS-11	IS-12
6:00 - 7:00	1330.7	1453.8	933.4	481.9	808.0	1236.6	578.6	672.1	658.0	408.8	1115.3	1390.0
7:00 - 8:00	3462.0	3789.9	2622.6	1330.8	2325.4	3213.4	2878.3	2084.7	2086.9	1532.1	2743.5	1741.5
8:00 - 9:00	5157.3	6922.8	5215.6	2888.3	4964.1	5951.4	6370.3	4057.1	4088.3	3861.1	5530.2	2415.3
9:00 - 10:00	5453.1	8084.9	5576.0	4147.2	6453.8	7262.3	7003.0	5301.4	4938.4	5186.1	6648.8	2926.0
10:00 - 11:00	5217.7	8445.4	5894.9	3901.3	6334.9	7263.8	7077.3	5414.9	4640.4	6183.4	6925.6	3077.4
11:00 - 12:00	5027.7	8272.6	5574.2	4058.4	6449.2	7205.9	6426.6	4777.9	4741.2	6140.1	6586.4	3139.4
12:0 0 - 13:00	4944.7	8184.1	5568.4	3787.5	6631.5	6702.8	6531.7	4659.2	3109.3	6029.2	6804.0	3107.9
13:00 - 14:00	4945.6	7695.3	5598.5	3625.5	6036.2	6561.0	6591.7	4329.4	4199.3	6148.8	6624.2	2948.5
14:00 - 15:00	4673.1	7826.7	5545.0	3525.8	5988.6	6323.4	6614.4	4502.7	4643.0	5924.7	6642.4	2916.7
15:00 - 16:00	4696.7	7456.9	5668.2	3825.3	5804.6	6601.3	6656.1	4649.7	4573.7	5680.1	7092.0	3061.7
16:00 - 17:00	4549.1	8073.6	5290.2	4071.1	5944.1	6382.4	6532.6	4552.5	4662.5	5392.7	6608.7	3195.0
17:00 - 18:00	5227.5	7913.9	5834.9	4087.9	5662.0	6590.7	6722.4	4439.8	4584.4	5694.8	6597.4	3206.7
18:00 - 19:00	4821.5	8328.5	5849.7	3518.5	5892.7	6732.5	6824.1	4448.3	4564.6	5405.1	6631.4	3321.8
19:00 - 20:00	4499.2	7616.4	5245.4	3439.6	5557.3	6673.4	5898.2	4262.8	4210.1	4777.3	6269.1	3309.9
20:00 - 21:00	4311.8	7314.6	4876.7	2545.3	5000.5	6176.2	5402.9	4081.4	3789.9	3523.0	5780.5	3167.3
21:00 - 22:00	4009.3	5792.8	4598.8	1726.1	4037.7	5590.5	4831.1	3953.8	3492.6	2112.2	5186.5	2777.5
Total	72326.7	113171.7	79892.3	50960.2	83890.3	96467.3	92939.1	66187.3	62982.3	73999.1	93785.5	45702.3

Table 2.1.3 Traffic Volume at 12 intersection (PCU)

2.1.3 Large Vehicles

Table 2.1.4 shows the share of large vehicles to total vehicles. The overall share of large vehicles was found to be about 4.0%. Table 2.1.5 shows the share of large vehicles by direction.

IS	Small Veh	Large Veh	Total	% of Large Veh
IS-1	54,286	4,003	58,289	6.9
IS-2	95,946	91,374	4,572	4.8
IS-3	65,461	3,261	68,722	4.7
IS-4	43,403	1,397	44,800	3.1
IS-5	69,467	3,142	72,609	4.3
IS-6	102,124	2,891	105,015	2.8
IS-7	76,595	4,317	80,912	5.3
IS-8	56,962	1,246	58,208	2.1
IS-9	52,950	1,131	54,081	2.1
IS-10	61,815	1,827	63,642	2.9
IS-11	76,291	3,398	79,689	4.3
IS-12	39,024	851	39,875	2.1
Total	774,813	32,225	807,038	4

Table 2.1.4 Share of Large	e Vehicles at	intersection
----------------------------	---------------	--------------

* Small Veh : Cars , Micro bus , Small rigid truck(under 3.5 ton) , Tractor, motorbike, Bicycle, Animal cart, others

* Larrge Veh : Small bus , Large bus, Middle right truck (3.5 ~ 12ton) , Large right truck (over1.2) , Articulated Truck(3.5~12ton) , Large Articulated Truck including Trailer (Over 12ton)

Direction IS	Ι	Π	III	IV
1	6	7	7	
2	3	4	8	5
3	1	4	7	6
4	4	2	0	3
5	3	6	3	5
6	3	1	2	3
7	0	9	4	8
8	1	1	2	2
9	1	2		3
10	2	3	3	
11	2	5	2	6
12	3	2		0

 Table 2.1.5 Share of Large Vehicles at intersection by direction (%)

2.1.4 Turning Movements Counts at intersection

Turning movement volume was computed from Traffic Volume at each intersection. Table 2.1.6 shows the traffic volume at each intersection by direction.

IS-No	Direction	Right	Thru	Left	Left U-Turn	Out Total	Intersection Traffic
	Ι	2266		11650		13916	
IS-1	II	10437	14009		3092	27538	58289
	III		13888	2870	77	16835	
IS-2							
	Ι	1046	824	4251		6121	
10.2	II	3672	17974	1297	237	23180	(9722
18-3	III	1544	592	9042		11178	08/22
	IV	8136	19078	727	302	28243	
	Ι	1549	520	7807		9876	
15 4	II	7549	12544	427	698	21218	44800
15-4	III		284			284	44800
	IV	93	9614	2929	786	13422	
	Ι	8718	6311	2019		17048	
IS-5	II	1455	12442	2271		16168	72600
	III	2189	6438	3534		12161	72009
	IV	865	16866	9501		27232	
IS-6						0	
10.7	Ι	3914	12314	8474		24702	
	II		12808	6405	141	19354	80012
13-7	III	6837		7597		14434	80912
	IV	4085	18337			22422	
	Ι	1707	4822	1428		7957	
TC Q	II	1136	15436	4005		20577	58208
13-0	III	5310	5122	1456		11888	58208
	IV	3090	13611	1085		17786	
	Ι	3567		7363		10930	
IS-9	II	6844	14911			21755	54081
	III		14827	6569		21396	
	Ι	11262	9609			21825	
IS-10	II	5056	12881		865	18802	63642
	III		13129	10264	576	23969	
	I	3757	10383	5177		19317	
IS-11	II	5918	11270	6270		23458	79689
15-11	III	1384	10593	5466		17443	17007
	IV	5480	10467	3524		19471	
	I	4577	14792		110	19479	
IS-12	II		15170	_		15170	39875
	III	2200		2026		5226	

Table 2.1.6 Turning Movements of Counts

*Note: Direction "I" = Northern Leg of the intersection; Traffic directions at intersection are coded in clockwise direction starting from northern direction as "I". Intersection traffic means the total vehicles passing through the Intersection.

	Ι	Π	III	IV	
Ι	0	11769	7348	8529	27650
II	4599	0	3174	21056	28850
III	9561	3112	0	1035	13700
IV	8788	15298	2480	0	26550
	22959	30193	13000	30598	96750

IS-2

IS-6

	Ι	Π	III	IV	
Ι	0	521	6472	10912	17900
II	11759	0	4509	3345	19600
Ш	886	4680	0	8535	14100
IV	2345	23387	7649	0	33400
	15000	28570	18630	22800	85000

2.2 Result of Road Surface Condition Survey

The following surveys were conducted to reveal the existing road and traffic conditions of priority road projects.



 Figure 2.2.1
 Location Map of Road Surface Condition Survey

No	Location/	Pavement Condition	Result of Measurement		Remarks	
1	Sapporp IS	Bad	Asphalt Surface Course	40mm	Detriorated	
	~~FF ~~F ~~	Duu	Cocret	200mm		
		Fair	Asphalt Surface Course	40mm	The condtiton of Enebish	
2	Devenhund IS		Asphalt Binder Course	100mm	Street side is good. The side of	
2 Bayanburd IS	Dayanburu 15		Base Cource	200mm	Ikh Toyruu is deteriorated.	
		Sub-base Course	300mm			
		Bad	Asphalt Surface Course	50mm	Deteriorated.	
3 (Cingis Avenu		Base Cource	100mm		
			Sub-base Course	150mm		
4 Pea		Good	Asphalt Surface Course	50mm	The pavement was recently	
	Peace Avenu (E)		Asphalt Binder Course	50mm	reconstructed.	
			Base Cource	100mm		
			Sub-base Course	300mm		
5	Pace Avenue (W)	Rough	Asphalt Surface Course	70mm	Deteriorated.	
3			Base Cource	200mm		

Table 2.2.1 Existing Pavement Condition

Table 2.2.2 Result of Road Surface Condition Survey

No.	Name Road	Length (km)	Average of IRI	Length to be Repaired (km)	Ratio of Repair (%)	Remarks
1	Peace Avenue (West)	15.4	4.2	0.8	5	
2	Peace Avenue (East)	12.9	3.8	0.6	8	
3	Chingis Avenue	12.66	3.8	0.6	8	
4	Ikh Toyruu	7.4	3.6	0.8	11	
5	Narny Zam	8.4	1.7	0	0	
6	Ard Ayush Street	7.76	3.6	0.2	3	
7	Trade Union Street	5.6	5.4	2.2	39	
8	Khuvsgal Street	7.3	4.3	1.0	14	
9	Tlgoit Road & Baruun Naran Road Road	5.06	4.9	0.8	16	
10	Sonsgolon Road	5.55	6.1	3.0	54	
11	Power Plant-4 Road	5.98	8.5	5.98	100	Original Priority Project
12	Ajilchin street	3.33	6.9	2.2	67	
13	Khuvsgalchid Avenue	3.12	5.0	1.2	39	
14	Ikh Surguuli street & Doloon Buudal Road	6.6	3.8	0.8	12	
15	Road behind 15th Khoroolol	5.86	4.7	1.1	19	

IRI; International Roughness Index

3. COMPONENTS OF PRIORITY ROAD PROJECTS

3.1 Targeted Goals and Selection Criteria

Since Priority Road Projects is designated as a short-term road improvement under UBMPS, they are to be selected to exert maximum effects by minimum costs. Priority Road Projects will be selected in UB-CBD and its surroundings to achieve the following targeted goals:

- To increase traffic capacity of roads where traffic is concentrating
- To relieve traffic bottlenecks where traffic is congested
- To create and reserve the space for public transport to implement in incremental steps up to planned urban mass transit
- To create a model section to demonstrate a modern street with high amenity, high utilization of road space, environmental buffer zone and traffic safety in the vicinity of UB-CBD.

It is also important that they should be free from time-consuming due procedures such as detailed EIA and land acquisition together with property compensation.

3.2 Formulation of Sub-projects among Priority Road Projects

The following sub-projects are formulated among Priority Road Projects to achieve the targeted goals and to conform to the designated selection criteria, and the location of sub-projects is shown in Figure 3.2.1.

No.	Name of Sub-project				
No. 1:	Traffic Control and IS Improvement encompassing Sukhbaatar Square				
No. 2:	Construction of Grade Separation Structure at Sapporo IS and Model Road Improvement				
No. 3:	Construction of Grade Separation Structure at Ard Ayush Ave./Amarsanaa Str. IS				
No. 4:	Construction of Grade Separation Structure at Bayanburd IS				
No. 5:	IS Improvement at Tsagdaagiin IS and Construction of New Road along the Selbe River				
No. 6:	Construction of Grade Separation Structure at Tuul Jin Pan IS				

Table 3.2.1 List of Sub-projects

However, these sub-projects have some issues to be solved as listed in Table3.2.2 prior to the project implementation.

Table 3.2.2 List of Issues to be solve
--

No.	Issues			
No. 1:	Coordination is necessary because UB City has a plan to implement a part of project.			
No. 2:	Coordination is necessary because UB City studies a plan to construct a flyover in a			
	different direction.			
No. 3:	Not identified			
No. 4:	Coordination is necessary because UB City studies a plan to construct a viaduct.			
No. 5:	Coordination is necessary because UB City studies a plan to construct a viaduct.			
No. 6:	Coordination is necessary because UB City studies a plan to construct a viaduct.			



Figure 3.2.1 Location of Sub-projects

3.3 Contents of Sub-projects

3.3.1 No. 1: Traffic Control and IS Improvement encompassing Sukhbaatar Square

(1) Scheme of Road Improvement

- To impose one-way traffic control (clockwise or Ovoo Turning) on roads such as Sukhbaatar Street、Ikh Surguul Street and Zaluuchuud Avenue encompassing Sukhbaatar Square and Parliament
- To improve intersections and to widen west-bound Peace Avenue
(2) Targeted Goals

- To increase traffic capacity of roads of Sukhbaatar Street, Ikh Surguul Street and Zaluuchuud Avenue due to improvement of intersection
- To enhance traffic safety at intersections due to decrease of conflict points
- To lessen traffic burden to Tob Shuudan IS in front of Central Post Office between Chinggis Avenue and Peace Avenue
- To disperse concentrated traffic at two intersections on Peace Avenue and to segregate right-turning traffic from through and left-turning traffic

(3) Expected Effects

- To provide smooth traffic flow on Sukhbaatar Street where two congested intersections exist at both ends by minimum costs
- To enable to regulate left-turning traffic flow from Khudaldaany Avenue to eliminate cause of traffic congestion on Sukhbaatar Street
- To make full use of roads encompassing Sukhbaatar Square and Parliament at well-balanced level

(4) Present Condition of Project Site



3.3.2 No. 2: Construction of Grade Separation Structure at Sapporo IS and Model Road Improvement

(1) Scheme of Road Improvement

- To construct a grade separation structure at Sapporo IS securing the space for future public transport
- To improve the existing rotary-type intersection by at-grade intersection with traffic signals
- To construct a model section of road with environmental buffer zone and securing the space for future public transport at the center

(2) Targeted Goals

- To increase traffic capacity at Sapporo IS due to construction of flyover and improvement of intersection
- To enhance traffic safety at intersections due to elimination of rotary-type intersection
- To provide high amenity along the road and to reserve the space for future development on Peace Avenue
- To utilize space at Sapporo IS efficiently and effectively to provide big traffic islands

(3) Expected Effects

- To provide Sapporo IS with smooth traffic flow by separating through traffic on Peace Avenue from turning movements
- To reduce travel time to pass Sapporo IS by eliminating cause of traffic congestion and time-consuming rotary-type intersection
- To disseminate a model of road improvement on Peace Avenue by creation of environmental buffer zone

(4) Present Condition of Project Site



3.3.3 No. 3: Construction of Grade Separation Structure at Ard Ayush Ave./Amarsanaa Str. IS

(1) Scheme of Road Improvement

- To construct a grade separation structure at Ard Ayush Ave./Amarsanaa Str. IS
- To improve the existing rotary-type intersection by at-grade intersection with traffic signals

(2) Targeted Goals

- To increase traffic capacity at Ard Ayush Ave./Amarsanaa Str. IS due to construction of flyover and improvement of intersection
- To enhance traffic safety at intersections due to elimination of rotary-type intersection

(3) Expected Effects

- To provide Ard Ayush Ave./Amarsanaa Str. IS with smooth traffic flow by separating through traffic on Ard Ayush Avenue from turning movements
- To reduce travel time to pass Ard Ayush Ave./Amarsanaa Str. IS by eliminating cause of traffic congestion and time-consuming rotary-type intersection

(4) Present Condition of Project Site



3.3.4 No. 4: Construction of Grade Separation Structure at Bayanburd IS

(1) Scheme of Road Improvement

- To construct a grade separation structure at Bayanburd IS
- To improve the existing rotary-type intersection by at-grade intersection with traffic signals

(2) Targeted Goals

- To increase traffic capacity at Bayanburd IS due to construction of flyover and improvement of intersection
- To enhance traffic safety at intersections due to elimination of rotary-type intersection

(3) Expected Effects

- To provide Bayanburd IS with smooth traffic flow by separating through traffic on Ard Ayush Ave./ Ikh Touruu from turning movements
- To reduce travel time to pass Bayanburd IS by eliminating cause of traffic congestion and time-consuming rotary-type intersection

(4) Present Condition of Project Site

(5) Improvement Scheme



3.3.5 No. 5: IS Improvement at Tsagdaagiin IS and Construction of New Road along the Selbe River

(1) Scheme of Road Improvement

- To rectify a staggered intersection between Tsagdaagiin Str. And Erkhuu Str.
- To improve at-grade intersections on Ikh Touruu
- To construct a new road along the western dike of the Selbe River



(2) Targeted Goals

- To enhance traffic safety at intersections due to decrease of conflict points
- To lessen traffic burden to Tsagdaagiin IS by construction of New Road along the Selbe River
- To increase traffic capacity of Ikh Touruu due to improvement of intersection

(3) Expected Effects

- To provide smooth traffic flow on Ikh Touruu where a congested intersection exists by minimum costs
- To enable to regulate left-turning traffic flow from Ikh Touruu at to eliminate cause of traffic congestion of a staggered intersection
- To strengthen the road network at UB-CBD using the space along the Selbe River

(4) Present Condition of Project Site



3.3.6 No. 6: Construction of Grade Separation Structure at Tuul Jin Pan IS

(1) Scheme of Road Improvement

- To construct a grade separation structure at Tuul Jin Pan IS
- To improve the existing rotary-type intersection by at-grade intersection with traffic signals

(2) Targeted Goals

- To increase traffic capacity at Tuul Jin Pan IS due to construction of flyover and improvement of intersection
- To enhance traffic safety at intersections due to elimination of rotary-type intersection

(3) Expected Effects

- To provide Tuul Jin Pan IS with smooth traffic flow by separating through traffic on Ikh Touruu/B. Dorj Str. from turning movements
- To reduce travel time to pass Tuul Jin Pan IS by eliminating cause of traffic congestion and time-consuming rotary-type intersection

(4) Present Condition of Project Site



4. COMPREHENSIVE EVALUATION AND SELECTION OF PRIORITY PROJECT

4.1 Evaluation Aspects

The following aspects are enumerated in the descending order to evaluate sub-projects from the technical, environmental and economical viewpoints:

- 1) Rationale: Since the capital investment to sub-projects will be done using Japan's ODA, the rationale of project should be confirmed clearly.
- Harmonization: It is necessary to harmonize to both on-going road improvement projects and the proposed future road network in order to exert maximum effects as well as to avoid waste.
- 3) Time Requirement: The sub-project is deemed as "a short-term road improvement under UBMPS" and it should be implemented in a short period. Accordingly, the priority will be put lower in case that a sub-project needs time-consuming due procedure such as detailed EIA and land acquisition together with property compensation.
- 4) Scale of Project: The sub-project will be implemented simultaneously while the GOM implements his own road improvement projects. The scale of project should be modest considering that sound financial condition be kept.

4.2 Summary of Evaluation

Table 4.1.1 shows the summary of evaluation to give priority for the implementation of project.

4.3 Selection of Priority Projects

The following aspects are taken into considerations for the implementation of project.

- 1) Urgent Road Project No. 1 is suitable to be implemented by the Mongolian side using their own fund because the scale of the project is small but big effect is expected.
- 2) Urgent Road Projects No. 2 and No. 4 are recommended to applying JBIC loan as a re-package project because all criteria for evaluation are fulfilled and the scale of the project is deemed reasonable.
- 3) The following actions should be taken for the purpose of the project implementation;
 - to make inter-governmental consensus, especially UB City Government and Ministry of Environment Tourism (MET)
 - to confirm availability of official request to the Government of Japan regarding application of Japan's loan for road improvement
 - to control further development along the selected sub-project to secure land

	Priority Road Projects					
Sub-project No.	1	2	3	4	5	6
Traffic Control and IS Improvement encompassing Sukhbaatar Square		Construction of Grade Separation Structure at Sapporo IS and Model Road Improvement	Construction of Grade Separation Structure at Ard Ayush Ave./Amarsanaa Str. IS	Construction of Grade Separation Structure at Bayanburd IS	IS Improvement at Tsagdaagiin IS and Construction of New Road along the Selbe River	Construction of Grade Separation Structure at Tuul Jin Pan IS
Current Dayly Traffic Volume (PCU/day)	26,900 00 27 49,300 Peace Ave.	78,300 78,300 000 ² 12 65,000	000 ⁶ 72,100 00 ⁶ 1000 1000 1000 1000 1000 1000 1000 10	75,500 41,500 49,200	40,200 40,200 002'8 43,200	$ \begin{array}{c} 00 \\ \hline 01 \\ 01 \\ \hline 01 \\ 01 \\ \hline 01 \\ 01 \\ \hline 01 \\ 01 \\ 01 \\ \hline 01 \\ 01 \\ 01 \\ 01 \\ 01 \\ $
Project Cost Estimate	1.5 Million US\$	21.4 Million US\$	15.6 Million US\$	17.6 Million US\$	2.7 Million US\$	15.9 Million US\$
Evaluation Short-time Requirement Harmonization Less Traffic Congestion Efficiency & Capacity Model Demonstration 	Excellent Good Good Good Good	Fair Good Good Good Good	Fair Fair Good Good Fair	Fair Good Good Good Good	Fair Fair Good Good Fair	Fair Fair Good Good Fair
Comments	1) Enbale to exert maximum effects by minimum costs	1) Bring considerable effects to mitigate congestion	1) Bring considerable effects to mitigate congestion	 Bring considerable effects to mitigate congestion 	1) Bring considerable effects to mitigate congestion	1) Bring considerable effects to mitigate congestion
	2) Achieve traffic safety	2) Create a model section	2) Enhance efficiency by a flyover	2) Enhance efficiency by a flyover	2) Enhance efficiency and safety	 Enhance efficiency by a flyover
3) Enhance efficiency and amenity		3) Enhance efficiency and safety	3) Achieve traffic safety	3) Achieve traffic safety		3) Achieve traffic safety
Conclusion	Very Good	Very Good	Good	Very Good	Fair	Good
Priority	1	2	4	3	6	5

Table 4.1.1	Summary of	Evaluation
-------------	------------	------------

5. PRELIMINARY DESIGN OF SELECTED PROJECT

5.1 Geometric Design Standard

(1) Road Classification

Following table is the road classification in Mongolia stipulated in the regulation of "BNBD 32-01-00". The roads, which are listed on the Urgent Road Project in Short Term Improvement can be classified as "Normal Type Road-I".

Road Type		Classification by purpose	Daily Traffic Intensity	Median Strip	Possibility For linkage	
High class	s road		Main road	В	Must	Limited
Highway			Main and state road	В	Must	Half limited
	I	Multilane	Main and state road	С	Advisable	Can be half limited
Normal Type road	Ш		Main and state road	С	Single lane	No limitation
/road grade/	d III e/	2 1000	Main, state and local road	С		
	IV	2 Iane	State and local road	400-2000		
Low traffic in road	ntensity	Single or 2 lane	Local road	Transport unit <200		

Table 5.1.1 Road Classification under the Mongolian Standard

(2) Design Speed

Following table is the design speed for road design in Mongolia stipulated in the regulation of "BNBD 32-01-00". According to the regulation, 120 km/h will be applied for "Normal Type Road-I" which are target of the Urgent Road Project. On the other hand, the traffic speed has been practically restricted to "60 km/h" at the most part of urban area in Ulaanbaatar City. Considering the sounding condition of the target road, "60 km/h" shall be applied for design speed of target roads.

Table 5.1.2 Desig	n Speed under	the Mongolian	Standard
-------------------	---------------	---------------	----------

					Design speed km/hour				
Road type			l type		Land surface type				
				Plain land	Rough road	Mountainous area			
High cl	ass ro	ad		140	120	80			
Highway			Multilopo rood	120	100	80			
be	de	Ι	Multilane road	120	100	60			
al ty	ad ad gra	Ш		120	100	60			
2 E	ad 20		2 long road	100	80	50			
°Z	Ro	IV	2 Idne Toau	80	60	40			
Traffic low intensity road		ıd	Single or 2 lane road	60	40	30			

(3) Lane Width and Median

3.0m to 3.75m lane widths are generally used and 3.50m wide lane width is desirable in case of the design speed of 60km/h.

The median of Peace Avenue at the Location of Sapporo Intersection has a width of 12m at the present. Ulaanbaatar Master Plan 2020 has suggested that the median can be used for public transportation. Based on the master plan, 17m width of median shall be reserved to keep the space for the public transportation.

5.2 Typical Cross Section

(1) Typical Road Cross Section of Sapporo Intersection

Following typical cross sections can be applied for the Sapporo Intersection.



Typical Cross Section (1)



Typical Cross Section (2)

(2) Typical Road Cross Section of Bayanburd Intersection



Following typical cross sections can be applied for the Bayanburd Intersection.

Typical Cross Section at Bridge Portion



5.3 Design Condition of Grade Separation Structure

(1) Sapporo Intersection

i) Superstructure

1) Length of Bridge	228m		
2) Span Arrangement	Center Span : 2@30.0 m Side Span : 6@28.0m		
3) Width of Cartridge Way	W=8.00m (2-lane) x 2		
4) Type of Super Structure	PC-T Girder (Post Tensioning)		
5) Number of Main Girder	5-pcs x 2.		

ii) Substructure and Foundation

1) Type Abutment	Inverted T-Type Abutment
2) Type of Pier	Concrete Single Column Type : 7 set / Bridge
3) Type of Foundation	Spread Type Foundation

(2) Bayanburd Intersection

i) Superstructure

1) Length of Bridge	225m			
2) Span Arrangement	Center Span Side Span	: 45.0 m : 6@30.0m		
3) Width of Cartridge Way	W=17.00m (4-lane)			
4) Type of Super Structure	Center span Side Span	: PC-Box Girder : PC-T Girder (Post Tensioning)		
5) Number of Main Girder	Center Span Side Span	: - : 9-pcs		

ii) Substructure and Foundation

1) Type Abutment	Inverted T-Type Abutment
2) Type of Pier	Concrete Rigid Frame Type : 6 set
3) Type of Foundation	PC-Pile Foundation (L=9.0m)

(3) Pavement Design

The designated pavement is to be expected as following:

- Asphalt Surface Course : h1= 50 mm
- Asphalt Binder Course : h2= 50 mm
- Aggregate base course : h3=150 mm
- Aggregate sub-base course:h4=150 mm

5.4 Drawing of the Improvement of the Intersections and Structures

(see from next page)



PLAN OF SAPPORO I.S







(4) Construction Plan

Following sequences shall be taken into account to construct the fly-over with keeping existing traffic.





5.5 Project Cost

The estimation of the project cost was the results of preliminary engineering design, quantity take-off of main work items.

- Civil Work Cost
- Price Escalation (to be examine)
- Physical Contingency
- Consulting Services
- Environmental Management
- Property Compensation

The basic premises in estimating the project cost are as follows;

- 1) The unit costs for construction works are estimated considering labor cost, material cost, equipment cost and overhead for major work items. The analyzed unit prices have been compared with recent similar bid prices and adjusted as required to obtain realistic prices.
- 2) Engineering services cost is assumed totaling 10%, comprising 3% of construction cost in detailed design stage and 7% of construction cost in construction supervision.
- 3) Physical contingency is estimated to be 5% of the total of construction cost.

Table 5.5.1 Summary of the Cost Estimate for the Priority Project

Items		1) Sapporo IS (USD)	2) Bayanburd IS (USD)	Total (USD)
1. Construction Cost				
1) Direct Cost	Bridge	9,176,000	9,597,900	18,773,900
	Road	3,716,000	1,004,000	4,720,000
	Sub-total	12,892,000	10,601,900	23,493,900
2) In-Direct Cost	(30%)	3,868,000	3,181,000	7,049,000
3) Overhead Cost	(10%)	1,676,000	1,378,000	3,054,000
Sub Total		18,436,000	15,160,900	33,596,900
Physical Contingency	(5%)	921,800	758,045	1,679,845
2. Consulting Services	(10%)	1,843,600	1,516,090	3,359,690
3. Environmental Measure	(0.5%)	93,000	76,000	169,000
4. Property Compensation (0.5%)		93,000	76,000	169,000
Total Project Cost		21,400,000	17,600,000	39,000,000

1US\$=1.184 Ta

6. ROAD OPERATION AND MAINTENANCE PLAN

6.1 **Present Operation and Maintenance System**

UB Road Maintenance Company (UBZZ) under UB City Government is in charge road maintenance in Ulaanbaatar City. UBZZ has 87 full-time base staff and employs part-time staff for busy period.



Fig. 6.1.1 Organization Chart of UBZZ

UBZZ owns 23 equipment at present as shown in Table 6.1.1 to carry out road maintenance works.

	Machinery equipment	Model	Capacity/ton	Made in	Started using	Quality	Condition
1	Fork lifter	ZIL 4505	6	Russia	1995	not bad	Being used
2	Fork lift	ZIL 4505	6	Russia	1995	not bad	Being used
3	Fork lift	Kamaz 5511	10	Russia	1988	not bad	Being used
4	Fork lift	Kamaz 5512	10	Russia	1988	good	Being used
5	Crane	ZIL130 KS	6	Russia	1990	not bad	Being used
6	Water tank truck	DS-39	5	Russia	1996	not bad	Being used
7	Roadwork maintenance truck	Nino	4	Japan	2001	good	Being used
8	Roadwork maintenance truck	Nino	4	Japan	2001	good	Being used
9	Roadwork maintenance truck	Nino	4	Japan	2001	good	Being used
10	Passenger car	Magnus		Korea	2000	not bad	Spare parts are rare & expensive
11	Passenger car	Sonata		Korea	1995	not bad	Usually broken down
12	Truck	Porter	1.5	Korea	1994	not bad	Being used
13	Motor grader	DZ-122		Russia	1988	bad	Engine & some parts aren't usable.
14	Roller	DU-48	8	Russia	1999	bad	Can't make the surface smooth since some parts are broken.
15	Asphalt finisher	HA44W-2	2.4-4.4	Japan	2001	good	
16	Excavator	Komatsu W93 R	97.8 HP	Japan	2001	good	
17	Excavator	Komatsu W93 R	97.8 HP	Japan	2001	good	
18	Asphalt finisher	195-DS	10	Russia	1995	bad	Not acceptable condition to complete the work.
19	Roller	Sakai	8	Japan	2001	good	Being used
20	Roller	Sakai	8	Japan	2001	good	Being used
21	Passenger car	Landcruiser 80		Japan	2005	good	Being used
22	Traffic light truck	Porland		China	2006	good	Being used
23	Fork lift	ZIL 4505	6	Russia	1988	bad	Isn't usable

Table 6.1.1 List of machinery equipments being currently used

6.2 **Present Condition of Road Maintenance**

UB City accomplished road works in the past as shown in Table 6.1.2, namely road construction by UB Road Department and repair/maintenance by UBZZ.

					Million Tg.
		2003	2004	2005	2006
Ac	complishment of Roadwork in UB	1,219.9	4,002.4	2,319.0	3,562.3
	Road Construction	469.5	1,007.2	1,708.5	2,027.7
	Repair and Maintenance	750.4	2,995.2	610.5	1,534.6

Table 6.1.2 Accomplishment of Road Works

Source: JICA Study Team

7. PROJECT IMPLEMENTATION PLAN

7.1 Executing Agency

The Ministry of Road, Transport and Tourism (MRT&T) is responsible for the policy-making in the sector, supervision over the execution of the government decisions and relevant laws, co-ordination of activities of the agencies concerned, etc.

The Ulaanbaatar City Government is responsible for to maintain economic and financial sustainability, increase investment, loans, grants, and own reserves, develop social infrastructure through proper policies on ecology, land and urban development, decrease unemployment and poverty, and create favorite environment facilitating the population to live healthy, study and work. The Ulaanbaatar City Government conducts the construction and maintenance of roads in the Ulaanbaatar City, while UB Road Department, the implementation agency of UB City, is a governmental implementing agency responsible for the planning/designing, construction of roads and bridges in UB and their maintenance and management.

Accordingly, MRT&T is responsible for the project implementation as the executing agency, and UB Road Department is responsible for the design and the tender processing and takes directly charge of supervision for construction stage.

7.2 Capability of Executing Agency

7.2.1 Organization

The organization chart of respective agencies is shown in Figures 7.2.1 and 7.2.2.



Fig. 7.2.1 Organization Chart of Ministry of Road, Transport and Tourism



Fig. 7.2.2 Organization Chart of Road Department of Ulaanbaatar City Government

7.2.2 Budget

The budgets related to road by each agency are shown in Table 7.2.1. The Road Fund is formed from fuel taxes.

The Government of Mongolia appropriates funds for road construction and repair/maintenance, utilizing the Road Fund, the National Budget and the Mongolian Development Fund. The budget of UB Road Department in the year 2006 increased

almost double compared to that of year 2005, and it meant that road and traffic situation was deteriorated considerably and rehabilitation works were required urgently. The budget of Road Department under MRT&T in the year 2007 amounts 67.5 Billion Tg that comprises 7.02 Billion Tg from the Road Fund, 23.26 Billion Tg from the National Budget and 37.22 Billion Tg from the Mongolian Development Fund.

					Million Tg.	
Road Budgets	2002	2003	2004	2005	2006	2007
Road Depart. MRT&T	14,700	19,800	17,400	22,100	30,800	67,500
UB Road Department	1,175	2,110	2,830	2,815	4,099	
UB Road Maintenance Company (UBZZ)	538	416	550	742	1,054	
Exchange rate (Tugriks/\$)	1,110	1,147	1,185	1,205	1,180	



7.3 Project Implementation Schedule

A project implementation schedule is tentatively drawn up as shown in Figure 7.2.1.

Table 7.2.1 Institutional Arrangements for the Project Implementation

		Major Items			YR	200	08				`	YR	200	09	Y	′R	201	0	Ŋ	YR	201	1	Ŋ	/R 2	201	2	Y	R 2	2013	Γ	YR	201	4	Y	R 2	015
		-		9	10		11		1	2	Ι	II	III	IV	Ι	Π	III	IV	Ι	II	III	IV	Ι	Π	III	IV	Ι	Π	III IV	1	II	III	IV	Ι	Π	III IV
1	JBIC Apprai	sal Mission																																		
2	Pledge																																			
3	Exchange of	Notes (E/N)																																		
4	Loan Agreer	nent (L/A)																																		
5	Procurement	Process of Consultant							ц	фп	μ																									
6	Selected	Preparation of Detailed Design and																																		
0	Project	Tender Document										1	ΥĽ																							
7	(Sapporo	Procurement Process of Contractor														Ш	ш																			
8	EO &	ROW Establishment Plan																																		
9	Dorromhumt	Utilities Relocation Plan																																		
10	Dayanburt	Construction																	m	фπ	ш	ш	ш	Ш	П	П	ш	ш	шш	þ	пп	ψīπ	m			
11	FO)	Operation	IT	T				Т																						Г				_	►	

8. ENVIRONMENTAL CONSIDERATION

8.1 Objective

JICA Study Team has conducted the environmental study for priority road project with new proposal to re-package sub-projects subject to JBIC. Objectives of the Study are:

- To identify environmental issues to be considered in order to select priority road project.
- To take IEE Study for selected propriety road project including public consultation.
- To recommend further study focusing on EIA under Mongolian system.

First, 6 alternative plans, described in Table 8.1.1 were created as sub-projects for road priority projects. JICA Study Team evaluated these plans from the viewpoints of technical, financial and environmental issues, and finally proposed 2 priority projects.

	Project Description
No.1	Traffic Control and IS Improvement Encompassing Sukhbaatar Square
No.2	Construction of Grade Separation Structure at Sapporo IS and Model Road Improvement
No.3	Construction of Grade Separation Structure at Ard Ayush Avenue and Amarsanaa Street Intersection
No.4	Construction of Grade Separation Structure at Tasagnii Ovoo Intersection
No.5	Improvement of Tsagdaagiin Intersection, and Construction of New Road along the Selbe River
No.6	Construction of Grade Separation Structure at Tuul Jin Pan Intersection

 Table 8.1.1
 Description of 6 Sub-Projects

8.2 Pre-Evaluation

Pre-evaluation was taken by field observation, results of HIS and secondary data collection. Based on the field observation and project components, 6 six sub-projects can be categorized 3 types.

Туре А

Sub-project 1 is located at Sukhbaatar Square, where is the most popular zone in Ulaanbaatar City. There is less impact predicted toward geological/hydrological condition, biota and ecosystem because the sub-project will not contain large scale construction. However project area is located close to the business area. Therefore it is required to take special considerations to their business activities.

• Major environmental issue will be air pollution.

In operation stage, this sub-project is expected to reduce traffic congestion, so that traffic speed will be improved. It is concluded that emission of CO_2 and air pollution can be reduced by high efficient consumption.

Such kind road construction generates huge construction waste, so that solid waste management is a major concerned issue of the sub-project.

Generally current noise and vibration disturbance is not so small. During construction stage, construction activities such as mobilization, piling, compaction, pavement, etc. will accelerate noise/vibration disturbance. Adequate noise/vibration mitigation is required.

The sub-project site is located under large traffic area including large volume of pedestrian. Safety management especially focusing traffic accident is strictly required.

Туре В

Sub-project 2, 3, 4 and 6 are categorized as type B. Major road developments of type B are improvement of intersection and construction of fly over. Construction sites are basically within ROW, therefore serious impact will not be generated. Major construction activity is building fly over.

Major impacts generated in construction stage are air pollution and noise/vibration disturbance, which are generated by material mobilization, piling, compaction, piling, etc.

During operation stage, it is expected to improve traffic condition, mitigating traffic congestion and accident, increasing traffic speed. This improvement can enhance saving of fuel consumption of vehicles. Hence it is expected to reduce air pollution, also to mitigate global warming.

Meanwhile, structure of fly over will generate different situation on noise disturbance, noise will affect resident's life in apartments, especially to whom living on 3rd, and 4th floors. This situation is not familiar in Mongolia.

Туре С

The sub-project 5 consists of new road construction and change of road alignment, this situation will generate land acquisition. There are vacant area and gas station near the area of change of road alignment. The gas station has still been operated; therefore negotiation for land procurement will be needed.

The area of new road construction is beside Selbe River, it seems that some land development has started. New road construction will generate huge sand waste, so that it is required to make adequate waste and water quality management to minimize aggravation of river condition.

The table below shows a brief impact evaluation of the six alternatives and "Do-nothing" cases.

Sub-project	1	2	3	4	5	6	Do-nothi
Environmental Item							ng
Natural Environment	No						
Pollution	Moderate						
Social Environment	Minor	Minor	Minor	Minor	Moderate	Minor	Moderate

 Table 8.2.1
 Brief Evaluation of the Six Alternatives and "Do-nothing" cases

Natural environment consists of meteorological, geological and hydrological condition, ecosystem, etc.

Pollution consists of air, water and soil pollution, noise and vibration disturbance, etc. Social environment consists of land acquisition, gender equality, children's rights, health, etc. Source: JICA Study Team

The do-nothing case will aggravate traffic congestion and this will further aggravate air pollution. According to the result of HIS, traffic congestion is one of the most serious problems. Therefore the do-nothing case will cause increasing social dissatisfaction with traffic inconvenience.

In comparing the six sub-projects, Category A, sub-project 1 might be recommended because the project scale is not large and is not expected to cause serious social impact. The major predicted impacts are traffic disturbance, exhaust emissions, dust, noise and so on, which are the general types of impacts caused by construction. Such impacts can be mitigated by appropriate measures.

Type B, flyover construction, will cause huge solid waste and traffic disturbance at levels that would be higher than those in sub-project 1. However these can also be mitigated by adequate counter measures. Therefore it is concluded that priority projects can be selected from Type B only if sub-projects in Type B are more effective at improving road condition. In the sub-projects in Type B, there is no significant difference.

The IEE Study focused on sub-projects 2 and 4. The tables below summarize the evaluation of impacts for these two proposed sub-projects.

8.3 Initial Environmental Examination (IEE)

JICA Study Team conducted IEE Study in above 2 priority projects. Study components are "Air Quality Survey", "Noise Survey" and "Public Consultation".

8.3.1 Study Method

Air quality was measured total 2 points at each location. 1 point was set beside road (st. A-1) and another was as background point (st. B). Actual points are shown in figure 8.3.1.



Figure 8.3.1 Survey Point of Air Quality and Noise Measurement

The survey was continued for 24 consecutive hours, sampling and measurement were taken every 2 hours. Methods of sampling and measurement followed the Mongolian National Standard Method shown in Table 8.3.1. Meteorological condition (air temperature and pressure, wind speed and direction) were also measured at the same time.

Survey Parameter	Method				
SO ₂ (Sulfur Dioxide)	Pararosaniline (Spectrophotometer) Method				
NO ₂ (Nitrogen Dioxide)	Salzman Method				
TSP (Total Suspended Particulate)	Gravimetric Method				

Table 8.3.1Method of Air Quality Survey

Air Quality Survey as same as noise measurement was taken at following date:

Table 8.3.2Date of Air Quality and Noise Survey

	Sapporo Intersection of Bayangol District	Bayanburd Intersection of Chingeltei District
Weekday Measurement	18 th -19 th December, 2007	11 th -12 th December, 2007
Weekend Measurement	22 nd -23 rd December, 2007	15 th -16 th December, 2007

Noise survey was taken at same locations of air quality survey as shown in Figure 8.3.1. Noise is measured at total of 3 points, 2 point beside road (ground level (A1), and same height as proposed fly over structure (A2) and 1 background point (B) in each study location.

Noise survey was also taken in the same days as air quality survey for 24 consecutive hours in these days and measurement was taken every 1 hour. The noise level in A1 points in both Intersections was calculated as an average of three measurements in each of roads, surrounding the point. The maximum and minimum sound levels were measured every 1 hour and the average level was calculated, and the average levels during 16 hours of day time (07:00-23:00) and during 8 hours of night time (23:00-07:00) were calculated for each point.

The JICA Study Team has organized a public meeting focusing on residents and workers of apartments and various service entities. Schedule of the meetings are shown in Table 8.3.3.

Table 8.3.3 Date of Public Consultation

Location	Date	Number of Participants
Sapporo Intersection of Bayangol District	12 th January, 2008	48
Bayanburd Intersection of Chingeltei District	12 th January, 2008	42

The purpose of the meeting was to introduce road situation of UB city, environmental survey results and collect opinions of participants on a proposed priority road project and to build consensus and keep communication among stakeholders.

Questionnaire survey was also carried out after discussion. Questions are:

- How do you feel about current road condition around Sapporo/Bayanburd IS?
- Do you expect the project can improve road condition?
- Do you agree with the project?
- In case of agreement, what is needed?

8.3.2 Result

1) Air Quality

Figure 8.3.2 shows daily average of air quality. It is concluded that daily average of air quality did not satisfy acceptable level stated in the regulation.



Source: JICA Study Team

Figure 8.3.2 Daily Average of Air Quality

In comparison of concentration of NO_2 between measurement point beside road (A1) and background point (B), concentration at point B was relatively smaller than at A. It may result that major pollution load of NO_2 is generated beside road meaning vehicles.

2) Noise

Figure 8.3.3 shows hourly distribution of noise level. In 2007, noise standard criteria have been established in the regulation MNS-4587-2007 based on standard level by WHO. Noise standard is classified into 2 levels, that to say, 60dB and 45dB, day time and night time respectively.



Figure 8.3.3 Hourly Distribution of Noise Level

Based on the results, it was found that there is less statistical difference between point A-1 (ground level beside road) and A-2 (midair level) on noise level, and noise level were exceeding Mongolian standard noise level at both locations. Meanwhile background level on point B was lower than point A-1 and A-2 though noise level was exceeding standard level. It explains that major noise source is generated by transportation activity. Therefore it is required to install adequate mitigation such as sound barrier, e.g.

3) Public Consultation

Figure 8.3.4 describes result of questionnaire in the public consultation.

🛚 Very Bad 🖬 Bad 🗖 Fair 🖨 Good 🗖 Very Good 🖬 Very Bad 🖸 Bad 🗖 Fair 🖨 Good 🗆 Very Good Congestion Exhaust gas E E Bayanburd IS Bayanburd IS Sapporo IS Sapporo IS 100% 0% 20% 40% 60% 80% 100% 0% 20% 40% 60% 80% Noise ■ Very Bad
Bad
Fair
Good
Very Good ■ Very Bad
Bad
Fair
Good
Very Good Safetv Bayanburd IS Bayanburd IS Sapporo IS Π Sapporo IS 0% 20% 40% 60% 80% 100% 0% 20% 40% 60% 80% 100% 🛚 Very Bad 🖪 Bad 🗆 Fair 🗖 Good 🗆 Very Good Conviniencey Walking ■ Very Bad 🖪 Bad 🗆 Fair 🗖 Good 🗆 Very Good Environment E Bayanburd IS Bayanburd IS Sapporo IS Sapporo IS E 0% 20% 40% 60% 80% 100% 0% 20% 40% 60% 80% 100% Q-2: Do you expect that the project can improve road condition? Q-3: Do you agrre with this project? ■ I agree. □ I agree w ith conditions □ I do not agree. I expect.
 I do not expect.
 I do not know. Bayanburd IS Sapporo IS Sapporo IS Bayanburd IS Q-4: What condition is needed? Sapporo IS Bavanburd IS Need more information Compensation Keep communication Proper mitigation measures Source: JICA Study Team

Q-1: How do you feel about current road condition ariund Bayanburd/Sapporo IS?

Figure 8.3.4 **Result of Questionnaire Survey**

The results for question-1 were the same as from the HIS; most residents feel that the road environment is "very bad" or "bad, especially regarding traffic congestion and exhaust gas.

Basically participants in the consultation welcomed and were interested in the presentation of the field survey results (air quality and noise). Participants were supportive of the construction of a fly over as a means of mitigating traffic congestion. The main comments made by participants are summarized below:

Sapporo IS

- It may be good idea to construct a flyover for traffic control.
- The construction should be started as soon as possible because the project will improve the city condition. It is necessary that the flyover is constructed wide enough for traffic.
- It is necessary to consider all negative impacts of the traffic congestion. The rate of progress and quality of construction will be crucial, as will the alleviation of noise caused by construction.
- For construction, it is necessary to use environmentally friendly technology and ensure the safety of construction workers.
- The project shall consider the safety and convenience of pedestrians through planting trees and grasses, creating water fountains for improving air quality and the general environment.
- It is suggested to plan and construct more pedestrian crossings and install traffic signals as well regulate trucks and trailers. The project activities need to be replicated at other intersections to reduce air pollution and traffic congestion.
- Promotion and public awareness activities need to be conducted to advocate and push the proposed project.
- Khoroo governors and khoroo parliaments (khoroo hural) expressed that this issue would be introduced at khoroo citizens meeting so that all residents would become familiar with this project and have the opportunity to provide comments. If required, the khoroo governors (who attended the meeting) offered to send a letter to the municipality to request the project implementation, if necessary.

Bayanburd IS

- It is expected that the project can mitigate traffic congestion and air pollution.
- Cooperation and public participation is important for successful project implementation, reduction of air pollution and improvement of the city landscape.
- It is strongly expected that the project will solve all the issues related to traffic congestion at this busy intersection. Further, it is suggested that the project be replicated at other high risk intersections with frequent traffic congestion.
- All social issues would need to be properly considered in designing and constructing a wide and beautiful bridge.
- The land acquisition process should propose proper and fair compensation to the affected residents.
- If possible, the "Baruun durvun zam" and "Zuun durvun zam" Intersections

should also be considered for construction of a flyover as an extension of the project.

- Residents expect to live in a safe and healthy environment by construction of the flyover.
- In Bayanburd IS, there are no crossings for pedestrians at all, so it is very important to build crossings.
- For reduction of noise, relevant sound barriers and trees need to be established and planted.

From the evaluation of the public consultations

- (1) Attendants of the public consultations mostly recognized traffic congestion as one of the most critical issues in Ulaanbaatar. They expect that road improvement will mitigate traffic congestion.
- (2) Most residents with children strongly request adequate and better consideration for pedestrians and also suggest the installation of traffic signals and pedestrian crossings.
- (3) As indicated in the HIS, participants strongly recognized air pollution as the most serious environmental issue. Residents living beside a road mentioned noise disturbance.
- (4) On the other hand, issues of water pollution and water supply do not concern the residents in the Ger area despite the current deterioration.
- (5) In the public consultations, especially the two public hearings, the issues of land acquisition and resettlement were not major topics; however, there were some opinions from participants suggesting careful consideration for building adequate compensation policy and consensus building.

8.4 **Conclusion and Recommendation**

8.4.1 Impact Evaluation and Environmental Management Plan

Impact evaluation is summarized below Table 8.4.1.

Table8.4.1	Impact	Evaluation	(Bayanburd IS)
			· · /

Location Impact		Impact	Description
Env	ironmental Item	Level	
1	Air Pollution	С	Mobilization of materials and equipment will generate traffic disturbance. During construction phase. While during operation, it is expected to improve air quality by mitigation of traffic congestion.
2	Water Pollution	С	There is water reservoir near project site and underground drainage, therefore construction plan shall be considered.
3	Soil Pollution	D	Basically construction and operation do not lead soil pollution.
4	Waste	В	The project will generate huge construction waste. Solid waste control is major issue in environmental management.
5	Noise & Vibration	В	Construction activity will generate noise and vibration disturbance. Existence of flyover will make a new situation in noise.
6	Ground Subsidence	D	Basically construction and operation do not lead ground subsidence.
7	Offensive Odors	D	Basically construction and operation do not generate odors.
8	Geophysical Features	D	Basically construction and operation do not change geophysical features.
9	Bottom Sediment	D	There is no river, lake near the project site.
10	Biota & Ecosystem	D	Due to urban area, specific biota and ecosystem are not predicted.
11	Water Usage	D	Construction and operation do not use huge water to affect water supply.
12	Accidents	В	Adequate traffic management is required during construction phase.
13	Global Warming	C/B	During construction phase, it is suggested to use energy saving equipment to minimize GHG emission. While mitigating traffic congestion can save fuel consumption.
14	Involuntary resettlement	D	Basically the project does not occupy land out of ROW.
15	Local Economy	С	Traffic disturbance during construction phase may affect access to the local business/shop.
16	Land use	D	The project does not change land use.
17	Social Institutions	D	The project does not change social institution.
18	Social Infrastructures and Services	С	Careless construction to underground, such as piling work, can damage underground utilities.
19	The Poor, Indigenous & Ethnic	D	There are little the poor, indigenous and ethnic people.
20	Misdistribution of Benefit/damage	D	The project does not generate misdistribution among residents.
21	Local Conflict	С	Basically the residents agree with the project. It is necessary to closely communicate to avoid confliction.
22	Gender	D	The project does not cause gender issues by providing proper labor environment and rule.
23	Children's Right	D	The project does not disturb children's right by providing proper labor environment and rule.
24	Cultural Heritage	D	There is no cultural heritage near the project site.
25	Infectious Diseases	 D	The project does not lead infectious diseases by providing proper
-		-	labor environment and rule.

Note: A: Serious impact is predicted.

B: Some impact is predicted.C: Unclear, need further evaluation.

D: No or less impact is predicted.

	Location	Import	Description
Env	ironmental Itom	Impact	Description
	Air Dollution	Level	Mobilization of materials and equipment will generate traffic
'		C	disturbance During construction phase. While during operation it
			is expected to improve air quality by mitigation of traffic congestion
2	Water Pollution	О	There is no water reservoir as well as drainage canal near project
-		U	
3	Soil Pollution	D	Basically construction and operation do not lead soil pollution.
4	Waste	 B	The project will generate huge construction waste. Solid waste
-		_	control is major issue in environmental management.
5	Noise & Vibration	В	Construction activity will generate noise and vibration disturbance.
			Existence of flyover will make a new situation in noise.
6	Ground Subsidence	D	Basically construction and operation do not lead ground
			subsidence.
7	Offensive Odors	D	Basically construction and operation do not generate odors.
8	Geophysical Features	D	Basically construction and operation do not change geophysical
			features.
9	Bottom Sediment	D	There is no river, lake near the project site.
10	Biota & Ecosystem	D	Due to urban area, specific biota and ecosystem are not predicted.
11	Water Usage	D	Construction and operation does not use huge water to affect water
			supply.
12	Accidents	В	Adequate traffic management is required during construction
			phase.
13	Global Warming	C/B	During construction phase, it is suggested to use energy saving
			equipment to minimize GHG emission. While mitigating traffic
1.4	las colorado a c		Congestion can save fuel consumption.
14	Involuntary	D	Basically the project does not occupy land out of ROW.
15			Traffic disturbance during construction phase may affect access to
15	Local Economy	C	the local business/shop
16	l and use	О	The project does not change land use
17	Social Institutions	D	The project does not change land doe.
18	Social Infrastructures	C.	Careless construction to underground such as piling work can
	and Services	Ŭ	damage underground utilities.
19	The Poor, Indigenous	D	There are little the poor, indigenous and ethnic people.
	& Ethnic	_	
20	Misdistribution of	D	The project does not generate misdistribution among residents.
	Benefit/damage		
21	Local Conflict	С	Basically the residents agree with the project. It is necessary to
			closely communicate to avoid confliction.
22	Gender	D	The project does not cause gender issues by providing proper
			labor environment and rule.
23	Children's Right	D	The project does not disturb children's right by providing proper
			labor environment and rule.
24	Cultural Heritage	D	There is no cultural heritage near the project site.
25	Infectious Diseases	D	The project does not lead infectious diseases by providing proper
			labor environment and rule.

Table 8.4.2	Impact Evaluation	(Sapporo IS	3)
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Note: A: Serious impact is predicted. B: Some impact is predicted. C: Unclear, need further evaluation. D: No or less impact is predicted.

From the evaluation based on observation, secondary data collection, field survey and public consultation, following environmental mitigations and monitoring plans are recommended.

Mitigation Measure	Monitoring Method
Air Pollution will be generated by the operation of h	eavy equipment, mobilization, loading/unloading
materials during the construction phase.	
 To select environment friendly equipment. 	 To measure air quality in accordance with
 To maintain the construction equipment 	related air quality standards.
properly to minimize exhaust emissions.	 To record community perceptions.
 To use covering sheet on bulk construction 	
material during transportation.	
 To place construction materials and demolition 	
waste properly.	
 To spray water to prevent dust to spread. 	
Noise Disturbance will be also generated by operation	ion of heavy equipment.
 To select least noisy equipment. 	- To monitor noise level in accordance with
- To arrange construction schedule to minimize	related noise standards.
noise in night-time.	- To monitor community perceptions.
- To train the drivers and operators of	
construction equipment to obey relevant laws	
and regulations.	
- To construct sound barriers.	
Water Pollution may be a minor impact compa	ared with air pollution and noise disturbance.
Generating turbid water during construction is the m	ajor potential source of water pollution,
- To design drainage layout in the surrounding	- To measure water quality in accordance with
area in such a way that waste water is not	related air quality standards.
directly discharged into the rivers and drains.	- To record community perceptions.
- To collect discharged sewage from the base	
camp into an adequate location with filtering or	
treatment before discharging.	
- To set up sedimentation pits to trap turbid	
water.	
- To neutralize acid water generated by concrete	
mixtures before discharging.	
Solid waste will be generated by civil work for flyove	er construction.
- To notify the workers to keep the construction	- To monitor solid/liquid waste control.
site clean.	- To monitor leakage of oil
- To recycle and/or reuse as much construction	- To record volume and type of waste materials
waste as possible: and	- To record manifest of waste inc. 1) name of
- To store waste at an appropriate place until it is	management company and location of the
taken out	disposal area 2) permission and license etc
Accidents will occur if there is inadequate traffic cor	alepodal alea, 2) permission and neeries, etc.
- To arrange the schedule for movement of bulky	- To interview the communities living around the
items to avoid husy hours	mobilization route
- To establish temporary traffic signs based on	- To observe and record the traffic concestion
the traffic regulations	caused by movement of materials and
- To coordinate with local government and traffic	equinment
	- To record traffic accidents
To improve physical road condition to	
withstand the operation of heavy equipment	
and vehicles	
Local economy especially transportation convict	s and shops along the construction sites will
be disturbed	ະອິລາດ ອາດຸມອິລາດານ ແມ່ຍ construction sites will
To prior appounce the construction schedule	To record and monitor complaints
To support temporary disability company	- To record and monitor compiaints.
- To support temporary disability compensation	
- To provide alternative area for the business	

 Table 8.4.3
 Recommended Environmental Management Plan
 To establish temporary loading/unloading 				
points.				
Social Infrastructures and Services will be interrupted by civil works.				
- To take a survey and inventories underground	 To record and monitor complaints. 			
infrastructures in the construction sites.				
- To temporary relocate social infrastructures.				
- To prior announce the construction schedule.				
 To establish temporary loading/unloading 				
points for public transportation services.				
Local Conflict may generate by traffic disturbance, local economic disturbance, and air/water				
pollution during the construction phase.				
- To keep close communication with community.	- To record and monitor community complaints.			
 To take disclose the project description and 				
schedule well in advance.				
 To give employment opportunities to the 				
community.				
- To inform the people about the project and				
employment opportunities it offers.				

Source: JICA Study Team

8.4.2 Further Action

Air quality and, noise level surveys and public hearings were carried out in the IEE Study. In order to identify other impacts and prepare a detailed management plan, the following further studies/surveys are recommended.

Study / Survey	Purpose
Underground Infrastructure Survey	To grasp position of underground infrastructures
Water Quality Survey	To find groundwater quality and quantity condition
Geological Survey	To grasp geological condition
Topographic Survey	To clarify slope condition. Especially the area of sub-project 4 is lower than its surroundings, so it is necessary to design drainage routes.
Study on Waste Management	To make waste disposal plan including creating recycle / reuse system

Table 8.4.4 Recommended Further Study

Source: JICA Study Team

The public hearings in Bayangol and Chingeltei mainly focused on the basic policy for urban development, especially road network improvement and the introduction of current environmental aspects. At that time, the Mongolian Government had not yet decided the priorities for road development; therefore, no representatives of the Government attended the meeting. JICA Study Team discussed the results of the IEE Study with the Road Department. They suggested the need to manage construction waste and replied that the application for environmental permission would be made as soon as possible.

However, restructuring of the Government after recent elections has meant that the process of preparing the application to the MET could not yet be started. According to the interview with person in charge of EIA, it will be possible to require a detailed EIA against the priority road projects.

N₂	Name	Home address	Positions
1.	Sarantsetseg S.	5th khoroo, Bayangol District (BGD)	Khoroo governor
2.	Ntsagdorj K.	5th khoroo, BGD	Chairman, Khoroo Citizens Representative
			Meeting
3.	Baasankhuu D.	12 th khoroo, Songino-Khairkhan District	Khoroo governor
		(SKD)	
4.	Khadbaatar B.	SKD	Traffic police officer
5.	Batzoring L.	SKD	Traffic police officer
6.	Enkhbold B.	Bayanzurkh District (BZD)	Driver
7.	Boldbaatar Sh.	9th khoroo, BGD	Driver
8.	Undram M.	12 th khoroo, SKD	Student
9.	Manlai E.	9th khoroo, BGD	Geologist
10.	Baasanjav J.	13 th khoroo, SKD	Pensioner
11.	Khos-Erdene E.	4th khoroo, BGD	Waiter
12.	Erdenechimeg M.	8th khoroo, Khan-Uul District	Cooker
13.	Ganchimeg L.	12th khoroo, BGD	Waiter
14.	Chuluunchimeg B.	5th khoroo, BGD	Student
15.	Ouyntuya D.	5th khoroo, BGD	Student
16.	Dulamkhuu S.	12 th khoroo, SKD	Pensioner
17.	Sumiya M.	12 th khoroo, SKD	Subkhoroo head
18.	Natasha K.	12 th khoroo, SKD	Unemployed
19.	Renchindorj D.	12 th khoroo, SKD	Pensioner
20.	Dejidmaa O.	12 th khoroo, SKD	Subkhoroo head
21.	Nyamsuren S.	17 th khoroo, SKD	School teacher
22.	Dorjsuren I.	5th khoroo, BGD	Driver
23.	Aydia U.	5th khoroo, BGD	Unemployed
24.	Sonintuya H.	2nd khoroo, Chingeltei District (ChD)	Medical doctor
25.	Batchuluun G	5th khoroo, BGD	Head of Admin department, Third Medical
			Hospital of UB city
26.	Enkhmaa A.	11 th khoroo, SKD	Medical doctor
27.	Jargal B.	8 th khoroo, Chingeltei District (ChD)	Hygeinist
28.	Odsuren K.	5th khoroo, BGD	Chemist
29.	Baigalmaa D.	5th khoroo, BGD	Unemployed
30.	Munkhbat B.	12 th khoroo, SKD	Subkhoroo head
31.	Sereenen L.	5th khoroo, BGD	Pensioner
32.	Bayasgalan S.	2 nd khoroo, SKD	Student
33.	Tuvshin V.	5th khoroo, BGD	Sales person
34.	Dulamjav L.	5th khoroo, BGD	Translator
35	Bulgantamir R.	5th khoroo, BGD	Office service person
36.	Auysh H.	12 th khoroo, SKD	Receptioner
37.	Tserenkhand D.	5th khoroo, BGD	Pensioner
38.	Tsogbadrakh D.	12 th khoroo, SKD	Driver
39.	Saikhanjargal A.	12 th khoroo, SKD	Sales person
40.	Naranzul Sh.	12 th khoroo, SKD	Sales person
41.	Davaajav J.	1th khoroo, Chingeltei District (ChD)	Secretary
42.	Saran E.	12 th khoroo, SKD	Pensioner
43.	Atarchimeg N.	12 th khoroo, SKD	Student
44.	Borkhuu D.	ÕÓÄ 5-ð õîðîî	Secondary school teacher
45.	Enkhbat T.	9 th khoroo, SKD	Medical doctor
46.	Khishigjargal D.	5th khoroo, BGD	Receptioner
47.	Khalzan U.	Orkhon – Uul Province	Driver
48.	Erdenetsogt G.	5th khoroo, BGD	Driver

Attachment: Attendance List of Public Hearing for Road Priority Projects (Sapporo Intersection)

N₂	Name	Home address	Positions
1.	Chimed Ch.	6 th khoroo, Chingeltei District (ChD)	Subkhoroo head
2.	Burmaa S.	6 th khoroo, ChD	Subkhoroo head
3.	Tuya R.	6 th khoroo, ChD	Receptionist
4.	Nyamsuren L.	9 th khoroo, SKD	Serviceman
5.	Tsetsegdelger J.	6 th khoroo, ChD	Serviceman
б.	Altan Maidar G.	6 th khoroo, ChD	Subkhoroo head
7.	Narmandakh B.	6 th khoroo, ChD	Pensioner
8.	Davaajav Ch.	6 th khoroo, ChD	Unemployed
9.	Munkhtur H6	6 th khoroo, ChD	Unemployed
10.	Lhagvadagva L.	6 th khoroo, ChD	Unemployed
11.	Solongo Ch.	2nd khoroo, Khan-Uul District (KUD)	Staff, Public health institute
12.	Sumiyabazar Ts.	6 th khoroo, ChD	School teacher
13.	Munkhdorj L.	1st khoroo Bayangol district	Car serviceman
14.	Purevsuren S.	12th khoroo, Bayanzurkh district	Student
15.	Ouynaa H.	6 th khoroo, ChD	Head, Untility service
16.	Barhasragchaa B.	6 th khoroo, Songino-Khairkhan District	Staff, Central Environmental Monitoring
		(SKD)	Laboratory
17.	Enkhgerel T.	9 th khoroo, SKD	Subkhoroo head
18.	Buyandelger Ts.	18 th khoroo, ChD	Staff, Public health institute
19.	Gundegmaa P.	11h khoroo, KUD	School teacher
20.	Enkhbileg N.	2nd khoroo, Sukhbaatar District	Driver
21.	Tsetsegdelger Sh.	12 th khoroo, ChD	Social worker
22.	Ouynsuren N.	17th khoroo, SKD	Unemployed
23.	Batgchimeg G.	5 th khoroo, ChD	Unemployed
24.	Otgontsetseg G.	5 th khoroo, ChD	Social worker
25.	Bayarjargal E.	9 th khoroo, SKD	Driver
26.	Ouynchimeg M.	2nd khoroo, ChD	School teacher
27.	Burenjargal J.	1st khoroo, SKD	Sales person
28.	Batmunkh E.	9 th khoroo, ChD	Student
29.	Sarantuya Y.	1 st khoroo, ChD	Sales person
30.	Buyantsog G.	11h khoroo, KUD	Student
31.	Chimed L.	6th khoroo, BGD	Pensioner
32.	Sergelen L.	9 th khoroo, SKD	Pensioner
33.	Ganbat Sh.	5th khoroo, BGD	Receptionist
34.	Ochirbat X.	5 th khoroo, ChD	Unemployed
35	Davaasuren S.	5 th khoroo, ChD	Engineer
36.	Banzragch S.	9 th khoroo, SKD	Subkhoroo head
37.	Tuul G.	9 th khoroo, SKD	Social worker
38.	Enkhtsetseg L.	5 th khoroo, ChD	Sewer
39.	Ariunaa N.	6 th khoroo, ChD	School teacher
40.	Purevsuren K.	6 th khoroo, ChD	Student
41.	Enkhuush R.	9 th khoroo, SKD	Unemployed
42.	Chuluunbaatar O.	1st khoroo, ChD	Taxation officer

Attendants List of Public Hearing for Road Priority Projects (Bayanburd Intersection)