3. ENVIRONMENTAL BASELINE DATA

3.1 Physical and geographical resources

3.1.1 Geography

The capital city Ulaanbaatar is surrounded by the mountains Bayanzurkh, Bogd Khan, Songino Khairkhan to the east, south, west and north. These mountains are the southern edges of Khentii Mountain and located in the confluence valley of the rivers Tuul and Selbe.

Ulaanbaatar lies an average of 1351 m above sea level and has in total of 4,704.4 square kilometers of territory. The city is stretched out 5 km from north to south and 30 km from east to west.

The Strictly Protected Area of Bogd Mountain is located to the south of Ulaanbaatar. The Tuul River runs from east to west across the mountainside and mountains and hills that continue to the north of city.

The Selbe River (the downstream of this river is so-called Dundgol River) flows into the Tuul River at the front mountainside. Bogd Khan Mountain is the mountain that stretches approximately 40 km from east to west. In the center it has the characteristics of high and medium mountains, its peak, Tsetsee Gun mountain top is of 2268 m high. Bogd Khan Mountain and its nearby area are located in the south western area of Khentii, part of Khangai Khentii frowning mountain ranges.

Sediments accumulated during the carbon age (350-200 million years ago), granite generated during the Jurassic and Cretaceous period of the Mesozoic era and modern moraine are spread in mountainsides and ravines.

The 1854 m high Tsogtchandmani Mountain located in the south western edge of the Khentii Mountain lying in the south east (south east from Nalaikh) of Ulaanbaatar is an internal watershed of basins of the Arctic Ocean, Pacific Ocean and Central Asia without outer flow.

The area that belongs to this project is sedimentary which is the steppe and low ground.

3.1.2 Soil

The soil cover of Ulaanbaatar consists from mountain- meadow steppe soil, mountain forest soil, and mountain steppe soil, soil of humid origin and river plain soil.

The four types of soil in terms of mechanic composition; muddy sand with gravel, sandy and muddy gravel, gravel with sand and clay and split soil are distributed in the most of project implementation area for the overhead bridge (overhead crossing) at Ajilchni street.

Paved soil with a thickness of 1.0-2.2 m and various compounds originated from human impacts is covered over the surface of the area.

We have taken soil samples in order to determine current condition of soil and its fertility, took samples from each soil layer and determined its mash, nitrogen, carbonate, reaction atmosphere, amount of calcium and magnum absorbed to absorption complex, mobile phosphorus, amount of potassium, salt accumulation and electrical conductivity using the national standards of Mongolia.

The locations of soil sampling points are shown in figure 9.

Analytical methods used for defining of soil fertility (productivity) are described in table 3.

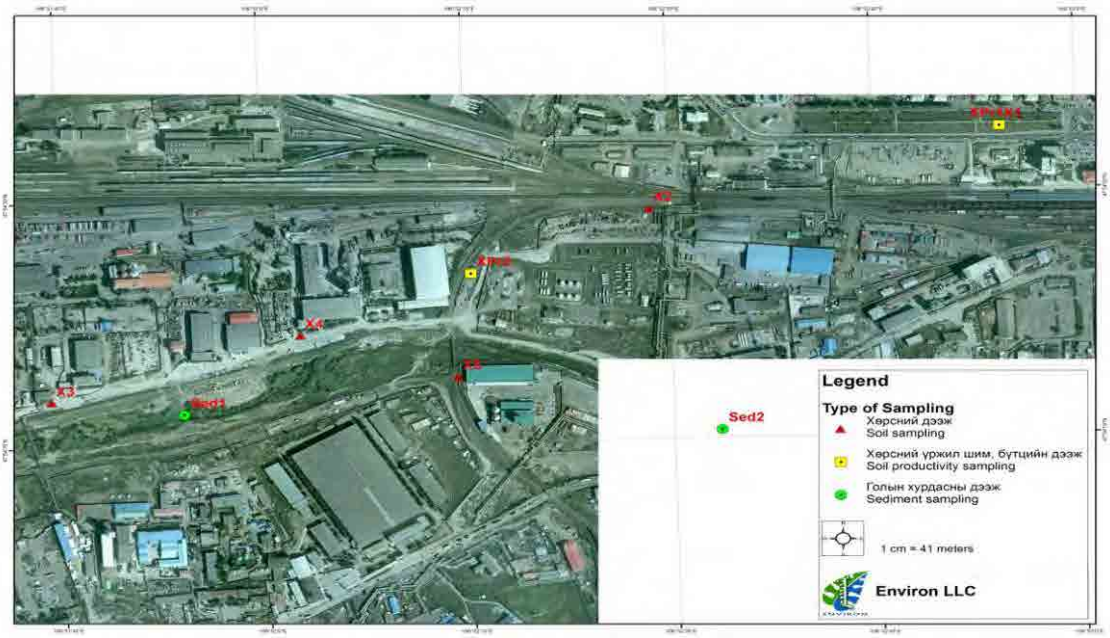


Figure 9. Location of soil samplings

Table 3. List of methods and their precision

Name of substances	Analytical methods	Accuracy
Humus	I.V. Tyurin	<0,04 mg/100g soil
Total nitrogen	Kjeldaal	<0,04 mg/100g soil
Soil reaction	PH-meter	<0,2
Mobile phosphorus	Machigin	<0,05 mg/100 g soil
Potassium exchange	Machigin	<0,05 mg/100 soil
Soil absorption complex	Trilon.B.	<0,2%
Carbonate	Calcium meter	<0.5%
Mechanical compounds	Method of aerometer and Kachinsky	<0,5%

Current status of soil along the flyover trace

There is very few soil remained along the trace, which still preserve its natural morphological characteristics and fertility because of human impact. Soil in the garden

located in north of UB Railway Central Station is one of these remained soils that has preserved its quality to date.

The south west part of this garden lies under the trace of proposed flyover project.

Figure 10. Garden view in the north of parking area

The garden area has a meadowy black soil and the soil properties are shown below.

Soil profile No.1 that represent meadowy black soil was made in the garden (coordinates of soil sampling: 47°54'33.81"N, 106°52'54.19"E h= 1,110 m above sea level) to the north from UB Railway Central Station.

Figure 11. Landscape of soil sampling area

Figure 12. Soil sample #1

Samples are taken from depths of0- 20cm and 25-35 cm respectively.

Record of soil outlook (morphology): Some area of this soil is grassless (5% of area) and gravel and fractured rocks occupy 20% of grassless surface and grassy vegetation grows as the base plantation and occupies 15-20% of the overall vegetation cover.

Bushes and woody vegetation with 5-8 cm of height occupy 5-10% of overall vegetation cover and there are lots of holes dug for plantation of wooden vegetation.

Paved road, buildings and construction continue outside of the fenced area.

A. 0-23 cm: Humus accumulation layer. This layer is black, has slight moisture, compound of clay (mechanic) particle, cell structure and sparse accord and has no fractured rocks and gravel. The bottom part of this layer has a rare gravel, clean transition and even boundary.

B. 23-40 cm: Carbonate accumulation layer. This layer is yellow, dry and has rare vegetation root, (mechanic) compound of light clay particle, cell structure and sparse accord and has no fractured rocks and gravel. Transition is clear and boundary is even.

Carbonate accumulation layer of B_2. 40-50 cm and below. It has dark flow on speckled and light brown background. The layer is dry, has (mechanic) compound of light clay, cell structure and dense consistency and no vegetation root. Gravel appears at depth of 45 cm.

The results of analysis defining the soil fertility (productivity) indicators show that:

Soil fertility indicator: A layer of soil mash accumulation has 3.6% of humus, 1.1% of nitrate nitrogen, 0.16% of carbonate, 17.4mg-eq/100gr of calcium exchange, 4.2mg-eq/100gr of magnum exchange, 1.6mg/100 gr of mobile phosphorus, 22.0 mg/100 gr of potassium and reaction atmosphere has alkalinity of (ph=8.3), electrical conductivity 0.170ds/m and low salt accumulation (0.05%).

B soil layer has 1.7% of humus, 0.03mg/100 gr soil of nitrate nitrogen, 0.16% of carbonate, 16.8mg-eq/100 gr of calcium exchange, 2.4 mg-eq/100 gr of magnum exchange, 1.3мg/100 gr of mobile phosphorus,8 mg/100 gr of potassium and reaction atmosphere has alkalinity of (ph= 8.5), electrical conductivity 0.141ds/m and salt accumulation of 0.04% (Table 4).

Table 4. Soil fertility parameters

Profile number	Depth of taken sample	pH	Salt, %	Electrical conductivity, ds/m	CO_2,%	Exchange basis, mg-eq/100 gr		Humus, %	NO_3, mg/100 gr	Fertility elements mg/100 gr	
						Ca	Mg			P_2O_5	K_2O
XPr-1	0-20	8.3	0.05	0.170	0.16	17.4	4.2	3.56	1.10	1.6	22.0
	25- 35	8.5	0.04	0.141	0.16	16.8	2.4	1.17	0.03	1.3	8.0

Mechanic composition of soil: According to the soil structure (sample) content of thick and medium particles (1-0.25 mm) sand varies between 1.6-13.0%, amount of thin particle (0.25-0.05 mm) sand varies between 40.5-56.0%, amount of dust with thick (0.05-0.01mm) particles varies between 17.5-20.6% and amount of dust with medium (0.01-0.005mm) particles varies between 6.0-25.2%, amount of thin particle dust (0.005-0.001 mm) varies between 1.9-9,1%, amount of muddy (part with diameter of <0.001) varies between 1.8-6.7% respectively (See table 5). It shows that this soil has mechanic compound of light clay.

Table 5. Mechanic composition of soil (mm)

Section#	Sample	Mechanic particles, % particle size, mm						
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.005	0.005-0.001	<0.001	<0.01
XPr-1	0-20	1.6	56.0	20.6	6.0	9.1	6.7	21.8
	25- 35	13.0	40.5	17.5	25.2	1.9	1.8	28.9

This soil has preserved its abundant natural fertility.

Soil affected by human factors. Most soil cover along the trace is strongly affected by human activity and the morphological state and fertility have been changed greatly. Most soil along with the trace is degraded either under road asphalt cover or fully covered with a cement layer in some areas, and lost its natural fertility and has been drastically changed due to pavements, deteriorated and became naked (See figure 13-14).

Figure 13. Soil nearby proposed flyover project is naked and compacted

Figure 14. soil nearby proposed flyover project is covered with asphalt road or concrete

Because of intensive human activity soil properties in these areas have been seriously changed from its natural status.

Figure 15. Impact of human factors

Figure 16. Various operational impact

Figure 17. Soil is relatively in good condition within fenced area of households

Figures 15 and 16 show the current changes of soil cover to due human activity.

Minor impacts are caused to soil in some of areas under households and small buildings along Flyover project trace (See figure 17).

Native topsoil will not be affected much by construction of Flyover project as soil in this area already has been deteriorated, naked and polluted due to vehicles, machinery and pedestrians.

However, soil in fenced areas, where households live is in a relatively good condition. Sampling of soil presenting compacted black meadowy soil was taken in the fenced area of Tsuurden LLC located to the south between railroad and Dundgol River. The sampling place was chosen here, because Flyover Bridge will pass through this place.

Soil sampling No. 2 carried out at coordinates of 47°54'25.32"N, 106°52'15.06"E at absolute height of h=1,280 m.

Figure 18. Some landscape view along planned Flyover

Figure 19. Soil layers

Results of soil morphology are shown in below.

Some soil of this area (75% of the area) is grassless and naked. Gravel and fractured rocks (40% of respective area) lie on grassless surface. The weed occupies the majority among the gramineceous and it has 1.8-6.7% of specific cover and 15-28 cm of height.

A. 0-25 cm: Humus accumulation layer. It is black colored soil with slight moisture content, vegetation roots, mechanic composition of light clay particle, cell structure, sparse consistency and fractured rocks and gravel. There is some gravel in the lower part of this layer, the transition is clear and boundary is even.

B. 25-40 cm: Carbonate accumulation layer. The layer is light brown and has rare vegetation roots, mechanic composition of light clay articles, cell structure, dense consistency and plenty of fractured rocks and gravel. The transition is clear and boundary is even.

BC. 40-50 cm of transition layer between carbonate accumulation layer and soil generation rocks. It has light white flecks on light brown background. It is dry and has mechanic composition of light clay particle, cell structure, dense consistency and no vegetation root. Gravel increases from depth of 45 cm.

Results of analysis, which determined the fertility characteristics of this soil show the following: A layer of humus accumulation of this soil contains 1.6% of humus, 1.22mg/100 g of nitrate, 0.21% of carbonate, 18.2 mg-eq/100 gr of calcium exchange, 5.3 mg-eq/100 gr of magnum exchange, 1.0mg/100g of mobile phosphorus, 14.0mg/100 g of potassium and alkalinity of reaction atmosphere of (pH=8.6), electrical conductivity of 0.170ds/m and low salt accumulation of 0.05%.

B layer of this soil contains 1.7% of humus, 0.03mg/100g of nitrate, 0.16% of carbonate, 16.8 mg-eq/100 gr of calcium exchange, 2.4 mg-eq/100 g of magnum exchange, 1.3mg/100 g of mobile phosphorus, 8 mg/100 g of potassium and has alkalinity of reaction atmosphere of (ph= 8.5), electrical conductivity of 0.180ds/m and 0.06% of salt (Please see table 6).

Table 6 Soil fertility characteristics

Section number	Depth of taken sample	pH	Salt, %	Electrical conductivity, ds/m	CO_2,%	Exchange basis, mg-eq/100 gr		humus, %	NO_3, mg/100 g	Fertility elements mg/100g	
						Ca	Mg			P_2O_5	K_2O
XPr-2	0-20	8.6	0.06	0.180	0.21	18.2	5.3	1.6	1.22	1.0	14.0

Mechanic composition of soil shows the following: According to the soil sample, amount of sands with thick and medium (1-0.25mm) particles varies between 1.6-13.0%, amount of soil with thin (0.25-0.05 mm) particles varies between 40.5-56.0%, amount of dust with thick particles (0.05-0.01mm) varies between 17.5-20.6%, amount of dust with medium (0.01-0.005 mm) particles varies between 6.0-25.2%, amount of dust with thin particles(0.005-0.001mm) varies between 1.9-9,1%, amount of muddy parts (<0.001 mm of diameter) varies between 1.8-6.% (Please see Table 7). This shows that this soil has sandy mechanic composition.

Table 7.Soil mechanic composition

Section №	Sample	Mechanic particles, % particle size, mm						
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.005	0.005-0.001	<0.001	<0.01
XPr-2	0-20	2.4	50.7	31.2	3.1	7.5	5.4	16.0

However A layer of fertile humus of the land is preserved; the fertility has degraded a lot due to erosion under pedestrian walk in the fence and exfoliation of vegetation cover and grinding down.

3.1.3 Land Use

Basic land use status of Mongolia as of 2011 is compared with previous years in table 8 according to main classification of Unified Land Fund.

Table 8.Land use status according to the main classifications of Unified Land Fund of Mongolia, in thousand hectares

Main land use classification	**2009**	**2010**	**2011**
total territory	156 411.6	156 411.6	156 411.6
Agricultural land	115 824.7	115 525.8	115.490.8
City, village and other settlement area	543.8	620.6	667.3
land under road, pipeline and network	383.6	407.1	429.2
Land with forest resources	14 315.4	14 297.9	14 260.0
Land with water resources	665.5	682.8	686.8
Land for special purposes	24 917.0	24 877.4	24 877.4

As land use status shows, there is a trend of increasing the portion of land under the road, pipeline and networks. For example, road, pipeline and network land was 383.6 thousand hectares in 2009, in 2010 it increased by 6, 1% and in 2011 it increased by 11.9%.

There is only one landuse classification in the project area, which is -industrial zone. This area belongs to industrial district of Ulaanbaatar city, as many of industrial plants and small and medium enterprises are concentrated in the western side of the city. Industrial enterprises compresses about 80% of total territory of 4th Khoroo of Bayangol and remaining portion, which is located to north west corner of this khoroo is occupied with some apartments. But industrial sites are continued next to apartment buildings.

Subsidiary organizations of Ulaanbaatar Railway such as Passenger's wagon depot of Ulaanbaatar railway, Service division No.2, Fire station and auto service department as well as Gasoline stations of Badral LCC and Just LLC are located to the north of the project area along two sides of Narny Road of the 4th khoroo.

The private companies like Suuri LLC, Wagner Asia Equipment LLC, Global Shariin Gol LLC, Magma Od LLC, Nature Urguu LLC, Mongol Tamkhi LLC, Mongol Tulkhuur LLC and Mon Karotage LLC, which make business on production and service (construction factory, warehouse of flammables and lubricants, maintenance and service of heavy duty machinery, storage and trade) are located in Western Teeverchdiin street to the north of Dund river along the access road.

Moreover, two persons D. Erdenebayar and D.Erdenebaatar are operating their private business in the 0.3 hectares of territory to the east of Ajilchin intersection, southern part of Western Teeverchdiin Road.

Mr D.Erdenebaatar built a public house in his owned area without permission of land authority and is renting it to 22 households of 72 people, which permanently live in this house. In addition to this, three households, which live in gers, are settled on the Shore of Dundgol River without any permission.

Fuel tank storage of Khuvsgul Trade LLC is located in the eastern part of the proposed flyover bridge. Factory of Gobi LLC is located to the south of Dundgol River, which is south of the project implementation area and over 30 people of 6 households are living next to this factory.

3.1.4 Climate

Ulaanbaatar has a short and warm summer and a long, dry, cold winter as the city is comparably located on the elevation. Most months of the year have an average temperature below zero. The city has centralized heating and energy system that provides an energy supply to its clients during this time.

The project implementation area covers the west side of Central Railway Station of Ulaanbaatar Railway and the territory of Bayangol (Industrial areas) and Khan-Uul districts.

Dund River separates the 2 districts mentioned herein above and it is dried up during the most seasons of the year.

Precipitation According to the data of the last 14 years (From 1998 to 2011), annual average precipitation is 247.8 mm/year, precipitation in May-September is comparably high, and the average maximum precipitation falls in July which is 58, 6 mm/month.

The month with the most precipitation within 14 years was August 2000 with 137.7 mm/month.

The day with the most precipitation was recorded on July 2009 with 44.8 mm/day which is 40 mm/day more than average precipitation for the last 14 years and there is the second month with most precipitation was June 2000 with 42, 8 mm/day of precipitation.

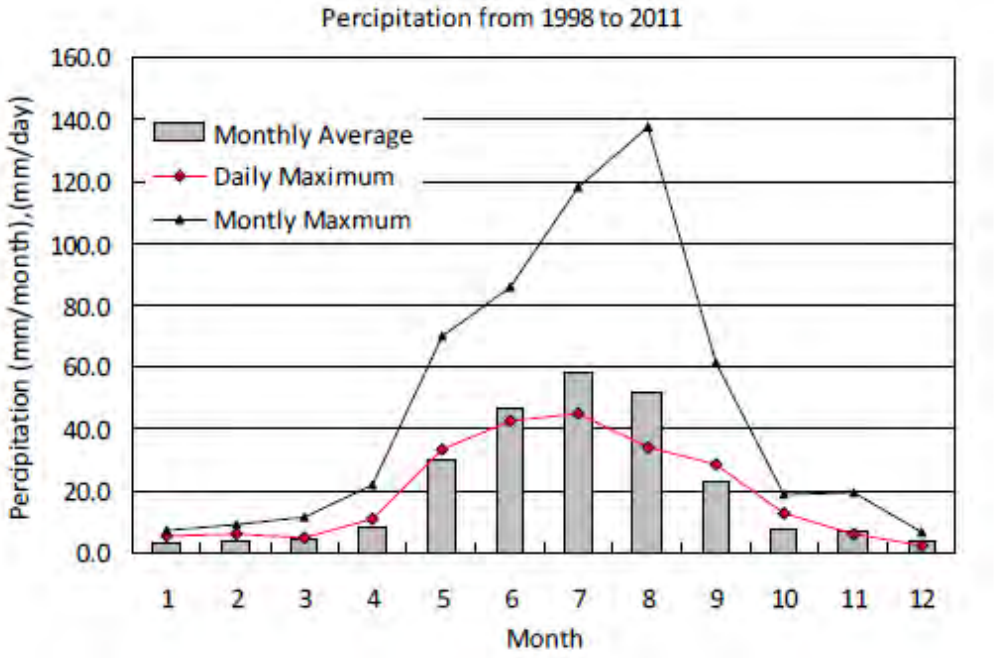


Figure 20 Precipitation dynamics of Ulaanbaatar city over 13 years.

Snow cover Average number of annual days with snow cover is 68 days and the thickest snow cover reaches 15 cm. The first snow falls in September and a permanent snow cover is generated at the end of October or beginning of November. Snow cover becomes permanent in mid November and the snow disappears in mid to late May. Number of days with snow is 6-8 days per month.

During the construction peak season between May-September, the number of average days with precipitation ranges 10-16 days per month.

Solar radiation The monthly total average of solar radiation of Ulaanbaatar varies between 180 – 420 w/m^2 and the amount varies depending on forms of landscape and specifics of forest. For example, forest in the back of mountainside of Shiljree Mountain (Terelj, Protected area) has the minimum solar radiation and Ulaanbaatar Station has a comparably high solar radiation according to the measurements (Figure 21).

Ulaanbaatar has many bright days in May and a naturally high amount of solar radiation and December has the minimum amount of total solar radiation due to a short term of sunshine.

In terms of the project implementation area, it is located under same terms and conditions as Ulaanbaatar station regarding landscape specifics. Therefore, allocation of solar radiation is same.

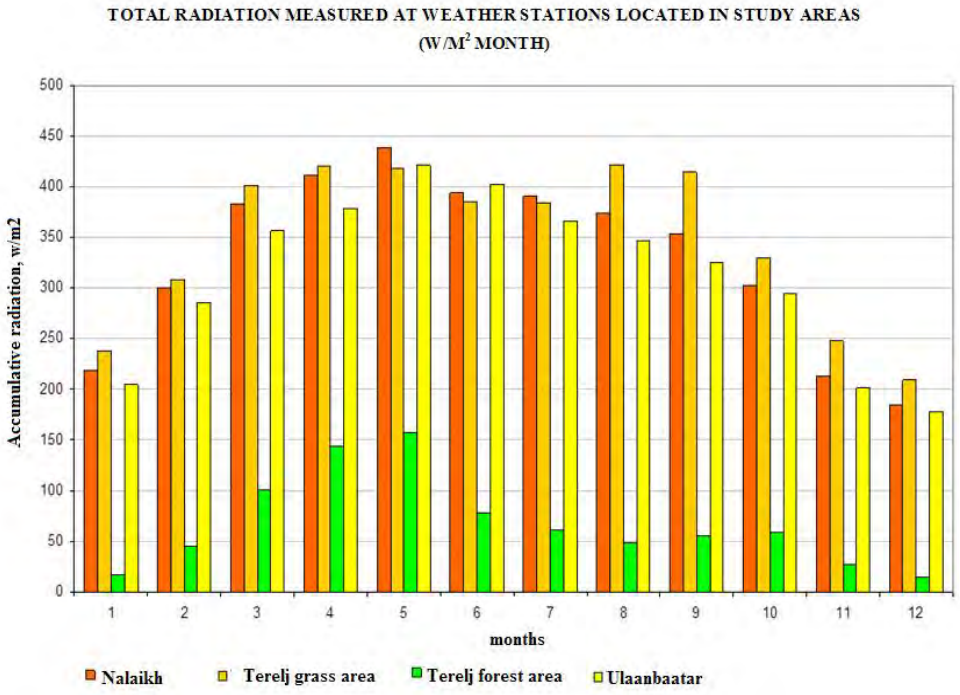


Figure 21 Monthly allocation of total solar radiation

(Source: Ya. Jambaljav, Possibility of using outline method to study of multitemporal permafrost in mountainous area, 2009)

Evaporation. Evaporation allocation is shown according to observation forecast of Metrological Station of Ulaanbaatar.

Table 9 Evaporation allocation

IV	V	VI	VII	VIII	IX	X	IV-X	XI-III	Year
6.9	11.8	15.2	14.0	12.5	8.0	4.4	73.2	51	78.2

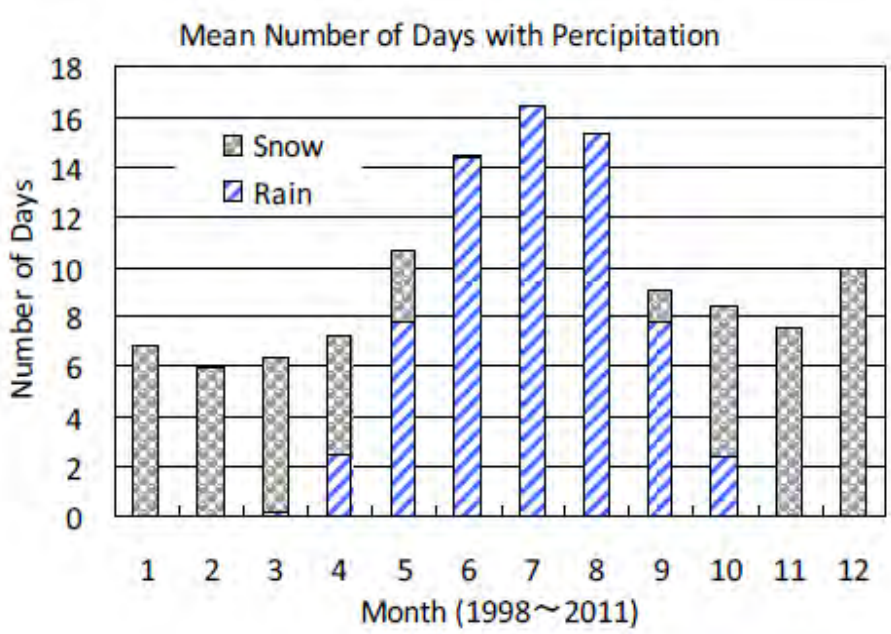


Figure 22 Number of days with precipitation

Winter season. In terms of seasonal duration, this region belongs to Khan Khentii mountainous region of the country.

The winter in Ulaanbaatar starts in the last week of October and continues for 163 days. The main characteristics of winter is that the temperature starts from -5 degrees and reaches down to -49 degrees in the river valleys (-45 degrees in the mountain), the snow thickness is 10-20 cm and snow is fluffy due to lack of wind and it has lots of hoar-frost and high relative moisture (more than 70%). Specifics of winter are that it is very cold in the river valleys and it is very harsh with strong wind.

Spring season. It starts in April and ends around June 1-13. Spring is shorter in the mountains Khan Khentii and Bogd Khan and lasts for 57 – 69 days.

The specifics of spring in the project area are that it is dry (in spite of this, it is more humid than in other areas, humidity is 45-50%). However the spring is windy, the daily average wind speed reaches 1-3 m/sec in forest area, 3-4 m/sec in the river valleys and maximum wind speed reaches 20-25 m/sec frequently.

However, the temperature amplitude is high. However, compared to other areas it has lower variation, its daily average is 12-14 of Celsius and the maximum amplitude reaches 35-37 degrees of Celsius.

Summer season. Summer starts in the first week of June, lasts for 90 days and ends within the first week of September in Ulaanbaatar region.

The main characteristics of summer are that it has a few precipitations; it is humid, cool, and cloudy and has low wind.

Autumn season. It is relatively short and lasts 51 days from the end of summer and beginning of winter. The main specifics of autumn are the wind increases and suddenly cools that reach -5 degrees and gets cold.

The first snow falls earliest at the end of August and stays there in high mountainous area.

Seasonal climate variations. The riverhead and Basin of Tuul River entirely belongs to the Strictly Protected Area of Khan Khentii and Bogd Khan Mountains and has a harsh continental cool climate. The main climate conditions are described by high air temperature amplitude of days, months and year, low air humidity, uneven allocation of precipitation, a harsh continental climate with a hot summer and cold winter and etc.

This creates specific climate conditions e.g. a long winter with not much snow, short summer with hot days and very cool nights, a constant lack of air moisture and precipitation.

3.1.5 Geology, Geomorphology and Permafrost

The geological composition of the Ulaanbaatar region consists from the Paleozoic era carbon, sandstone and slate of the Cretaceous age of the Mesozoic era and granite of the Jurassic age as well as of the Mesozoic era is mostly spread in the southern mountainous area.

Sediments consist from the deluvian layer of quaternary that is layered sediments mostly generated from sandstone and slate of the Mesozoic era and sediments of the alluvial layered seams are spread in the central areas. Geological structure of Ulaanbaatar is shown in Figure 23.

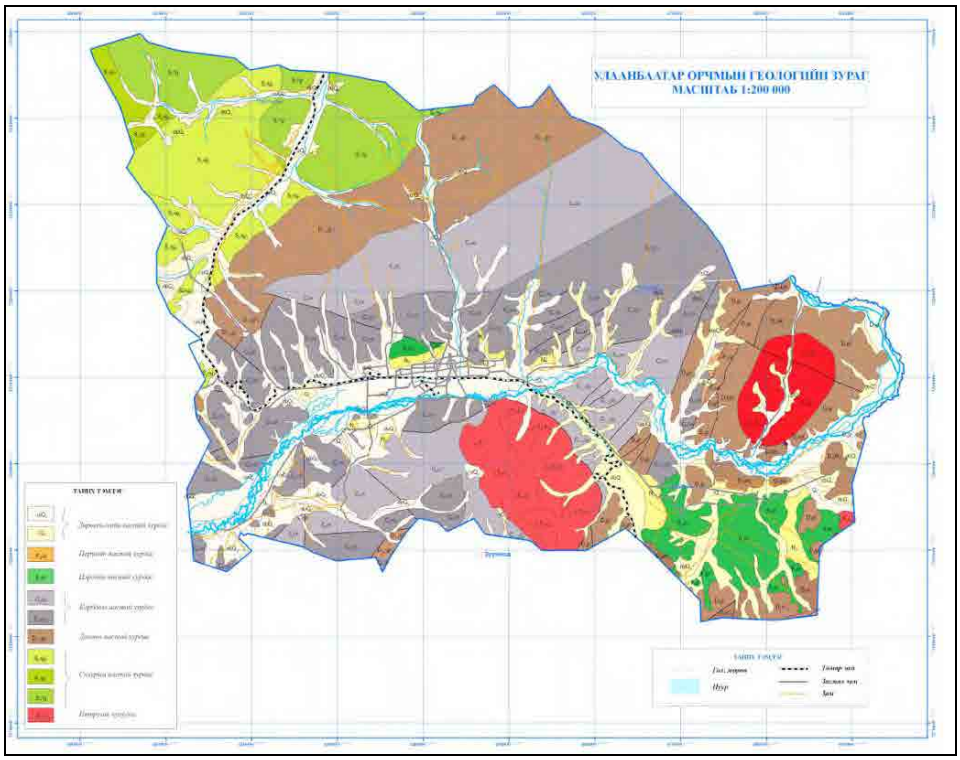


Figure 23. View of geological structure of Ulaanbaatar city

Dundgol River is an affluent of Tuul River and flows through the project area. Dundgol River is located on a mostly equally wide valley of the first terrace of Tuul River. However Dundgol River valley is disturbed with many artificial dams and trenches due to various engineering activities.

In terms of elevation, it is located within range of 1,277. 5 – 1,281.2 m above sea level. In other words, 3, 7 m of difference in the height can be observed, this may have been created by the engineering operations mentioned herein above.

According to geotechnical engineering survey, the project area consists from 5 main sediments; topsoil with dumped soil, gravel with various particles, muddy gravel with sand, gravel with sand and clay, muddy sand with gravel of upper-modern quaternary alluvian-deluvian age. Its thickness was continued while drilling reached at the 20th m in deep.

According to the existing literatures, thickness of this sediment is 50 m and more.

Layout of cross-sections describing the geological composition of the project implementation area is shown in Figures 24 and 25.

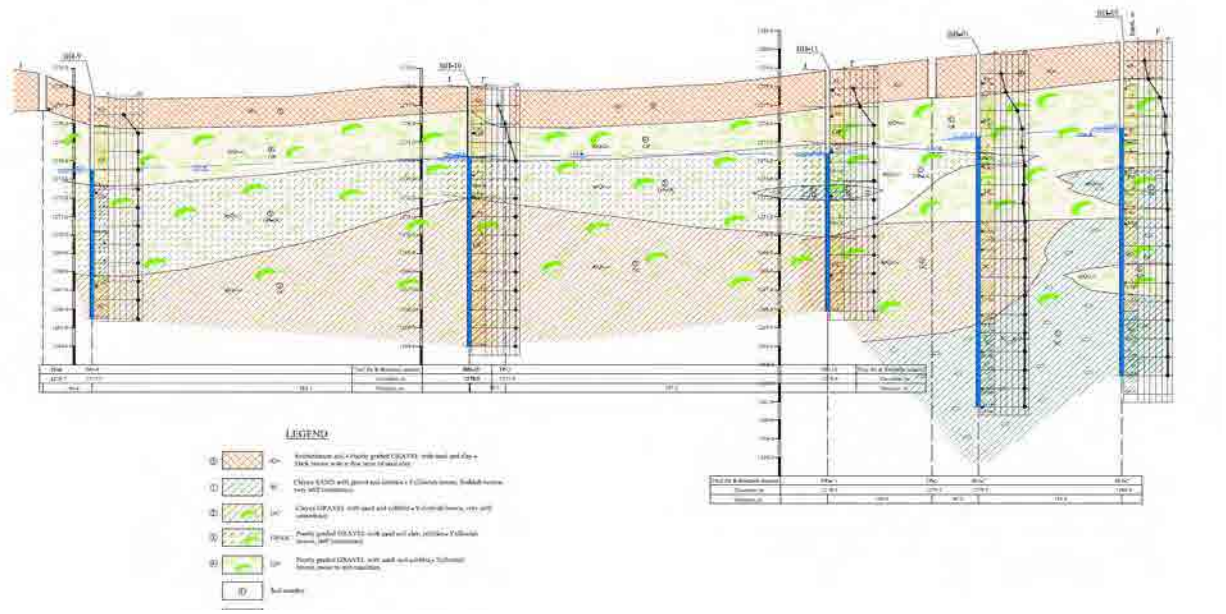


Figure 24. Geological Cross-section of Project Site (East-West)

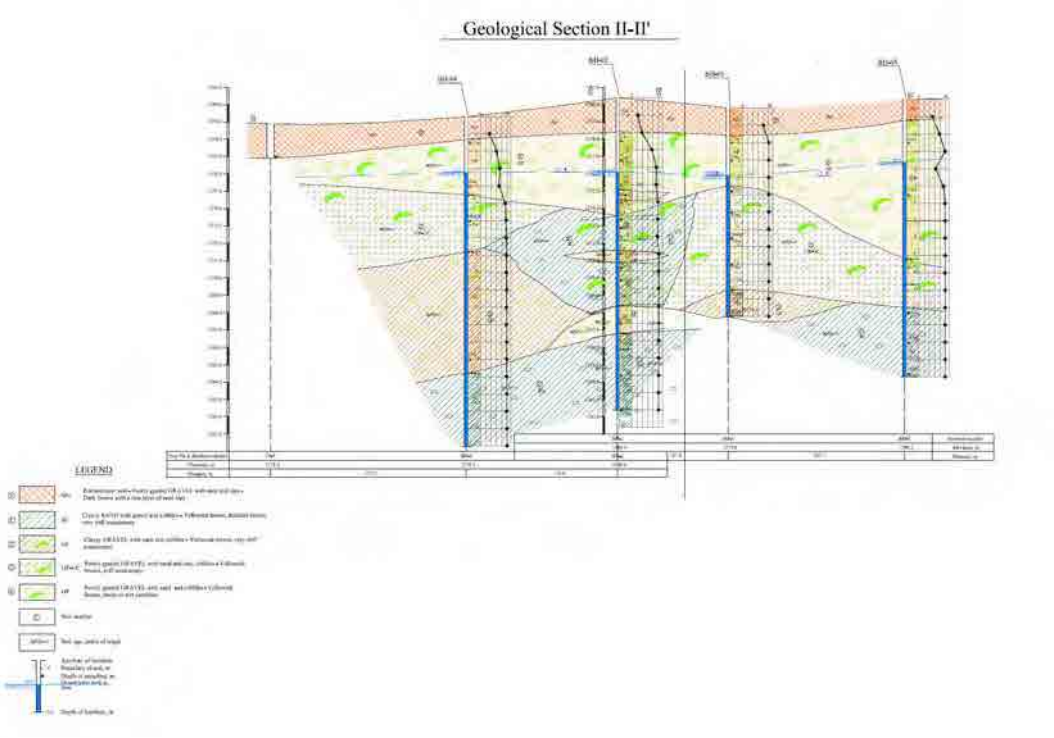


Figure 25. Geological Cross-section of Project Site (North-South)

Permafrost, frosting and defrosting of ground soil

According to a geological map of Mongolia with scale 1:1500 000 and the multitemporal permafrost map of Terelj, Nalaikh and Ulaanbaatar with scale 1:100 000, the territory of Ulaanbaatar region belongs to a region with an uneven distribution of permafrost. However, there is no permafrost in the territory of Ajilchn flyover project area.

Occasional permafrost can be generated in humid soil with a high content of clay in the valleys of some rivers relevant to the specifics of the geographical location and climate of Mongolia. To note, occasional permafrost may appear in the back side of some tall buildings with low direct radiation of sun in settlement areas.

However, permafrost has not been identified in the drilled holes within the project area.

According to seasonal frosting and defrosting map of ground soil of Ulaanbaatar with scale 1:25 000, the Ajilchin Flyover project area located in the A and B zones of seasonal frosting and defrosting of ground soil (Figure 26).

The zone A covers terrace of Dundgol River at the end of Tuul and Selbe rivers and has a gravel soil that consists from sand and sand rock of alluvial origins.

Average annual temperature of the ground soil is 2, 4 – 2, 5 degrees of Celsius, fluctuation amplitude of on ground temperature is 22 – 24 degrees of Celsius, frosting depth of ground soil is 2, 6 – 3, 3 m in a regular natural condition.

The zone B covers the first terrace of Tuul River and consists from sand, sandrock and gravel of alluvial origin.

Average annual temperature of ground soil is 2, 3 – 2, 5 degrees of Celsius, fluctuation amplitude of on ground temperature ranges in 22-24 degrees of Celsius, frosting depth of ground soil is 3, 3-3, 5 m in a regular natural condition.

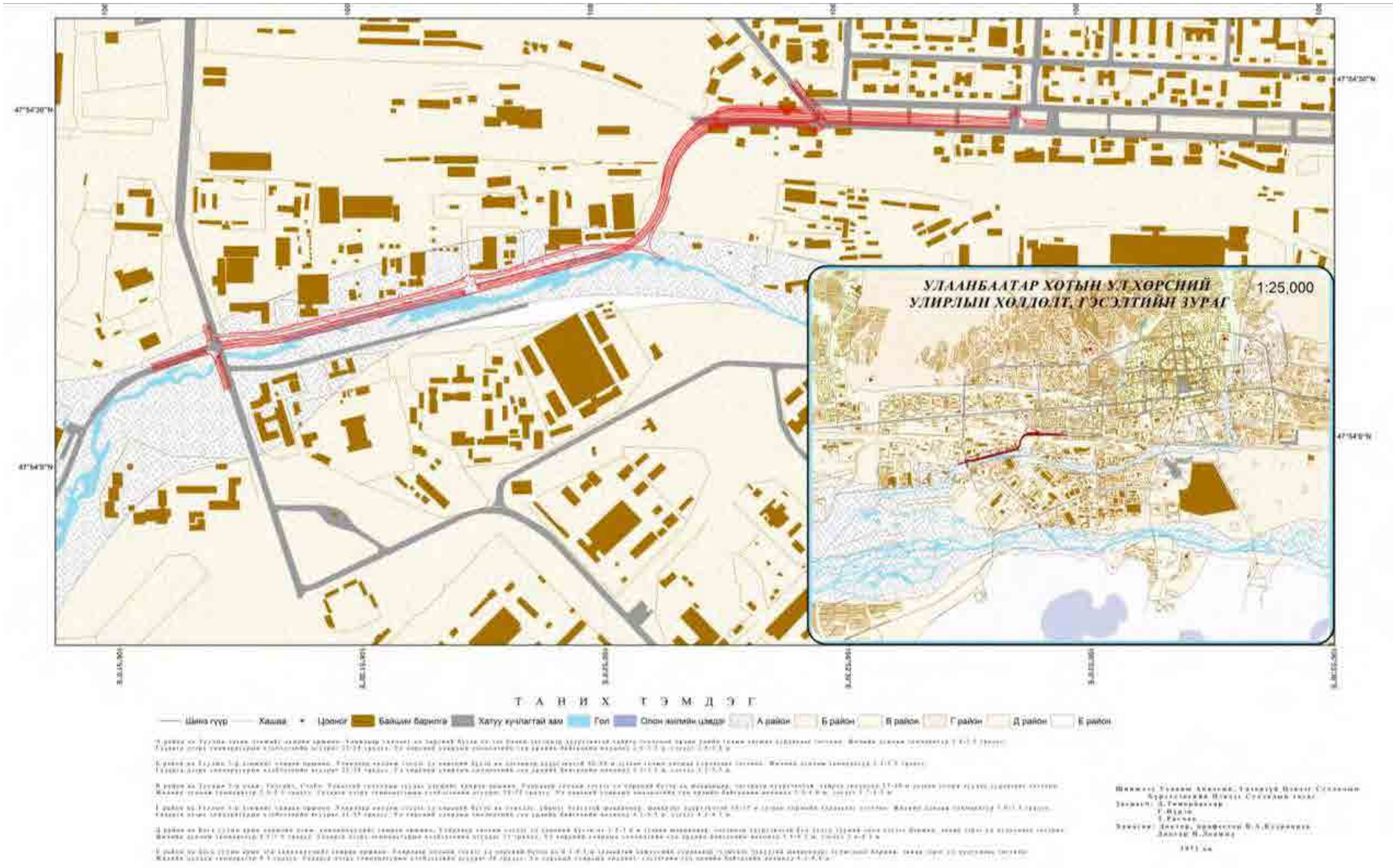
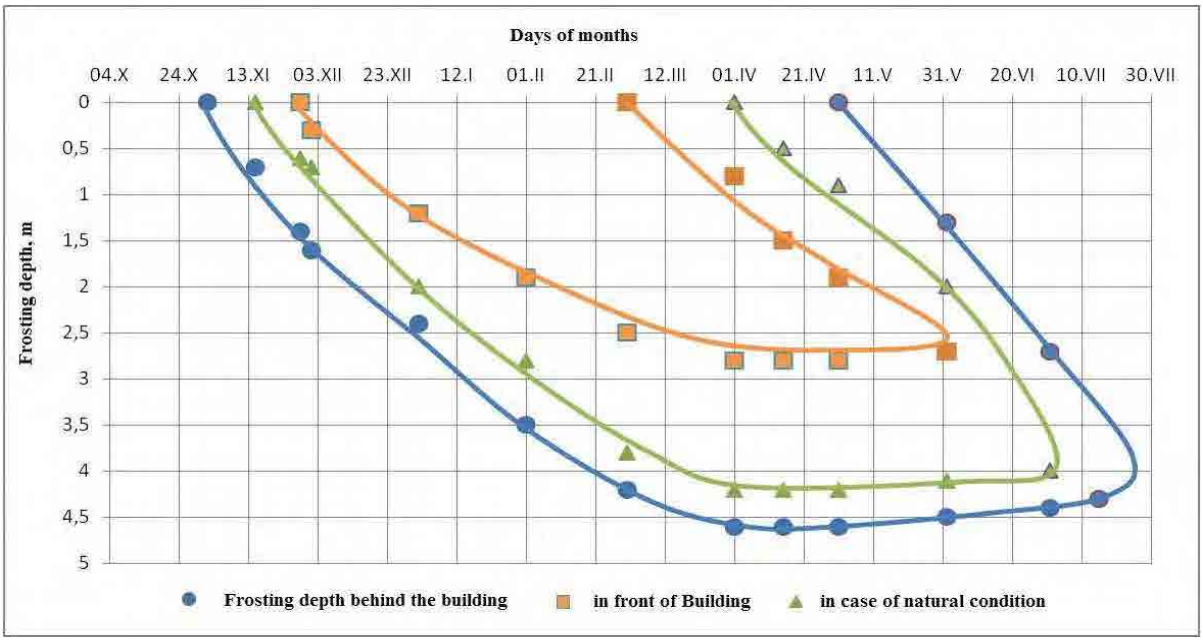


Figure 26. Frosting and Thawing Map of Ground Soil of Ajilchin Flyover Project Area.

Seasonal frosting of ground soil starts within the Ulaanbaatar territory in the beginning of November and the ground soil is completely frozen in March. Defrosting starts in the beginning of April and finishes in July. Duration of earth work, depth of building and construction foundation can be determined based on determination of dynamic progress of seasonal frosting and defrosting as well as the frosting depth. It is appropriate to carry out earth work between May-November in Ulaanbaatar. But the depth of ground soil seasonal frosting within the project implementation area varies between 2.6-3.5 m during regular natural conditions.

However dynamic process of seasonal frosting and defrosting of ground soil as well as frosting depth can be changed drastically depending on the conditions induced due to various engineering activities in the surface and underground. Such conditions can be created during project construction and after construction Flyover bridge.

To illustrate changes in dynamic process of frosting and defrosting and depth of frozen due to a construction, a case study results with 2-storey building of Geographic Institute of Academy of Sciences are described here shortly. This building is located in the Selbe River valley, which is 4 kilometers away to the east of project site. The frosting process and depth in front of as well as behind of this building found to be quite different Figure 27 (D.Tumurbaatar, 2004).



Months

Figure 27. Dynamic process of ground soil frosting in various natural and unnatural conditions

Change in frosting depth is mostly due to direct sun light that reaches the soil. If there is a barrier, either natural or manmade that interfere sunlight to soil, then difference in the frosting depth can be reached up to 2 meters in depth.

The other factors that contribute to the frosting depth, in addition to the sun lights, are mechanical composition of soil, clay content and particle size.

Deformation of buildings resulted from unevenly lifted foundation of building due to frosting bulge of ground soil is quite common in Ulaanbaatar.

3.1.6 Surface water reserve

The rivers Tuul, Selbe, Belkhi, Uliastai, Gachuurt, Khul, Uvur gorkhi, Tolgoit and Turgen run in north, west, east and southern parts of the capital.

The biggest surface water network among these rivers is the Tuul river whose open flow regime became more transformable due to specific natural factors that have occurred in terms of time and space.

The Selbe river is one of affluent of Tuul river. It disgorges from Ikh Bayan(2033m) a small mountain in the south western mountainside of Baga Khentiii and breach of Tsokhiot mountain, flows between short mountains through forest valleys and flows in to Tuul river around Ulaanbaatar (Power station#4).

The river has 2 major mouths of the rivers Khandgait and Belkh at headwater and the downstream of the river. The dry swashes take water from mountains on the both sides and refresh the Selbe River during abundant rainfall.

The length of Selbe River is 36, 6 km, water accumulation area is 314 square kilometers, and average height of basin is 1621 m (See table 10).

The average width of the river valley is 100-150 m, 400-500 m in some areas, the height of the side slope is 4-5m and has meadow vegetation.

The river watercourse has a gradual change, aggradations and glide. In some areas there are minor islands. The river watercourse is 20-25 m in wide banks, the average depth of water is 0, 1-0, 5 m, height of the river bank is 0, 4-0, 6 m.

Table 10. Average indicators of flow of Selbe river per many years

Main beam	Water accumulation area, km^2	Average multiyear discharge, m^3/sec	Flow module, l/sec	Flow volume, X $10^6 m^3$
Selbe Ulaanbaatar	314	0.80	2.60	88.1

Main water nourishment of the Selbe River is summer and autumn rainfall and the water level of the river varies greatly during these seasons. However the spring snow melting flood is observed during the end of April and beginning of May, its duration and size are short.

But the amount of spring flood takes 10-12% of the total annual flow depending on precipitation volume of previous year and precipitation during the cold season.

Precipitation that falls during the cold season (From October to April) plays the main role in the composition of flow of the river and the lake's spring flood. The summer drought starts a while after the spring flood and continues from mid July to mid September.

The river freezes up to its bottom and has no flow in the winter from mid November to late March. In terms of classification of river and lake regime, the Selbe River belongs to river with spring flood and rainfall flood of warm season.

Permanent regime survey of the Selbe River was initiated effectively from 1985 by establishing a water study patrol in the direction of Dambadarjaa. This patrol was closed in 1991 due to deficiency of human power and equipment and a new permanent water study patrol was established in 1994 nearby the Sanzai sanatorium and this patrol is implementing the main program of water study network and measuring and observing regime elements e.g. water level, discharge, water temperature, ice phenomenon and its thickness (Table 11).

Table 11. Morphological parameters of Selbe River water accumulation area

#	River- patrol	Water accumulation area, square kilometer	Length of river, km	Average height, m	Watercourse dip %	Forest area, %
1	Selbe-Sanzai	34.02	8.3	1620	21.3	63.7
2	Selbe-Dambadarjaa	188	26.2	1510	12.4	54.6

However relevant results of hydrological study noted on the permanent patrol show that the average amount of surface flow passing through the Tuul river over many years is 24,0-800,0 m^3/sec, it drastically increases during flash floods.

Annual flow allocation of the Selbe river is not even. Spring flood is observed in May in a year with abundant snow, the flow decreases starting from June and the maximum flow is observed starting from July when rainfall is abundant during July-September period (Table 12).

Table 12. Observed annual monthly average flow of Selbe River

#	River-patrol	V	VI	VII	VIII	IX	X	Annual
1	Selbe-Sanzai	0.53	0.38	0.21	068	0.8	0.8	0.7
2	Selbe-Dambadarjaa	1.14	1.08	0.98	0.76	0.70	0.33	0.48

Due to lack of observation materials of the Selbe River, annual flow distribution is calculated by a similar method used for rivers located in the western mountainside of Khentii Mountains and it is shown in Table 13.

Table 13. Annual flow distribution

Month / Water abundance	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III
Abundant	6.0	14.6	10.3	21.6	25.0	10.7	7.7	3.6	0.0	0.0	0.0	0.5
Regular	4.2	14	11	25.6	17.8	14.8	9.0	2.6	0.4	0.0	0.0	0.6
Diminished	6.0	10.8	9.8	21.6	25.5	14.6	7.8	3.2	0.0	0.0	0.0	0.6

The diminished flow of the Selbe River is divided into flows of cold and warm seasons.

The diminished flow of the cold season starts from the river frosting and continues until the defrosting and flow size is relatively small compared to summer due to a lack of ground water nourishment during the winter season.

The diminished flow of the warm season starts from the end of the spring flood and continues to the beginning of summer rainfall, from summer rainfall flood to the diminished period of the winter.

The monthly amount of the minimum flow during warm season is 2-3.5 l/sec $km^{2,}$ the monthly amount of the minimum flow during the cold season varies between 0.15- 0.25 l/sec km^2

Figure 28. Location of chosen beams

Observation and hydrological measurements required for assessment of regime and reserve water quality of the Selbe River are done at 3 points chosen along with Selbe River on July 9, 2012.

Measurement of depth, speed and discharge of river is done according to ''Instruction for water, weather and environment analysis Sh3.III:00'' issued by National Agency for Metrology, Hydrology and Environment Monitoring.

The maximum depth of Selbe river is 45 cm at beam W1, the maximum speed is 0.26 m/sec at beam W2 (Table 14).

Table 14. Discharge amount of Selbe River as of July 9, 2012

1	Beam	W-I	W-II	W-III
2	Discharge, m^3/sec	1.1	1.8	0.97
3	Coordinates of beam locations	$47^0$54'20.58" $106^0$52 I 11.44 II	$47^0$54 I 16.13 II $106^0$51 I 42.26 II	$47^0$54 I 17.66 II $106^0$54 I 27.54 II

Estimation of solid flow of the Selbe River is calculated by the following formula in relation to average muddiness of the water (ρ=100gr/m^3).

$R_0=\rho_0*Q_0/1000$,

R_0 - Drift sediment discharge

ρ_0- Amount of muddiness, 100 gr/m^3

Q_0- Flow norm, 0.8m^3/sec

Drift discharge is R_0=0.086 kg/sec.

Amount of bed sediment is taken equal to 20% of drift sediment and total sediments are equal to R_0^{total} =0.103kg/sec.

Table 15. Mechanic composition of sediment in bottom of the Selbe River

Sampling Location	Percentage of fracture, % per various diameters of fracture					Diameter of fracture, mm	
	200-100	100-50	50-20	20-10	<10	D max	D min
upstream in 150 m from Dundgol River Railroad Bridge	-	12.0	12.8	37.6	37.6	100	21

3.1.7 Underground water resources

As study results show, amount of underground nourishment within the study area is estimated at 9.5-45.6%, amount of water from melted snow varies between 0.2-25.2percent. Amount of rainfall water is 29.2-90.3%, the minimum rainfall was 29, 2% in 1972, the maximum reached 90, 3% in 1994.

The amount of rainfall had an increasing tendency in 1980's and 1990s.

During the years with an abundant rainfall, the amount of ground water flow in the river nourishment was drastically decreased and river has a major tendency to nourish the ground water. In the years with less rainfall, the main nourishment of river is from the ground water.

A natural tendency of nourishment of the Tuul river is mainly from the ground water and is clearly shown on Figures 29 and 30.

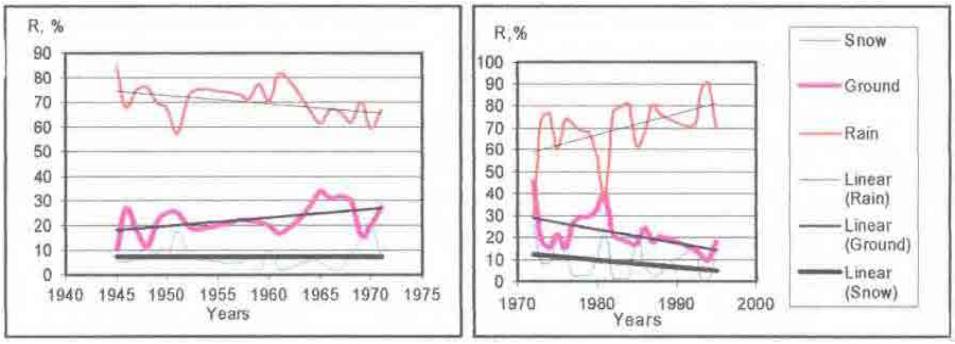


Figure 29. Change and tendency of nourishment of Tuul River flow

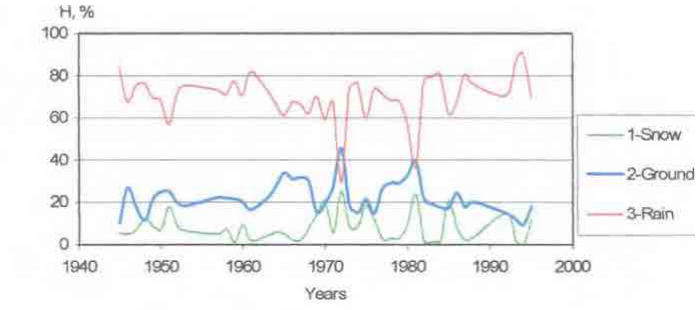


Figure 30. Amount and change of nourishment of Tuul River

3.2 Ecological Resources

3.2.1 Biodiversity Status

The Ulaanbaatar region has a numerous biotypes of nature e.g. water, marsh, forest, forest-steppe, steppe. Within the urban territory, its ecological micro environment e.g. ger districts, tall buildings, factories, summer camps, waste disposal areas create the favorable condition for many birds to come and acclimatize.

Steppe stretches along the valleys of the rivers Tuul, Selbe, Uliastai and Dund that flow through the city.

In addition, water reservoirs (frost-free) originating from power stations, retreatment facilities and water pond (freezing) established in river out gush, sand and gravel pits located to the south west of the city are creating the suitable environment for migratory birds to not only gather, but to stay over summer, nest and lay as well as creating possibilities for other birds to have drinking water throughout four seasons of the year.

It was observed that there are 30 species of lascivious mammals and 205 species of birds of 14 groups, 40 folks and 110 types.

66 species out of above species nest and lay, 21 species hibernate here migrating from abroad and these species create the main core of city birds.

138 species of total birds are migratory and 66 species are settled birds and settled birds occupy 39, 4% of permanent birds living in the center of city.

The western area of the railway station involved in our surveillance is not far from Bogd Mountain.

Small spring Dundgol with bushes and tall grasses flow in the middle of it. The tall buildings, vegetable warehouses, small processing factories for wheat and flour, railway, auto and dirt roads, planted trees and garden located in some areas create the possibility for many species of birds to nest.

The following mammals were identified in the project area (Figure 31):

- *Microtus gregalis* - Narrow headed vole,
- *Meriones unduiculatus* - Mongolian gerbil,
- *Ochotona dauurica* - Daurian Pika,
- *Lepus tolai* - Tolai hare

The number of these animals isn't many; these animals live along with river dams, bushes and shelters of bushes and belong to range of prey of the predatory birds living nearby the river.

Not many birds gather near the railway and the following settled birds constantly live nearby the vegetable warehouse; *Columba rupestris, Columba livia, Passer montanus, Passer domesticus, Corvus coron, Corvus corone, Pica pica, Pyrrhocorax pyrrhocorax*.

The followings small birds e.g. *Parus major, Ficedula parva, Carpodacus erythrinus* and predatory birds e.g. *Buteo hemilasius, Milvus migrans, Falco tinnunculus* sometimes live in the area in front of the fence with aspens and bushes.

It has been long time since this area lost its natural look and an artificial environment had been created by human. Therefore no additional negative impacts will be caused to the fauna there once the Flyover Bridge and access roads will be constructed.

		
Lepus tolai	*Meriones unduiculatus*	(Daurian Pika) *Ochotona Dauurica*

Figure 31. Mammals living in the Dundgol River basin

The aspens, elms, bushes, brushwood naturally grown along with the Dund River, small islands and creeks with minor bulrushes, tall grasses, and stream and lentic water become the rare environment for birds of many species to nest, rest and find their food. The birds e.g. Turdus ruficollis, Lanius isabellina, Phoenicurus phoenicurus, Phoenicurus auroreus, Motacilla alba, Motacilla flava, Ficudula parva, Saxicola maura, Parus major,Parus cyanus, Passer montanus,Carpodacus erythrinus, Uragus sibiricus, Emberiza spodocephala and big birds e.g. Pica pica, Corvus corone, Corvus corax, Milvus migrans nest and lay in major aspens and brushwood along with Dund river and birds e.g. Buteo hemilasius, Circus aeruginosius, Accipiter nisus, Falco cherrug, Falco tinnunculus, Falco amurensis, Perdix dauurica, Vanellus vanellus, Charadrius dubius, Tringa glareola, Actitis hypoleucos, Columba rupestris, Columba livia, Streptopelia orientalis, Cuculus canorus, Athene noctua, Apus apus, Apus pacificus, Upupa epops, Dendrocopos major, Dendrocopos minor, Riparia riparia, Hirundo rustica, Delichon urbica,Eremophila alpestris, Anthus hodgsoni, Anthus spinoletus, Pica pica, Corvus dauurica, Pyrrhocorax pyrrhocorax, Phylloscopus trochiloides, Phylloscopus inornatusare seen when they look for food and eat during their migration.

During the winter the following birds enter this area: Bombycilla garrulus, Acanthis flavirostris, Pyrrhula pyrrhula, Prunella montanella.

The most birds living along with direction of the Flyover bridge construction area are mostly adapted to vehicle, train and human noise and they are no anymore scared of these noise.

		
Carpodacus erythrinus	Corvus dauurica	Ficedula parva
		
Hirundo rustica	Milvus migrans	Prunella fulvescens

Figure 32. Birds nearby overhead bridge crossing

Heavy duty trucks are still passing through western Teeverchdiin road located in the north of the Dund River. Therefore some of the birds that were living here have fled from this noise, but the remaining birds have adapted to it.

The birds e.g. *Columba livia*, *Columba rupestris*, *Corvus corax*, *Pyrrhocorax pyrrhocorax*, *Apus apus*and *Apus pacificus*, *Upupa epops*, *Motacilla alba* nest and lay on the buildings of companies Mongol Tamkhi LLC, Ilch Khangai LLC and Wagner Asia Equipment LLC and etc.

The list of birds living in the project implementation territory is included in Annex 3.

If the Western Teeverchdiin road is to be expanded and paved, the dust will be reduced and negative impacts to the fauna will be decreased.

The rare and hunting birds included in the Mongolian and international laws, regulations and convention annexes do not vested and live in the project implementation area for Flyover bridge and road.

It has been long time since this area lost its natural look and an artificial environment has been created by human. Therefore no additional negative impacts will be caused to the fauna there since the construction of a Flyover bridge.

But much attention shall be paid on environmental protection, reduction of dust and noise and labor safety must be followed during bridge and road construction.

Aquatic animals. The assessment on impact to river basin, its fishes and others animals is conducted to anticipate and reduce potential impacts from Ajilchin Flyover project.

Research surveillance and sampling had been carried out by the end of July and in the beginning of August. Three samplings were taken in upstream, middle and downstream of the Dundgol River. During this period the rainfall was abundant and an usual thin watercourse inside the river basin had lots of water. Water had sand and mud sediment color and in some areas it had a deep hole of approximately 80 cm.

The basin protected by river dam had lots of wastes and trashes from cement mixture and bushes and weeds are fully grown in some areas and a lot of drying up and evaporation are occurring, resulting in a very thin flow of the Dund river watercourse within the basin.

Besides the contaminated sand and mud of bed sediments, a lot of waste accumulated due to improper human activity (from surrounding factories and services) and dust contamination resulted from many vehicles passing through the river bank.

During the study, there were not many planktons observed but a few chafers and crabs e.g. Daphnia longispina (Lendig), Chydorus sphaericus, Cyclops sp and Euchlanis dilatata occurred rarely in lentic water near the river bank.

The following benthos animals were observed:

1. Gerris sp.
2. Culex sp.
3. Libellula sp.
4. The most common mollusk is a clam of Limnaea species.
5. A few thorn bugs and leeches are spread.

Some of the representatives of benthos animals are shown in Figure 33.

A. Coenagrion sp. B. Corexa sp; C. Limnaea peregra.

Figure 33. Some representatives of benthos animals

These benthos insects rarely live in a contaminated water stream and become an indicator that describes the nourishment supply of fishes and alevins of the Dundgol River as well as river water contamination and ecological disturbance.

3 following species of alevins inhabit in the Dundgol River.

1. Rhynchocypris lagowskii (Phoxinus lagowskii Dybowski)
2. Rhynchocypris czekanowskii (Phoxinus czekanowskii Dyb)
3. Barbatula toni – was the most common alevin that we met (Picture 34).

2 species of following Rhynchocypris groups of fishes become the main food for other fishes living in the crowd.

- Rhynchocypris czekanowskii. Body length reaches 7, 3-10, 0 cm and they inhabit usually in water stream, its main food are floating animals, insects and their larvae. This Rhynchocypris has no benefits for fish culture. Sometimes fishermen use it as badger fly.
- Rhynchocypris lagowskii. Body length reaches 17-20 cm. This fish inhabits relatively in cold water and has a bigger body than other rhynchocypris species. They eat various insect larvae of dry land and water for food. Also, they eat and destroy the spawn of fish culture and other fishes and have no benefits for fish culture. It becomes the prey of other fishes.
- Barbatula toni. It has a cosmopolitan distribution in all the rivers and lakes of Mongolia. It inhabits near the water bottom and becomes the prey of other fishes that live at the bottom. It is a fish of comparably cold water and eats mainly benthos organisms and populates in the first month of summer. The Dund River has lack plankton animals. Therefore, gulfweed and other common animals take main role in the food of immature alevins and adult alevins mostly eat the benthos organisms.

A. Rhynchocypris;

B. Barbatula toni;

Figure 34. fish species in Dundgol River

Planktons and benthos animals, fish species living in the Dund river show that 1) Only alevin inhabits in this river and other fishes of fish culture cannot live in the Dund river due to water quality and a lack of water volume and other degraded environmental factors. 2) Level of river watercourse flow is rather low and it is contaminated by pollution. Therefore, benthos

organisms representing the quality of water are missed in Dundgol River. 3) There have not been recorded any rare and endangered aquatic species.

Vegetation

In accordance with botanica-geographical classification, the Ajilchin Flyover project area nearby the Railway passenger's wagon depot in the territory of Bayangol district of Ulaanbaatar city belongs to transition zone of Mongolian-Daurian mountain steppe and steppe region of Mid-Khalkha.

The Ajilchin Flyover project area represents more the characteristics of Tuul river basin and meadow of the Dundgol River. The vegetation species of project area have been selectively collected during field work (Grubov.V.I, Determinant of vascular vegetation of Mongolia, Science, 1982) are presented as below:

Type of naked seeded plants:

Salicacaeae Lindl.

Salix microtachya Turcz.

Populus tremula L.

P.laurifolia

Ulmaceae Mirb.

Ulmus pumila L.

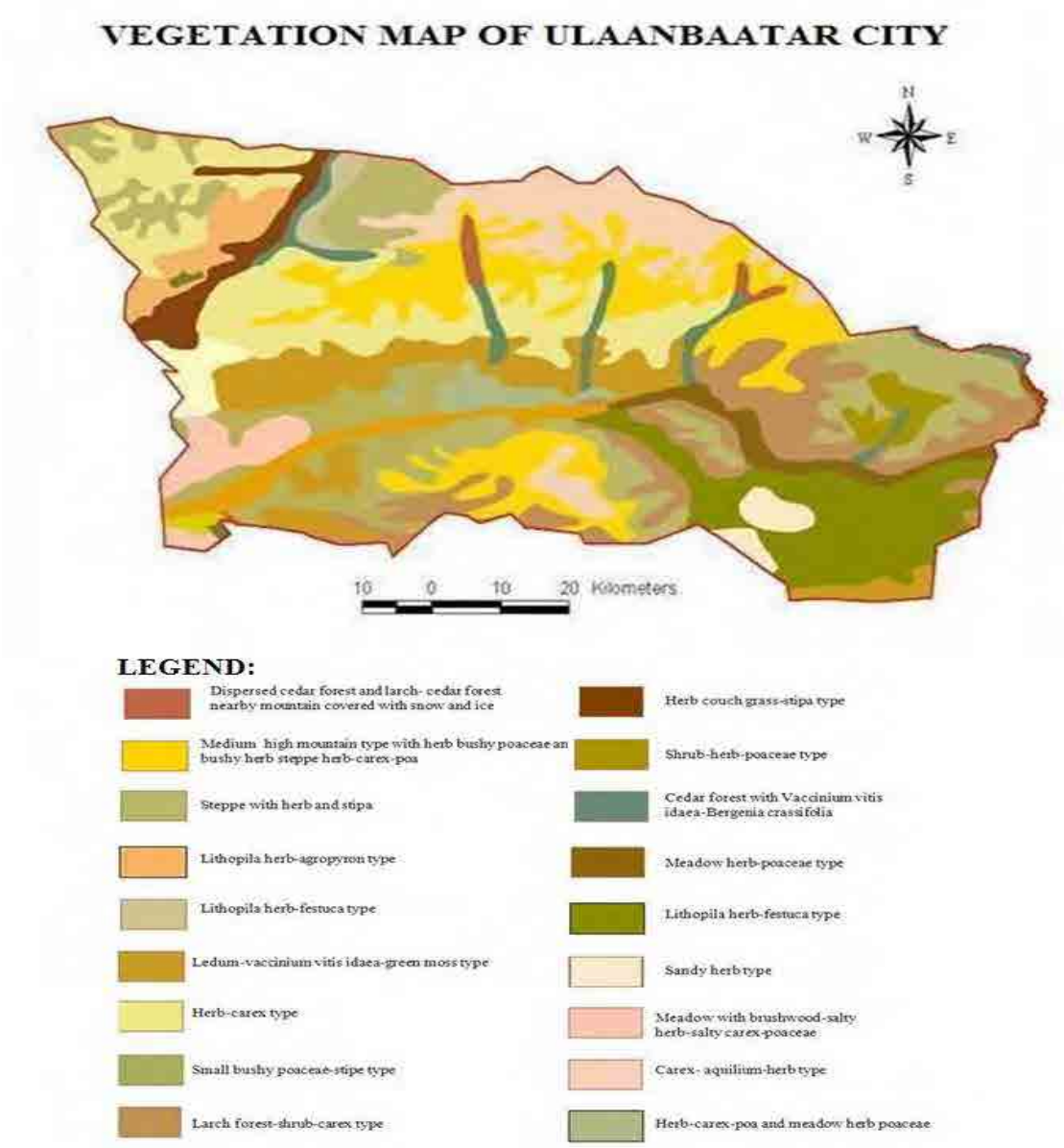


Figure 35. Vegetation cover of Ulaanbaatar city

Type of hidden seeded plants:

Gramineae
Agropyron aegiopoides Drob.
Chenopodiaceae
Chenopodium urbicum L.
Rosaceae
Potentila nivea L.
Potentila anserinaa L.
Gentianaceae
Gentiana nutans Bge.
Ranunculaceae Juss.
Pulsatilla Bungeana
Labiatae Juss.
Dracocephalum foetidum Bge.
Liliaceae

Class of double seeded vegetation:

Thymus serpyllumus
Solanaceae Hall.
Hyoscyamus niger L.
Scropulariaceae Lindl.
Cymbaria dahurica L.
Rubiaceae Juss.
G. verum L.
Leontopodium campestre R. BP.
Achillea asiatica L.
Artemisia frigida Willd.

Two key points were chosen in the surveillance area and complete records of plant species have been done based on the division into two areas.

Figure 36. Eastern part of railway of Dund River

Figure 37. Western part of Dund river

Record 1. August 7, 2012

Outlook: An area along the railway was greatly deteriorated. The main vegetation are weed, straw, nettles, cumin and plantain. The vegetations that were blooming during the surveillance are weed, feather grass, steppe wheat grass, plantain.

Figure 38. Plantain

Figure 39. Bind wood

Figure 40. Nettle

Figure 41. Straw

Record 2. August 7, 2012

The watercourse of the Dund river and riverside meadow is contaminated by flammable materials and lubricants as it is located close to domestic waste disposals, railway and auto road.

Prevailing plants in this area are fat-hen, weed, bushes, elm and dracocephalum foetidum (latin).

Figure 42. Dracocephalum foetidum

Figure 43. Saussurea

Figure 44. Wild onion and cumin

Figure 45. Carex pediformis

During the surveillance no rare and endangered plant species have been observed in the project area and in its immediate area.

The project area is located in the area with poor bio species and thus this is due to prior constructed railway and road infrastructures. Proposed construction of Flyover bridge and its access roads will not be adversely affect the vegetation cover in this area, as current vegetation cover status is needed to be recovered.

3.2.2 Protected Areas

Protected areas of Mongolia are divided into 4 categories: Strictly protected area, national park, natural reserve, and natural monument.

Classification and number of protected areas and percentage of special protected area within the land network and territory of Mongolia is shown in Table 16.

List of special protected areas is shown as per June 2011.

Table 16. Classification and size of protected areas of Mongolia

PROTECTED AREAS					
№	Classification of protected areas	Number of protected areas by classification	Size of area (in ha)	Percentage of protected area within network	Percentage of total territory of Mongolia
1	Strictly protected area	14	11,492,123	45.49	7.35
2	National park	25	11,378,068	45.04	7.27
3	Natural reserve	24	2,259,154	8.94	1.44
4	Natural monument	10	133,176	0.53	0.09
	Total	73	25,262,521	100.00	16.15

In 2012, the number of protected area was increased in all categories and 17% of the overall territory of Mongolia was taken under state protection.

There are three protected areas are located within the territory of Ulaanbaatar city, where the feasibility study on Ajilchin Flyover Project is ongoing. Bogd Khan Strictly Protected Area and Khan Khentii Strictly Protected Area and Gorkhi Terelj National Park.

Among these areas, the national park of Bogd Khan Strictly Protected Area is the closest to the project implementation area.

3.3 Environmental quality

3.3.1 Air Quality

Air pollution is the main challenge to air quality of Ulaanbaatar city. High concentration of human population and highest in Mongolia power-energy production as well concentration of vehicles contribute in production of toxic smokes and substances causing huge negative impact to human health and socio-economic development.

Three combined heat and power stations, over 200 steam boilers, more than 1,000 boilers and over 140,000 ger furnaces produce smoke in Ulaanbaatar from burning coal during the winter season and causes a major negative impact to health of the inhabitants.

The main air polluters e.g. sulfur dioxide, nitrogen dioxide, dust and smaller dust particles are required a special attention for reducing.

Besides the issues mentioned herein above, an increase of vehicle owners and growth in population are becoming the serious issue for Ulaanbaatar in terms of air pollution and traffic jam. A study was carried out on air quality within the Ajilchin Flyover project area to define status in relation to Mongolian air quality standard (MNS4585).

Within the expanded survey on air quality, the air samplings have been taken simultaneously in five locations within 24 hours, in order to define daily status of main

polluters. Locations are nearby Railway Fire Station, Passenger's Wagon Depot, at Dundgol Railroad Bridge, Southeastern corner of Gobi Factory in Khan-Uul District, and on the east of Ajilchin intersection (refer to Table 17 and Figure 46)

This survey started at 11 AM on July 2 and completed on 08.30 AM on July 3, 2012.

While measuring the contaminating substances e.g. sulfur dioxide, nitrogen dioxide, large particle dust, carbon monoxide and lead contents, the weather parameters like air temperature, atmospheric pressure, wind speed and wind direction have been measured same time and a visual observation of weather was also carried out.

Locations of sampling points is shown in table 17.

Table 17. Air sampling points info

	Name and location of point	Latitude	Longitude
1	Railway Fire Station	47°54'33.84"N	106°52'32.32"E
2	Railway Passenger's Wagon Depot	47°54'31.10"N	106°52'18.29"E
3	Southeastern corner of Gobi Factory	47°54'13.49"N	106°52'16.68"E
4	Dundgol Railroad Bridge	47°54'22.27"N	106°52'13.41"E
5	East of Ajilchin intersection	47°54'14.33"N	106°51'23.63"E

In order to determine one time content of contaminators with common distribution e.g. sulfur dioxide, nitrogen dioxide at each monitoring point during the observation, the best absorbent per respective substance was chosen and air was absorbed throughout 20 minutes.

Sulfur dioxide was analyzed using tetra-chloro-mercurat method; nitrogen dioxide was analyzed using Griss-Ilyusov wet chemical method.

In addition to this, the content of large particle dust in the air was analyzed by weight method of absorbing it throughout 20 minutes, carbon monoxide content was analyzed by a direct analyzator and the content of lead in the air was analyzed by particle sampling.

Figure 46. Location of the air quality monitoring points

On the days when surveillance was carried out, the onetime content of sulfur dioxide was between 0.004-0.104 mg/m^3, daily content was between 0,009-0,035 mgandm3, and the maximum daily content was 0.104 mg/m^3 near the Railway Fire Station at 11.00 AM. Daily average content was 1.0-1.7 times more than allowed average limit per 24 hours approved by Air Quality Standard but daily average content didn't exceed limit for one time content.

The daily average content of nitrogen dioxide varied between 0.063-0.099 mg/m^{3}and the maximum one time content reached 0.374 mg/m^{3}at 11 am near the Gobi factory.

The daily average content was 1.1-1, 2 times more than the allowed daily average limit per 24 hours approved by air quality standard and one time content was 1, 1-4, 4 times more than the allowed limit for one time content.

The one time content of nitrogen dioxide exceeded allowed limit for one time content in 35% out of all observation and it exceeded 37, 5% near Railway Fire Station, 12, and 5% near the Wagon Depot, 25% near the Gobi Factory, 25% near the Dundgol Railroad Bridge and 75% near the Ajilchin intersection.

The daily average content of the measurement of large particle dust (PM_{10}) varied between 0.053-0.127 mg/m^3 and the maximum one time content was 0.172 mg/m^3 near the Gobi Factory around 23 PM.

PM_{10} was 1, 27 times more than the daily average limit set forth in Air Quality Standard.

The content of large particle dust shows that the onetime content got closer to 0,1 mg/m^3 and exceeded the standard in 52,5% of overall measurement and shows that amount of large particle dust is large.

The results of the measurement carried out at five locations are shown in the pictures below by each contaminating substance.

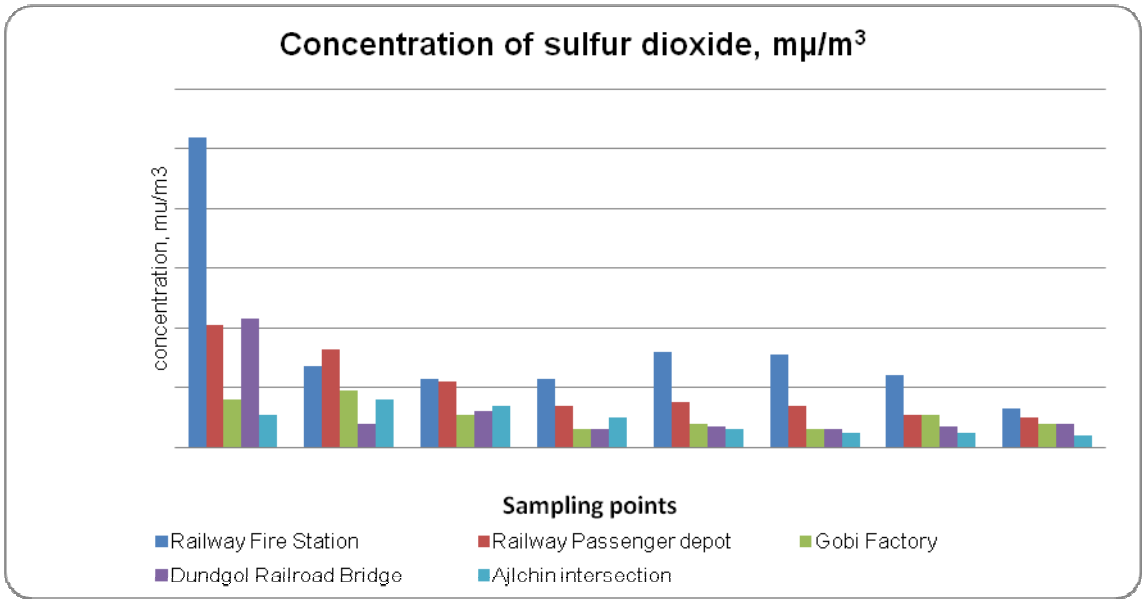


Figure 47. One time content of Sulfur Dioxide

The figure 47 shows that the onetime content of sulfur dioxide was higher near the Fire Station around 11 AM than at other points, but it didn't exceed an allowed limit set forth in Air Quality Standard. Sulfur Dioxide at other points was basically at the same level.

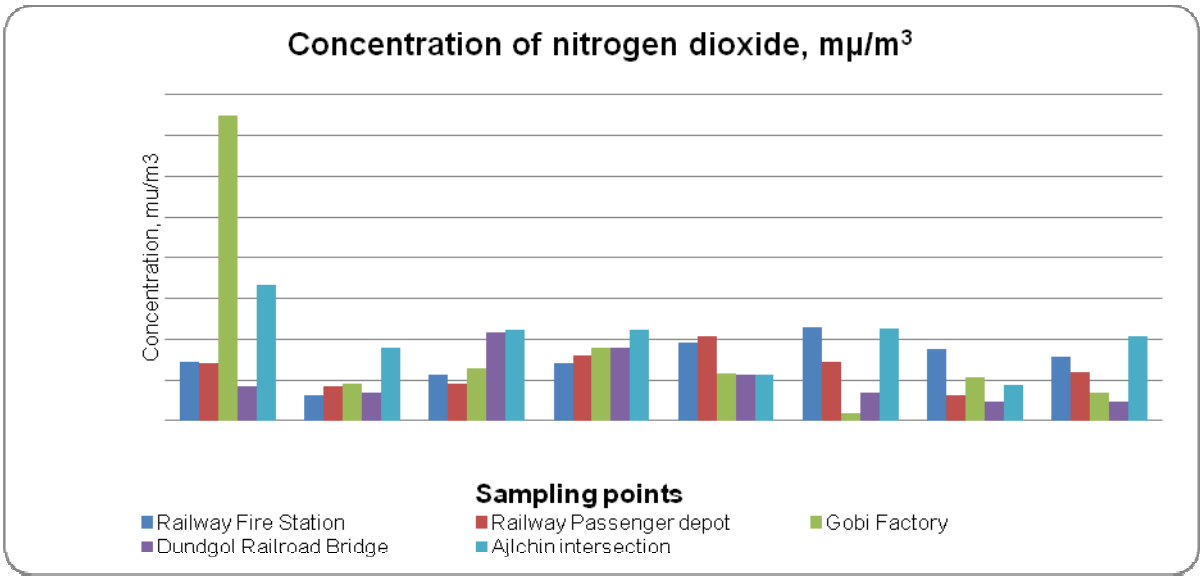


Figure 48. One time content of Nitrogen Dioxide

According to figure 48, one time content of nitrogen dioxide was higher near the Gobi factory at 11 AM than at other points. It was 4, 4 times higher than an allowed limit set forth by Air Quality Standard. Nitrogen dioxide at other points was basically at the same level.

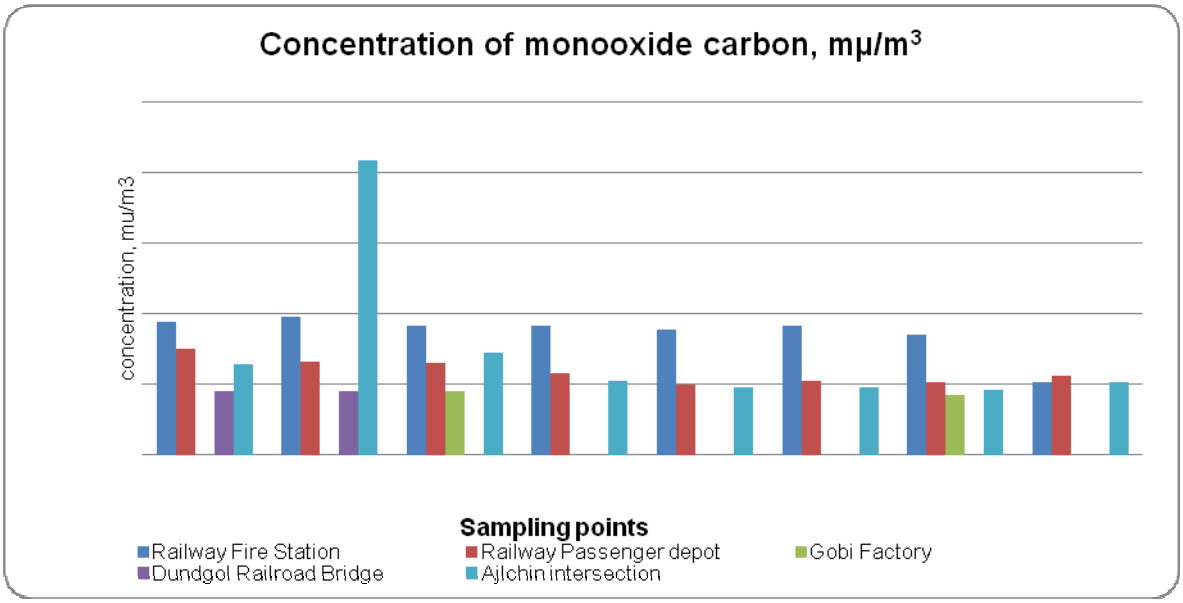


Figure 49. One time content of Carbon Monoxide

According to Figure 49, one time content of carbon monoxide was higher near the Ajilchin intersection around 14 PM than at other points but it didn't exceed an allowed limit set forth by Air Quality Standard. Content of carbon monoxide at other points was basically at the same level.

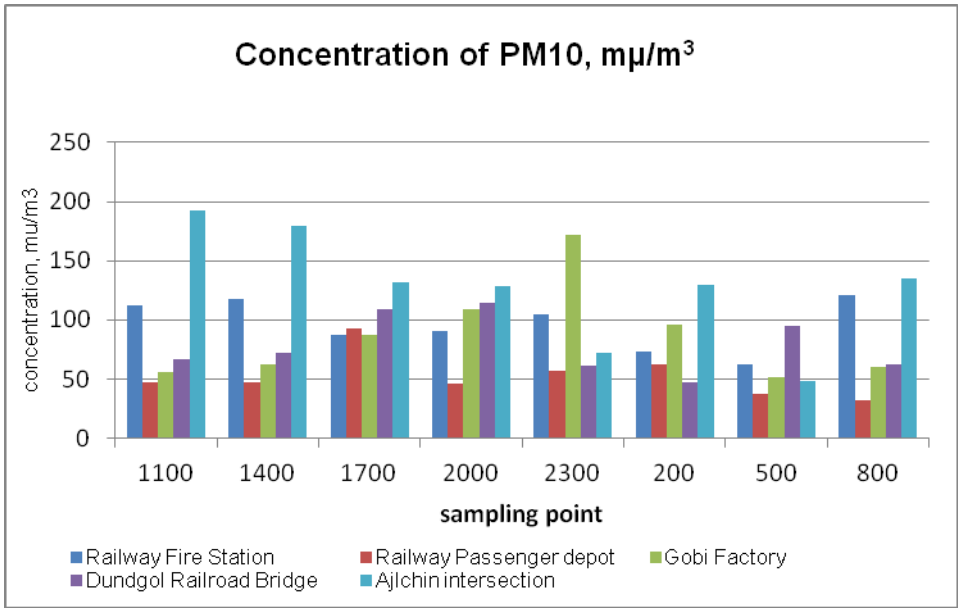


Figure 50. One time content of large particle dust, mkg/m^3

Above graph shows that one time content of large particle dust was slightly higher near the Ajilchin intersection than at other points.

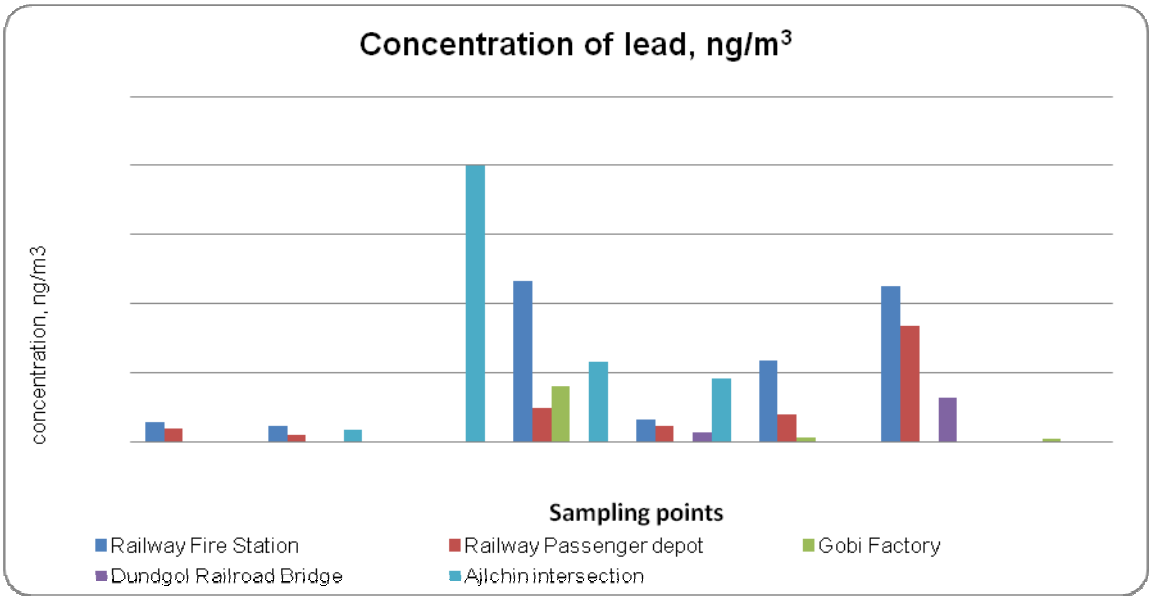


Figure 51. One time content of Lead

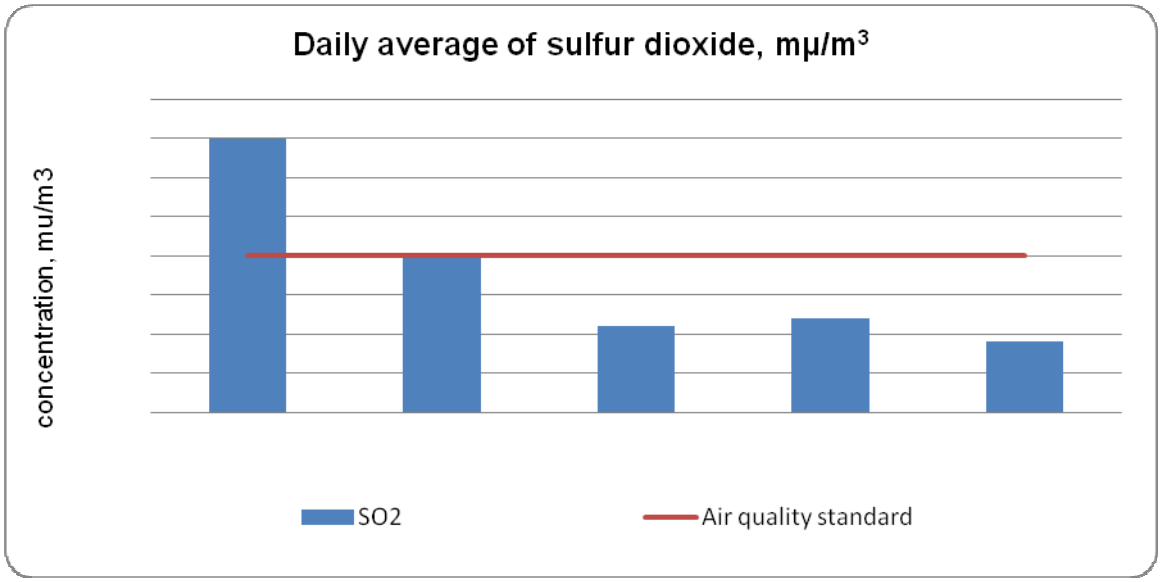


Figure 52. Daily average content of Sulfur Dioxide

The daily average content of sulfur dioxide was 1,0-1,75 times more near the Fire Station and the Passenger's Wagon Depot than the average content per 24 hours set forth by Air Quality Standard and at other points this content was lower than allowed limit set forth by the standard.

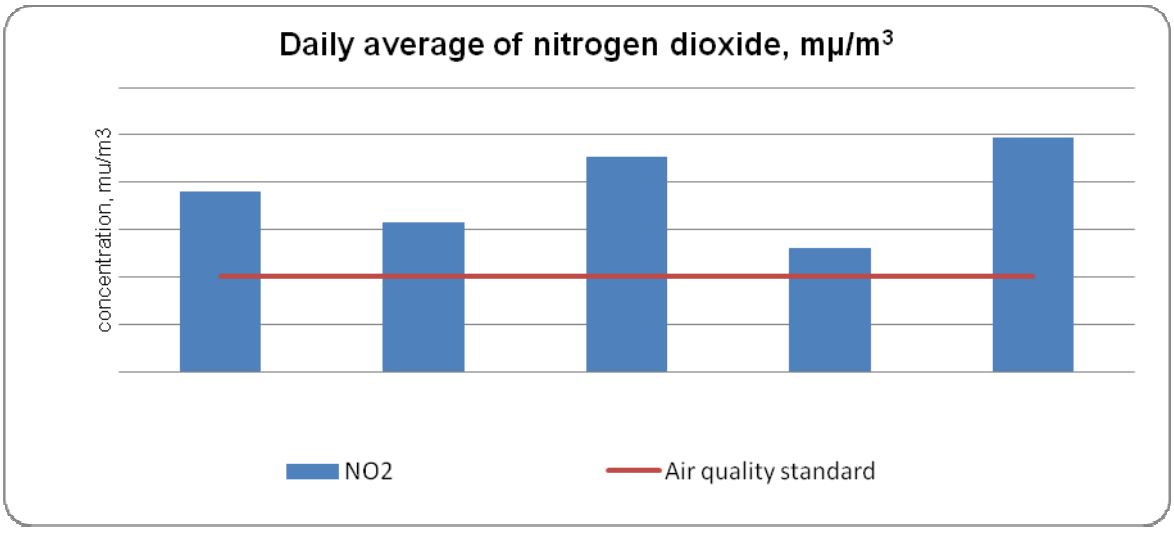


Figure 53. Daily average amount of Nitrogen Dioxide

The daily average content of nitrogen dioxide at all the points was 1,3-2,46 times more than average content per 24 hours set forth by Air Quality Standard.

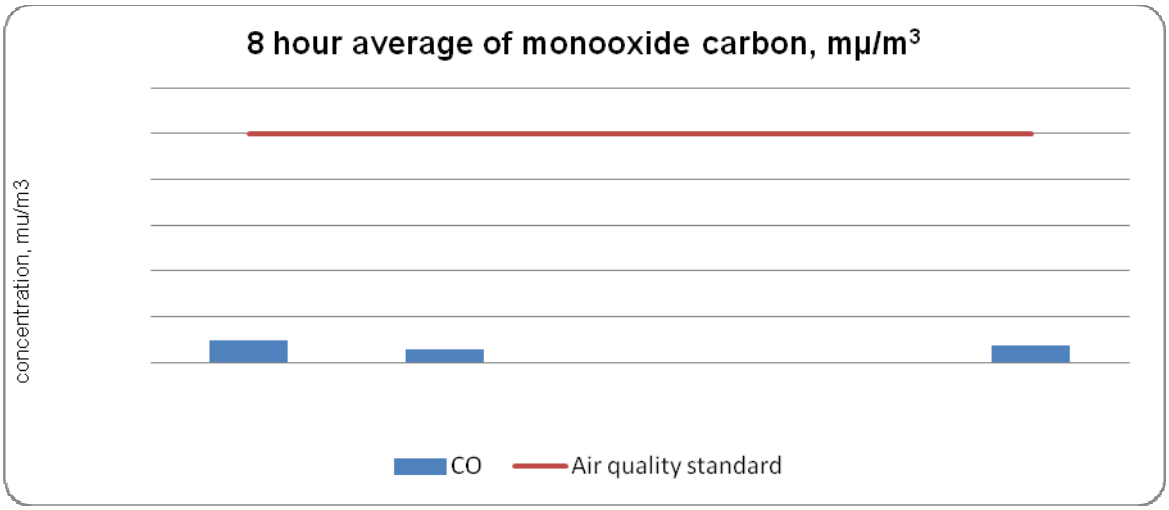


Figure 54. Average content of Carbon Monoxide per 8 hours

The above picture shows that the content of carbon monoxide is within the standard.

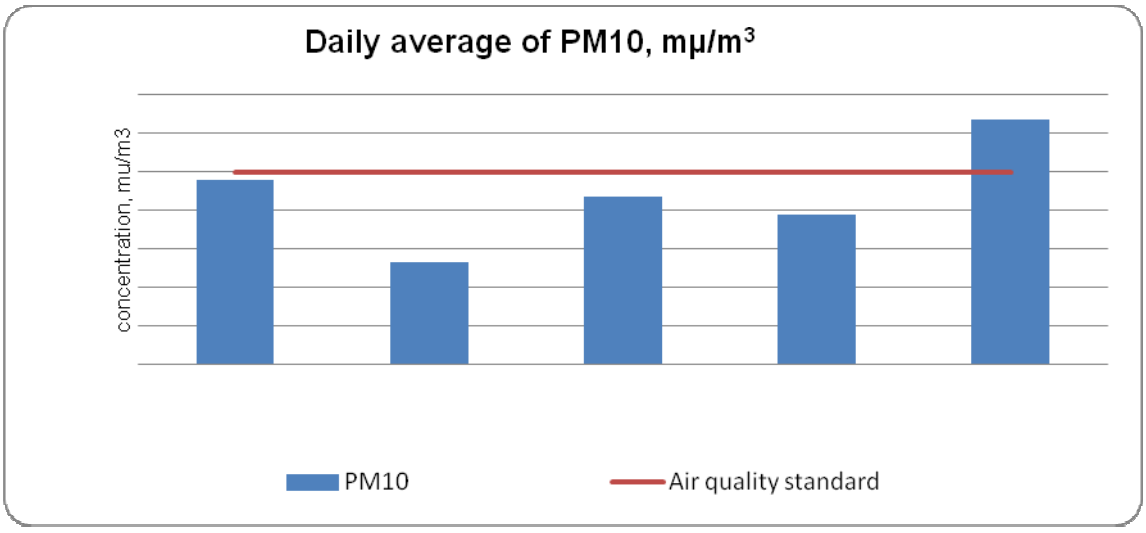


Figure 55. Daily average content of large particle dust

The daily average content of dust near Railway Fire Station, Wagon Depot and Ajilchin Intersection was 1, 27 times more than an allowed limit set forth by Air Quality Standard.

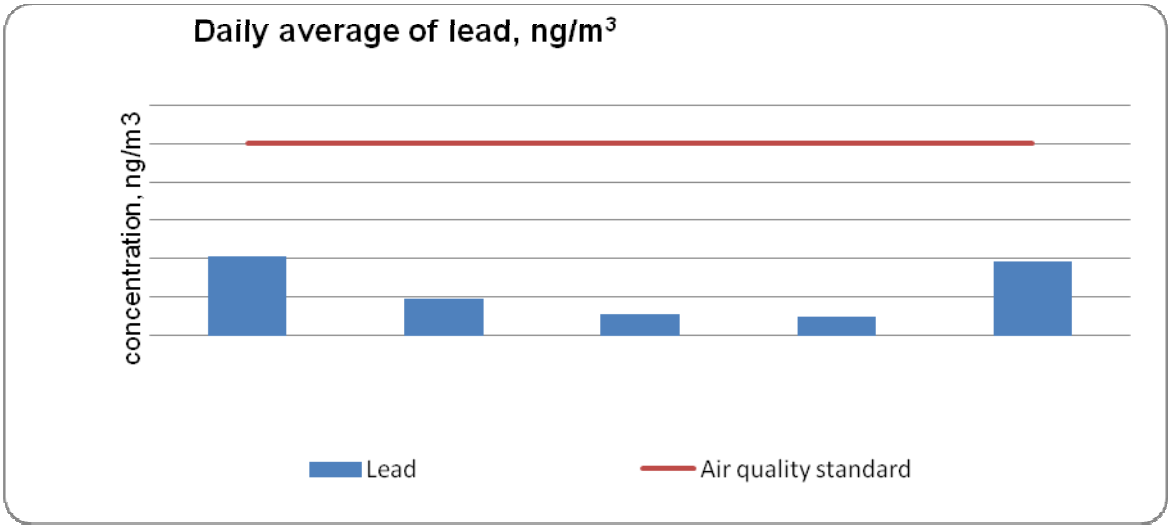


Figure 56. Content of Lead in air

The daily average content of lead in air was within the average content of lead per 24 hours set forth by Air Quality Standard. The content of lead near the Ajilchin intersection and Fire Station was slightly higher than at other points.

Currently, the Wagon Depot and Railroad bridge have low or no traffic at all, but the area near the Gobi Factory; Fire Station and Ajilchin intersection have more traffic. However this traffic is low compared to the traffic of central road and other roads, it is used as shortcut to avoid the traffic jam.

The compiled results of analysis and research show that the onetime content of nitrogen dioxide exceeded an allowed limit in 35% of total observations, and nitrogen dioxide

content exceeded 37,5% near the Fire Station, 12,5% near the Wagon Depot, 25% near the Gobi Factory, 25% near the Railroad bridge and 75% near the Ajilchin intersection.

The daily average content of nitrogen dioxide was 1,1-1,2 times more than an allowed average limit per 24 hours set forth by Air Quality Standard and the one time content was 1,1-4,4 times higher than an allowed limit per one time.

The daily average content of sulfur dioxide at the Fire Station and Wagon Depot was 0,009-0,035mg/m^3 or 1.0-1.75 times more than an allowed average limit per 24 hours set forth by Air Quality Standard.

The content of large particle dust shows the one time content got closer to a daily average allowed limit of 0,1 mg/m3 and exceeded in 52,5% of total measurements and shows that the amount of large particle dust is large.

The content of other contaminators of the air e.g. lead, carbon monoxide was less than the allowed limit or its impacts can be neglected.

Currently negative impacts of contaminators in the project implementation area are exceeding allowed limits of air quality due to frequent traffic jams and low speed of traffic on the street. Projected emission of polluters from vehicles expected to be reduced when Ajilchin Flyover Bridge will be constructed and exploited. The reduction of emission is expected due to reduced traffic jam and increased traffic speed on nearby roads to Flyover project area.

In some areas traffic volume is going to increase compared to current status, when the flyover bridge will be opened. These locations are along Flyover bridge direction around Railway Fire Station and over current railway main railroads. However, current high traffic jams will be reduced (so does air pollution) in other main roads like Peace avenue, Chingiss avenue and Gurvanjin bridge etc.

3.3.2 Noise And Vibration Level

Noise The main generator of noise spread in the environment is caused by various factors e.g. traffic of various transportation means, building and construction, mining and industrial operations. Noise exceeding an allowed limit causes many negative impacts to human health and damages the human hearing and brain cells, affects mental system and becomes sources of fatigue, misconcentration, startling, insomnia and eventually affects the cardio-vascular activity causing high blood pressure, indigestion and poor digestion.

In Mongolia no serious research works was held except some studies of scientists e.g. professors N.Saijaa, N.Tugjsuren, who updated and developed a national normative for noise and professor N.Tugjsuren measured and studied noise caused by vehicles passing through a central road of Ulaanbaatar.

No systematic research that carried our detailed assessment on the noise level around the railway was carried out in the country previously. In some cities the average level of noise along with main road of transportation means was measured. According to this study, average

noise level of Ulaanbaatar is 75, 6 dB, Erdenet 67.1 dB, Darkhan 54, 9 dB, Choibalsan 57, 0 dB.

Assessment method for noise level Hygienic norm on noise, its assessment and frequency schedule are divided to Octavian range.

Octave is a frequency interval between maximum frequency and minimum frequency with double its frequency.

The octave range shall be determined by an average frequency between its minimum and maximum amounts.

$$f = f \text{ min} \times f \text{ max} = f \text{ min} \times 2 f \text{ min} = 2 \times f \text{ min} = 1.41 f \text{ min}$$

The maximum and minimum amounts of frequency to determine the octave range shall be divided into standard frequency amount of $\sqrt{2}$ =1.4142135 and multiplied.

For example, f=1000 Hz is the minimum amount of octave range frequency F_{min}=1000/1.414135=707 Hz, maximum amount shall be f_{max}=1000·1.414135=1414 Hz

But one third (1/3) of the octave interval meaning shall be found by dividing the standard amount of octave zone frequency to $\sqrt[3]{2}$ =1.25 and multiplied.

For example, If we break a whole octave range (1/1) with 500 Hz of standard frequency into 1/3 octaves, it will be 500:1.25= 400 Hz, 500 1.25=625 Hz.

Health norm on noise In order to assess the place with various noises in terms of hygiene, a logarithm level of average square meaning of noise pressure shall be taken as indicator to normalize. This indicator shall be normalized by octave ranges of noise frequency.

In terms of health, the maximum limit for noise which continuous impact the person can take is approved and followed. This maximum limit for noise is similar in many countries of the world (Table 18).

Table 18. Level of maximum limit for noise

Noise duration (in hours)	8	6	4	3	2	1.5	1	0.5	0.25	0.02	0.01
Maximum noise limit, dB	90	92	95	97	100	102	105	110	115	117	120

Negative impacts will be caused to health if person stays more than 8 hours in a place which noise level reaches 90dB and hearing organ will be damaged if stay more than 0, 6 minutes in a place with noise of 120 dB.

Level of noise limit depends on its frequency (Table 19)

Table 19. Relationship of level of noise limit with the frequency

Frequency zone, Hz	63	125	250	500	1000	2000	4000	8000
Level of noise limit, dB	99	92	86	83	80	78	76	74

Mongolian standard (MNS 5002:2000) updated in 2000 is followed as general requirement for noise classification, hygiene specification and norm, noise safety and meeting of hygiene requirements and Mongolian standard MNS 5003:2000 is followed as general requirement for measurement of noise.

Standard MNS 5002:2000 thoroughly determined the amount of constant and inconstant noise level within wide frequency range depending on the workplace requirements.

For example, potential noise level at industrial permanent workplace of our country is set forth as follows (Table 20).

Table 20. Allowed potential constant and inconstant noise level within wide frequency range

Workplace	Noise pressure level (in DB) in octave range with average geometrical frequency (1 Hz)								Average noise level, dB
	63	125	250	500	1000	2000	4000	8000	
Constant workplaces and work zones of the industry, industrial surrounding and workplaces with permanently mounted machinery	99	92	86	83	80	78	76	74	85

Results of noise measurements taken in the Ajilchin Flyover Project territory

Noise measurement points were given in the ToR and the study team has defined exact locations of measurements.

There were selected five points and at the chosen points, the noise level was measured by ENVIRONMET METER 4IN (tool intended for simultaneous measurement of relative air humidity and air temperature), wind speed was measured by an Anemometer and soil temperature was measured by a laser thermometer (Figure 57).

Figure 57. Tools used for measuring of noise level nearby proposed Flyover bridge

Locations of 5 points of measurement are shown in Figure 58.

Figure 58. Location of points where the noise level was measured

Results of measurement and research carried out at chosen points

Maximum, minimum and average amounts of noise in measured areas are shown in Tables 21-23 and the change throughout the day is shown in Figure 58.

Table 21. Noise level at points 1 and 2

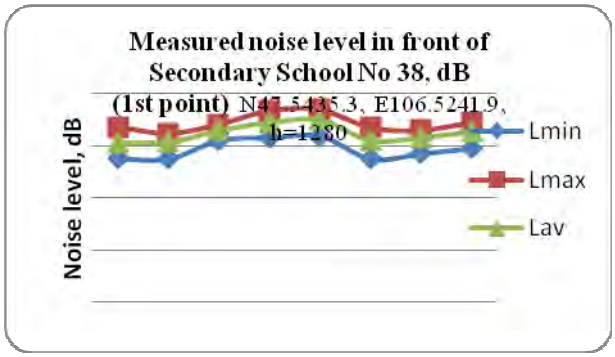
Noise level at I point				Noise level at II point			
T	**L_{min}**	**L_{max}**	**L_{av}**	**T**	**L_{min}**	**L_{max}**	**L_{av}**
2:00	55.2	67.3	61.2	2:00	60.6	91.3	62
5:00	55	64.7	61.5	5:00	60	76.7	65.5
8:00	62	68.3	66	8:00	70	77.9	72.6
11:00	63	73.7	69.1	11:00	66	76.8	71.5
14:00	63.6	74	70	14:00	70.4	82	75.5
17:00	55	66.9	62.1	17:00	83	104	84
20:00	57	66	63.3	20:00	77	98.3	82
23:00	59	69	65.5	23:00	72.8	82.7	74
Average	58.73	68.74	64.84	Average	69.97	86.21	73.38
Maximum	63.6	74	70	Maximum	83	104	84
Minimum	55	64.7	61.2	Minimum	60	76.7	62

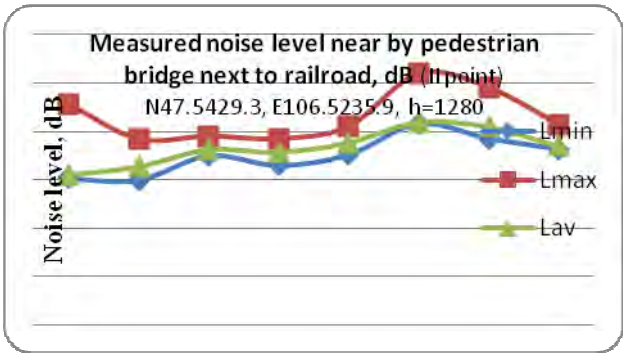
Table 22. Noise levels at points 3 and 4

Noise level at III point				Noise level at IV point			
T	L_{min}	L_{max}	L_{av}	T	L_{min}	L_{max}	L_{av}
2:00	56.4	65.1	62	2:00	57.9	62.8	61.1
5:00	55	62.3	60.1	5:00	63	76.1	69.2
8:00	64.9	70.4	68	8:00	68.2	72.3	70
11:00	60.3	65.6	63.3	11:00	63.5	72	66
14:00	68.4	72.3	71	14:00	62	67	63
17:00	67	77	72	17:00	69	91	79.1
20:00	61.4	77	69	20:00	67.2	74.7	70
23:00	63	72	68	23:00	62	74	68
Average	62.05	70.21	66.68	Average	64.1	73.7	68.3
Maximum	68.4	77	72	Maximum	69	91	79.1
Minimum	55	62.3	60.1	Minimum	57.9	62.8	61.1

Table 23. Noise levels at point 5

T	L_{min}	L_{max}	L_{av}
2:00	63.5	74.4	67.3
5:00	64.8	66.6	64.6
8:00	65.1	72.2	68
11:00	62.9	73	66.3
14:00	71.7	78.2	71.3
17:00	69	89	73.2
20:00	64	76	70.3
23:00	63	72	68
Average	65.86	75.18	68.63
Maximum	71.7	89	73.2
Minimum	62.9	66.6	64.6





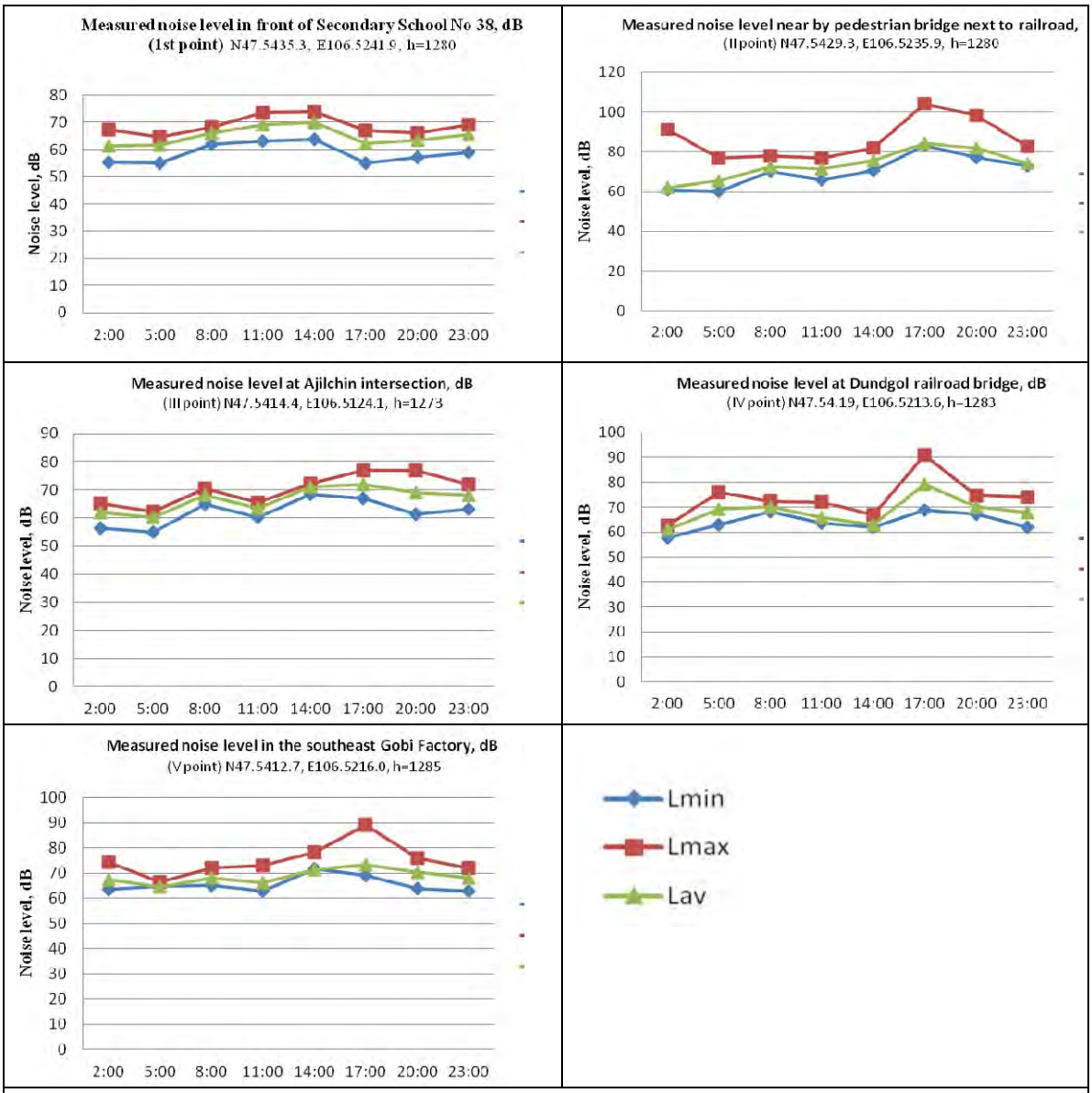


Figure 59. Noise levels measured in five points in the Flyover project territory (by each of 5 points)

Compiled results of the analysis are shown herein below.

1. The ranges of maximum and minimum amounts of noise at the points chosen nearby the overhead bridge are shown in Table 24 and daily average of maximum, minimum and average amounts of the noise is shown in Figure 60.

Table 24.The change range of maximum and minimum levels of noise at all points

Points of measurements	Range of maximum amount of noise, dB	Range of minimum amount of noise, dB	Range of average amount of noise, dB
I point	64.7-74.0	55.0-63.6	69.9
I I point	76.7-104	66.0-83.0	73.4
III point	62.3-77	55.0-68.4	66.7
IV point	62.8-91.0	57.9-69	68.3
V point	66.6-89.0	62.9-71.7	68.6

The maximum amount of noise reached 91 dB and 104 dB at the points I and II and records were taken when locomotives signaled and its recurrence is rare.

On the other hand, the maximum noise appears in period of 17-20 PM and it can be considered that created noise level is related to nearby railway operations.

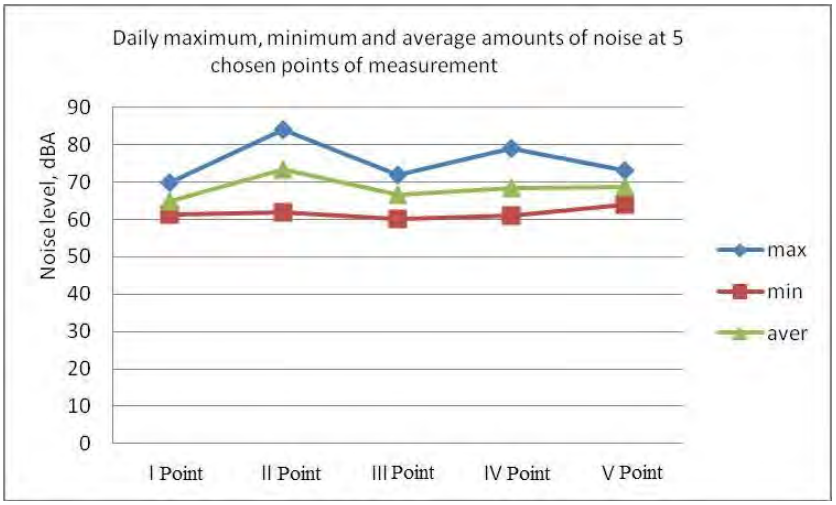


Figure 60. Daily maximum, minimum and average amount of noise at the points of measurement

1. Average changing range of maximum amounts of noise nearby Flyover project is 62.3-104.0 dB per day, changing range of minimum amount of noise varies between 55.0-83.0 dB and average changing ranges of manximu and minimum amounts are 74.80 dB and 64.13 dB respectively. There are no large scale permanent inhabitants in this area except 27 households living within 50 m range from Ajilchin intersection (Point III).

   In general, it is considered that no substantial negative impact from noise nearby Flyover project will be caused to human health as average daily amount of noise nearby Flyover project area is 69,38 dB. If refer to World Health Organization's guidance, it states that 70 dB of noise throughout 24 hours nearby industry, public service facility and auto road in settlement area will not cause negative impact to human health.

2. Further tendency of noise level will depend on intensification of vehicle flow that passes through this Flyover bridge . Once Flyover project is completed, traffic volume will be reduced in surrounding roads and traffic is expected to increase on Narny road and Ajilchin intersection. Given that traffic volume and speed will be changed when FLyover will be constructed, it would be appropriate to establish monitoring points for noise control.

Vibration

Vibration measurements have been conducted for identification of major sources of vibration as well as levels of vibration at current situation and future time, when the Ajilchin Flyover Bridge will be built.

Measurement is held throughout 24 hours in every 3 hours from 15.00 pm July 2, 2012 to 12 pm July 3, 2012 at 5 points where noise measurement is carried out (in front of school#38, nearby pedestrian bridge next to railroad, Ajilchin intersection, and Dundgol River railroad bridge, southeast corner of Gobi Factory).

The results of measurement carried out in every 3 hours throughout 24 hours are shown in Table 26.

The vibration level at the chosen points were measured by RIOVIBRO Vm-63/ Pocketable vibration meter and relative moisture and temperature were measured by Temp & Humidity Meter PCE-MHT1 and wind speed is measured by anemometer and PCE-MAM1.

Figure 61. Vibration was measured by a sensor at the surface level, where vibration is coming

Figure 62.Vibration measurement tools

Figure 63. Transportation means –a source of vibration

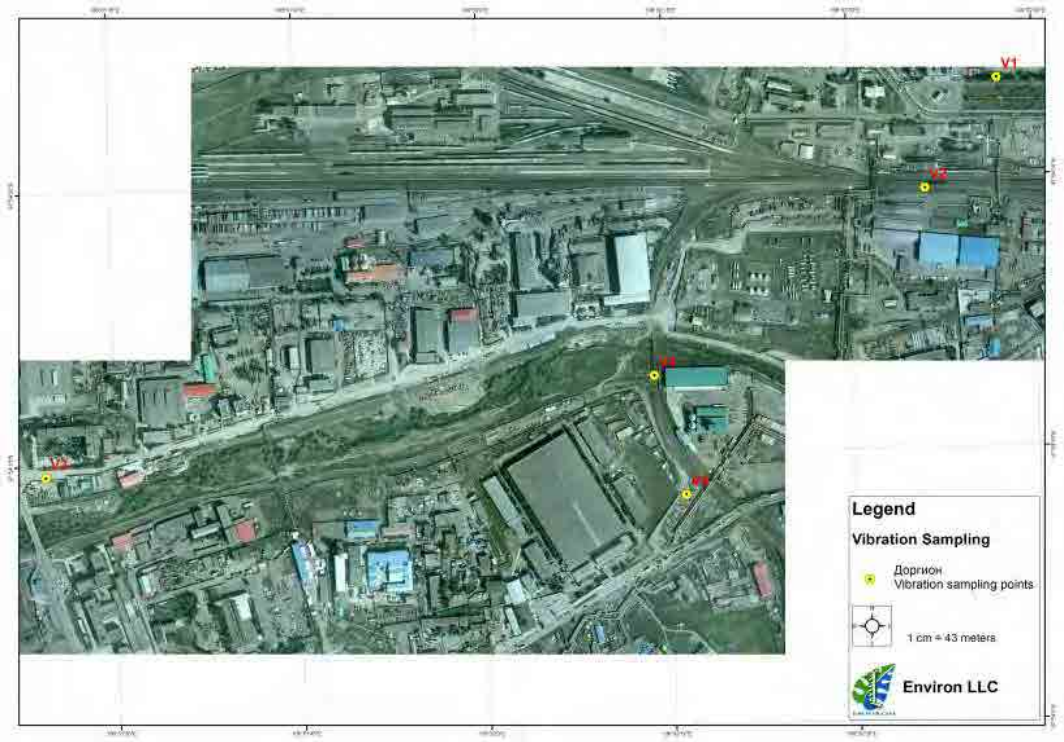


Figure 64. Location of vibration measurement points

The results of vibration measurement taken at 5 points are shown in table 25.

Table 25 Vibration measurement results of selected five points in the project area.

Measurement info	Measurement time (24 hours)							
Point 1 (Secondary school #38)	**15.00**	**18.00**	**21.00**	**00**	**03**	**06**	**09**	**12**
Hi m/cm^2	0.04	0.01	0.02	0.03	0.1	0.02	0.02	0.02
1 kHz/z cm/s	0.21	0.03	0.02	0.02	0.01	0.02	0.02	0.02
Low mm	0.015	0.014	0.015	0.003	0.003	0.005	0.003	0.004
Point 2 (pedestrian bridge)	**15.40**	**18.40**	**21.40**	**00.40**	**03.40**	**06.40**	**09.20**	**12.20**
Hi m/cm^2	0.04	0.04	0.02	0.03	0.07 Train passed	0.17 Train passed	0.21 Train passed	0.12
1 kHz/z cm/s	0.11	0.05	0.02	0.03	0.070	0.27	0.08	0.02
Low mm	0.021	0.014	0.029	0.004	0.003	0.121	0.015	0.011
Point 3 (Ajilchin intersection**)**	**16.00**	**19.00**	**22.00**	**01.00**	**04.00**	**07.00**	**10.00**	**13.00**
Hi m/cm^2	0.03	0.02	0.04	0.04	0.01	0.02	0.02	0.02
1 kHz/z cm/s	0.01	0.04	0.04	0.04	0.01	0.02	0.01	0.02
Low mm	0.007	0.014	0.019	0.004	0.003	0.003	0.005	0.004
Point 4 (Dund River Railroad Bridge)	16.20	19.20	22.20	01.20	04.20	07.20	10.20	13.20
Hi m/cm^2	00.2	0.02	0.01	0.02	0.02	0.17 Train passed	0.02	0.02
1 kHz/z cm/s	0.04	0.02	0.01	0.02	0.02	0.06	0.01	0.01
Low mm	0.005	0.003	0.003	0.003	0.003	0.005	0.005	0.005
Point 5 (Southeast of Gobi Factory)	**16.25**	**19.25**	**22.25**	**01.25**	**04.25**	**07.25**	**10.25**	**13.25**
Hi m/cm^2	0.01	0.01	0.03	0.02	0.01	0.01	0.02	0.01
1 kHz/z cm/s	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.02
Low mm	0.007	0.003	0.011	0.003	0.003	0.004	0.004	0.004

There is no study and respectively no standard or norms are set for the vibration in Mongolia. The normative document "SN2.2.4/2.1.8.566-96 – Vibration level at Industrial, Apartment Buildings and Public Facilities" of the Russian Federation was used for this assessment.

Average geometrical frequency within the octave plane for accommodation and public facility was taken by 2,4,8,16,31,5,63 Hz for assessment of general vibration.

Table 26. Weather parameters at the measurement points

Measured time	**V** Wind speed	**T** Air temperature	**T** Soil temperature	**B %** Relative air moisture
15:00	0,7	11.6	8,1	54
18:00	0,8	10,68	7.1	62
21:00	1,1	17,22	13.5	41
12:00	2,3	22,3	25	28

Measured time	**V** Wind speed	**T** Air temperature	**T** Soil temperature	**B %** Relative air moisture
03:00	2,78	23,8	28.6	33
06:00	3,5	22,1	23.4	26,2
09:00	1,1	2 0.9	20.2	23,2
12:00	0,3	17,25	11.6	45,4

Average square quantity of speed (V) and vibration accelerator were measured by sum calculated in octave plane of their logarithm level (Lv, La 1/1, 4).

The results of carried out measurements show that among five chosen points, the vibration level on the point No2 (next to main railroad) and on the point No4 (Southeast corner of Gobi Factory) was higher than the other points when vibration was measured during passing of train with 5-20 freight wagons.

In total of 120 measurements have been taken 8 times in every 3 hours throughout 24 hours and the maximum level of vibration was recorded when trains passed through.

But vibration level was low when heavy duty trucks and vehicles passed. We compared high results of vibration measurement with permitted hygiene norms of Russia and those high results of vibration do not exceed the permitted limit.

The vibration will likely to increase further and general vibration is likely to impact the health of inhabitants of buildings and public facilities along the flyover bridge, when it will be in exploitation. Therefore, vibration caused by transportation means and industrial operations through passing the Flyover bridge should further be recorded constantly and monitored so that not to interfere human population nearby and passengers of the vehicles.

Thus, proposed Flyover project will not produce vibration that will be harmful for surrounding human population and environment.

3.3.3 Surface Water Quality

In accordance with the ToR, water sampling were taken at three locations along the Dundgol River flow: upstream middle and downstream within the territory of proposed Ajilchin Flyover Project (Figure 69). Water quality parameters e.g. pH, electrical conductivity-EC, total dissolved solids-TDS of Dundgol River have been measured on the sites, when sampling took place.

General chemical composition of water samples was analyzed in the Water laboratory of Institute of Geo Ecology of Mongolian Academy of Sciences. Heavy metals content of these samples were analyzed in the Central Geological Laboratory. Results of laboratory analysis are in Attachment 9

The results of analysis are described below:

1. According to chemical composition, the first sample belongs to fresh and soft water of 2nd type of hydro carbonate and calcium group. This water belongs to ''Contaminated'' classification of classification norm of surface water clarity level.

The river water had lots of dirt, grass, vegetation and gulfweed. It was brown in color and had turbidity.

Figure 65. The first location of sampling at Dund river

2. According to chemical composition of second location of sampling, it is fresh and soft water of 2nd type of calcium group and hydro carbonate class. This water belongs to ''Contaminated'' classification of classification norm of surface water clarity level.

Figure 66. Second location of sampling

3. According to chemical composition of third sampling location the water belongs to fresh and soft water of hydro carbonate class, calcium group of 2nd type. This water belongs to ''Contaminated'' classification of classification norm of surface water clarity level.

Figure 67. Third location of sampling

In addition to chemical composition analysis, content on sulfur was analyzed for all three samples and no sulfur was identified in all the water samples.

According to compiled results of the samples, surface water mineralization is 230 mg/l, solidity is 2.5 mg-eq/l, the anions have $HCO_3^->Cl^->SO_4^{2-}$ structure and cations have $Ca^{2+}>Na^++K^+>Mg^{2+}$ structure.

To note that water quality and composition of all 3 samples are similar. Therefore, we consider that bridge construction area shall be chosen based on hydrological conclusion and other relevant factors.

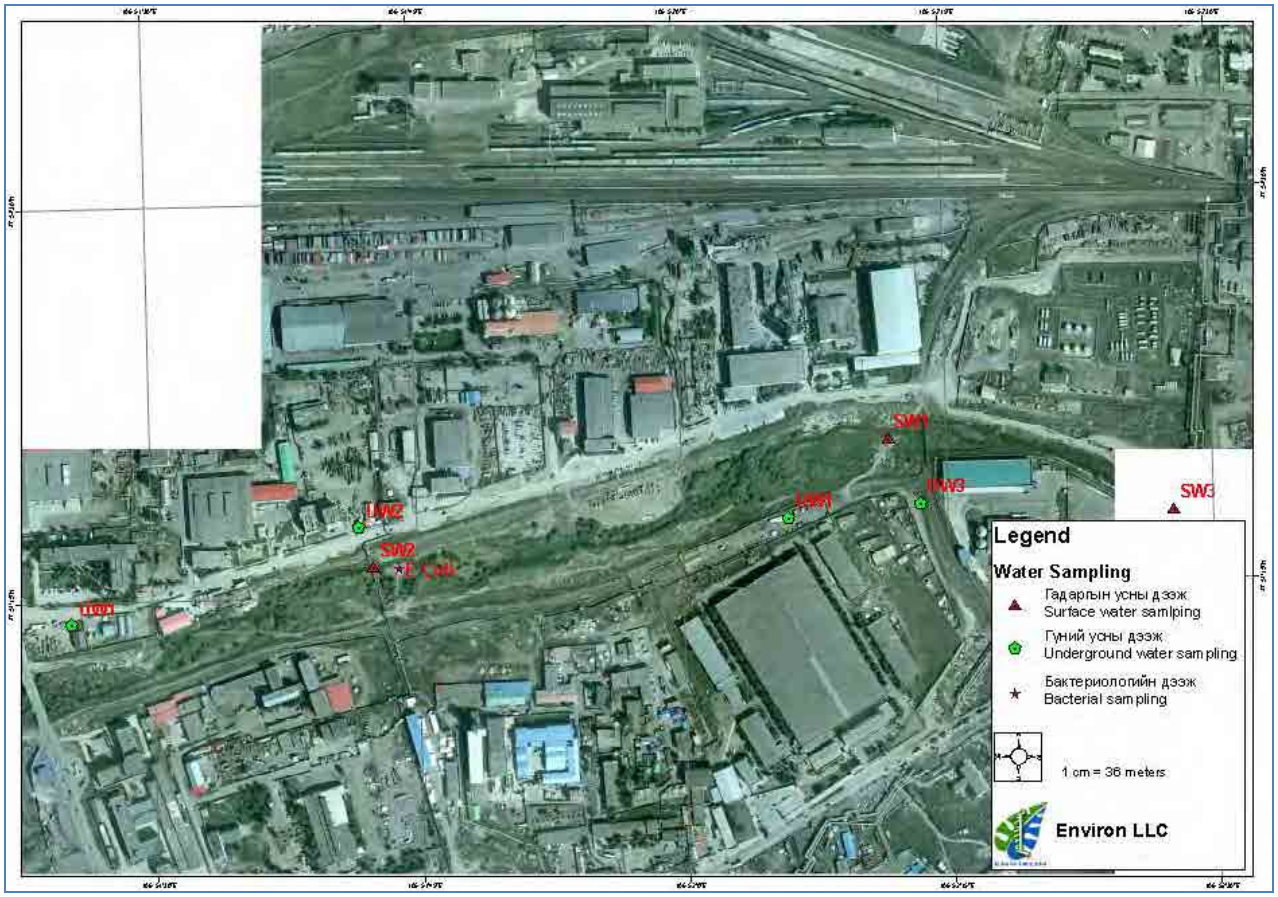


Figure 68. Location of surface and ground water sampling points

Bacterial Contamination Level of Surface Water

In order to identify bacterial status of Dundgol River, water sample was taken from Dund River at coordinate 47^0 54’ 16” N, 106 51’ 44.1” E (Figure 69). Sampling was taken according to the method of bacterial analysis and analyzed in Laboratory of National Public Health Center of Ministry of Health of Mongolia.

The bacterial analysis on delivered sample was carried out by standard methodology by 4 parameters and hygiene assessment was given compared to Mongolian National Standard of Drinking Water (MNS 900-2005), Water Quality, microorganism of intestinal (entro) group, microorganism adapted to heat, identification and counting of suspected intestinal E-coli (MNS 4697-98), identification and counting of suspected anaerob

microorganisms CI.perfringens (MNS 7939-2000), identification method (MNS6340-2003) for identification of water quality- salmonella.

The results of one time bacterial analysis carried out on samples taken from Dund river water don't meet the Mongolian standard requirements mentioned herein above.

The results of bacterial analysis are shown in Table 27.

Table 27. The results of bacterial analysis carried out on water sample taken from Dund river

Specification	Number of bacteria	Microorganism of entro-group	Anaerob microorganism	Pathogens of entrogroup
Name of standards followed	MNS 900-2005	MNS 4697-98	MNS 7939:2000	MNS 6340-2003
parameters shown in standard	100	0	Not identified	Not identified
Content within the sample	5×10^4	*E. coli*is identified	*Cl.perfringens* is identified	No pathogens are identified

Therefore, Dund river water shouldn't be used for drinking and domestic/household purposes. Water quality and safety shall be always followed up and monitored.

3.3.4 Ground Water Quality

The samples for analysis of ground water quality are taken from three locations within the project area and analyzed at water laboratory of Geo Ecological Institute and content of heavy metals within these samples was analyzed at Central Geological Laboratory.

1. Water from well in the fence of Ilch Khangai LLC was analyzed for ground water quality. According to chemical composition, it is fresh and soft water of hydro carbonate class and calcium group of 2nd type.
   The analysis results of this water meet the requirements of Standard for Drinking Water MNS900:2005.

Figure 69. Well of Ilch Khangai LLC for domestic use

2. Water of sample taken from the second location is fresh and smooth water of hydro carbonate class and calcium group of 2nd type according to its chemical composition.

   The analysis results of this water meet the requirements of Standard for Drinking Water MNS900:2005.

Figure 70. Second location of ground water sampling

3. There is one fragile area within the proposed Ajilchin Flyover project territory, where 23 households with 76 peoples live in a public house, owned and managed by a private person. All contingents of this house use a deep water well to meet their water demand. The third water sample was taken from this well to see if the water consumed meets drinking water quality standard. According to chemical composition, it is fresh and hard water of hydro carbonate class and calcium group of 3rd type. Lab result shows ammonia ion content in water exceeds the tolerable level indicated in the Drinking water standard MNS900:2005. Therefore, water is not so suitable for drinking. One would need to filter and soften in case of consumption.

Figure 71 Location of third sampling point for underground water quality

In terms of heavy metal content, no sulfur was identified in all underground water samples.

The underground water samples have 410 mg/l of mineralization, 4.9 mg-eq/l of solidity, anions have HCO_3^-> SO_4^{2-}> Cl^-structure and cations have Ca^{2+}> Mg^{2+}>Na^++K^+ structure.

Impact of surface and ground water composition to concrete mixture

Concrete mixture used for building and construction is commonly affected to deformation due to water used for mixture and corrosion of surface and ground water after performance of construction.

Corrosive impact of water is related to water environment pH and carbon, sulphates and magnum ion effects.

The following results are seen during comparison of standard and corrosive impacts of water sampling points involved in research with maximum limits.

According to analysis results, the corrosive impact of surface and ground water to concrete mixture is low and samples meet the requirements of ''Standard of water UST 3821-85 used for concrete and construction'' followed in Mongolia.

Table 28. Compiled results of corrosive impact analysis of water points

Specification	Measurement unit	Permitted maximum level	River water	Soil water
Chloride	mg/l	500	24.8	22
Sulphate	mg/l	3000	25	70
Substance to be weighed	mg/l	50000	29.7	0.0
Alkalinity	mg/l	600	44	44
Corrosive CO_2	mg/l	<3.4	2.75	0.7
Water environment pH	-	>5.5	7.97	7.41

3.3.5 Soil quality

Soil contamination in areas along the Ajilchin Flyover Trace. The mixed samples were taken from areas covered with domestic waste and various dumps to define soil contamination level and content of heavy metals.

Mixed soil sample-1. Soil section was done in the garden area to the north of Railway Central Station, preserving its natural look in order to compare the change and contamination of soil along the project trace covered with domestic wastes.

Figure 72. Soil sampling process

Contamination samples were taken from 0-7 cm of topsoil at 10 different points of respective area, those 10 samples were thoroughly mixed and one sample was prepared and marked as X-1 sample.

According to results of laboratory analysis of heavy metal content of soil taken from the garden located to the north of Central Railway Station, Cr (chrome) is low (49) or within an allowed limit (150) of the soil set forth in standard MNS 5850:2008, Cd (cadmium) is very low (<0.005) or lower than (0.01-2.0) an allowed limit set forth in standard, As (Arsenic) is low (18) or within an allowed limit (0.1-40) set forth in standard, Hg (mercury) is low (0.15) or within an allowed limit (0.01-0.85), Pb (lead) is low (45) or within an allowed limit (2-300) set forth in standard.

Mixed soil sample-2.

Sample X-2 was taken in the south of railway Passenger's Wagon Depot in a thin hollow area. This hollow area is full of domestic wastes e.g. trashes and plastic bags.

We took 10 samples from 7 cm depth of 10 areas of this contaminated area and prepared a mixed sample.

Figure 73. Mixed sample (X-2) is prepared from hollow area in south of Railway Wagon Depot

According to the results of laboratory analysis of heavy metal content in soil of hollow with wastes in south western part of railway station, content of Cr (chrome) is low (68) or within an allowed limit (5-1500) set forth in standard MNS 5850:2008, content of Cd (cadmium) is very low (<0.005) or within an allowed limit for soil (0.01-2.0) set forth by MNS 5850:2008,

content of As(arsenic) is low (11) or within an allowed limit (0.1-40) of soil, Hg(mercury) is low (0.19) or within an allowed limit of (0.01-0.85) standard, Pb (lead) is very low (27) or within an allowed limit for soil (2-300) set forth in standard.

Mixed soil sample-3. The sampling location is in between the Dundgol River and West Industrial Road next to Wagner Asia LLC. As with previous sampling point, the area dumped with various solid wastes. Soil sample X-3 was taken here in order to check soil contamination status.

Figure 74. Sampling location of mixed soil sample-3

According to results of laboratory analysis that determined heavy metal content in this soil sample, content of Cr (chrome) is low (40) or within an allowed limit (5-1500) set forth in standard, Cd(cadmium) is very low (<0.005) or within an allowed (0.01-2.0) set forth in standard, As(arsenic) is very low (7) or within an allowed limit (0.1-40) set forth in standard, Hg(mercury) is low(0.19) or within an allowed limit (0.01-0.85) of standard, Pb (lead) is low (62) or within an allowed limit (2-300) set forth in standard.

Mixed soil sample-4. Soil sampling area is located in between the Dundgol River and West Industrial Road next to Suuri LLC. Elevated waste of dam along with river watercourse is cut and dug in order to install cable line. This area has average vegetation and we prepared mixed soil sample X-4 by choosing an area with compacted and exposed soil.

Figure 75. Sampling location of mixed soil sample -4

According to the results of laboratory analysis that determined heavy metal content of this soil sample, content of Cr (chrome) is low (44) or within an allowed limit (5-1500) of soil set forth in standard, Cd (cadmium) is very low (<0.005) or within an allowed limit(0.01-2.0)- set forth in standard, As (arsenic) is low (6) or within an allowed limit (0.1-40) set forth in standard, content of Hg (mercury) is low (0.05) or within an allowed standard (0.01-0.85) for soil, Pb (lead) is low (25) or within an allowed standard (2-300) set forth in standard.

Mixed soil sample-5.

Sampling was taken next to Dundgol River Railroad Bridge in area with wastes in western side of bridge past the old bridge at Dund River. 10 samples were taken from 7 cm of depth of 10 different areas within 250 square meter area and samples were mixed into one sample X-5.

Figure 76. 10 samples were taken from 7 cm depth of 10 different points of this area

According to laboratory analysis of heavy metal content of nearby area of Dundgol River Railroad Bridge, content of Chrome is low (51) or within an allowed limit (5-1500) set forth in standard, Cadmium is very low (<0.005) or within an allowed limit (0.01-2.0) of standard, Arsenic is low (9) or within an allowed limit (0.1-40) of standard, Mercury is low (0.19) or within an allowed limit of soil (0.01-0.85) set forth in standard, Lead is low (97) or within an allowed standard (2-300) set forth for soil.

Compiled results of heavy metal content of sampled soils are shown in Table 29.

Table 29. Heavy metal content of the soil (mg/kg)

No of Samplings	Hg	Cd %	As	Pb	Cr
X-1	0.15	<0.005	18	45	49
X-2	0.19	<0.005	11	27	68
X-3	0.13	<0.005	7	62	40
X-4	0.05	<0.005	6	25	44
X-5	0.19	<0.005	9	97	51
MNS 5850:2008	2	3	50	100	150

3.3.6 Quality Of River Sediment

Two samples were taken to determine sediment quality of Dundgol River (for location of samplings please see Figure 77). One sampling was taken upstream of Dundgol River away

from Project area and second was taken in downstream Dundgol River within project area to identify baseline status of sediments beneath water flow.

Sediment sample -1. (Sed-1) Sediment sample was taken from downstream of Dundgol River about 400 meter from Dund River Railroad Bridge.

Figure 77. Sediment sampling location

According to the results of analysis of heavy metal content of sediment sample taken from the bottom of nearby water, content of Cr (chrome) is low (23) or within an allowed limit (5-1500) set forth in Mongolian standard MNS 5850:2008, Cd(cadmium) is very low (<0.005) or within an allowed limit (0.01-2.0) set forth in Mongolian standard MNS 5850:2008, As(arsenic) is low (11) or within an allowed limit (0.1-40) of standard, Hg(mercury) is low (0.05) or within an allowed limit (0.01-0.85) of standard, Pb (lead) is (481) or much more than an allowed limit (2-300) for soil and all data are put in table 30.

Table 30. Heavy metal content within the sediment (mg/kg)

Element	Hg	Cd	As	Pb	Cr
Sed-1	0.05	<0.005	11	**481**	23
MNS 5850:2008	0.01-0.85	0.01-2.0	0.1-40	2-300	5-1500

Sediment sample-2.

Second sediment sample (Sed-2) was taken upstream of Dundgol River 400 meters away from Dundgol River Railroad Bridge.

Figure 78. Sediment sampling location

According to the results of an analysis, content of Chrome is low (91) or within a (5-1500) allowed limit set forth in Mongolian standard MNS 5850:2008, Cadmium is very low (<0.005) or within an allowed limit (0.01-2.0) allowed limit set forth in MNS 5850:2008, Arsenic is low (13) or within an allowed limit (0.1-40) set forth by the standard, Hg is low (0.11) or within an allowed limit (0.01-0.85) for soil set forth by standard, Lead is low (57) or within an allowed limit (2-300) set forth in standard. Lab results are in table 31.

Table 31. Heavy metal content of the soil (mg/kg)

Elements	Hg	Cd	As	Pb	Cr
Sed-2	0.11	<0.005	13	57	91
MNS 5850:2008	0.01-0.85	0.01-2.0	0.1-40	2-300	5-1500

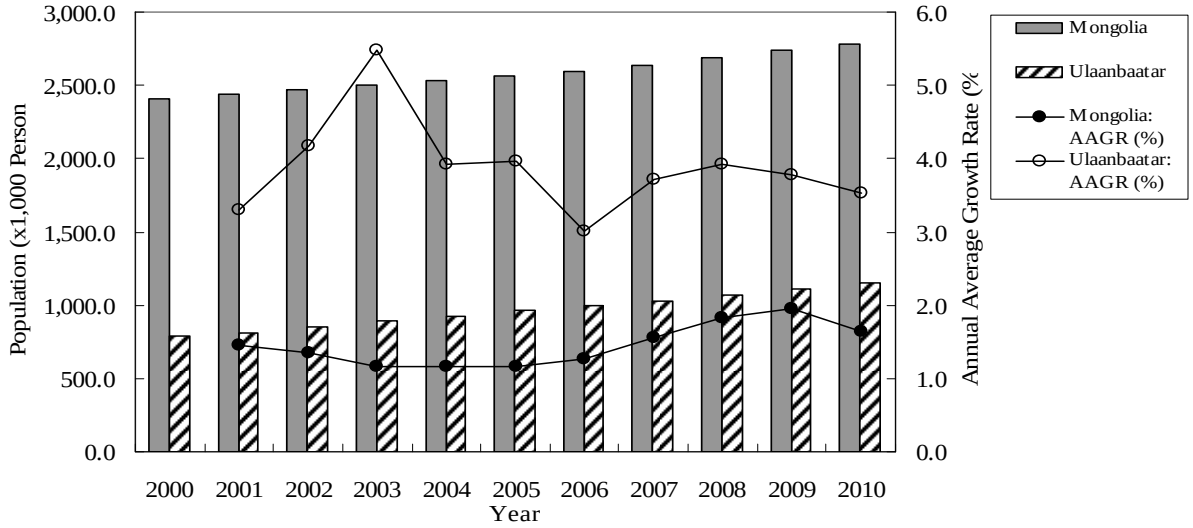
If take the lab results of sediment samplings, River pollution by heavy metals is a quite low or within allowable level set in the National standard, except lead content in the second sampling taken in the project area, which is 1.6 times higher than the upper limit of allowable Lead level (2-300). This indicates that Dundgol River is partly polluted by a heavy metal Lead and further study need to be done to identify a cause of pollution and extend of damage in the sediment of Dundgol River and to neutralize and clean the river from heavy metal pollution.

3.4 Social and Cultural Profile

3.4.1 Population and community characteristics

Population of Mongolia was increased from 2,44 mln to 2,811 mln within last 10 years (2001-2011) and it was increased by 1,1 times and population in Ulaanbaatar city is being rapidly increased 1.4 times from 810 thousands to 1,15 mln. Within last 10 years, average population growth of Mongolia is 1,6% (approximately 1,2-1,9%) which has normal growth level but percentage of population growth in Ulaanbaatar city is 3,5 % (3,0-5,5% a year) which is higher percent due to influences of citizens who are moved from countryside. As of 2011, number of population per 1 km area was 274 in Ulaanbaatar city and it was increased by 30 people compared to 2008, 19 people compared to 2009 and 9 people compared to 2010.

Displacement and movement was regulated under the plan until the first half of 1990 but in 1997 displacement and movement got free and population of Ulaanbaatar city was rapidly increased population of Ulaanbaatar city was increased by 5,5% a year and it is the high index. Since that time, growth percent was reduced a little but it was being increased by 3, 5% a year. Due to population of the city and economic growth number of automobiles is being increased and traffic movement will be difficult.



Source: Collection of Mongolian statistics, 2002-2010
Remark: AAGR, Annual average growth

Figure 79. Changes to population growth in Mongolia and Ulaanbaatar city.

Ulaanbaatar city consists of 6 districts and 3 satellite towns (figure 80), Songinokhairkhan district (24,8%) and Bayanzurkh district (26,2%) where approximately half of population lives here, lead others through growth of population and each of them was increased by 5% and 6,3% within last 10 years (2001-2010). (Figure 79) Furthermore traffic movement from the east and right sides being increased to the city center.

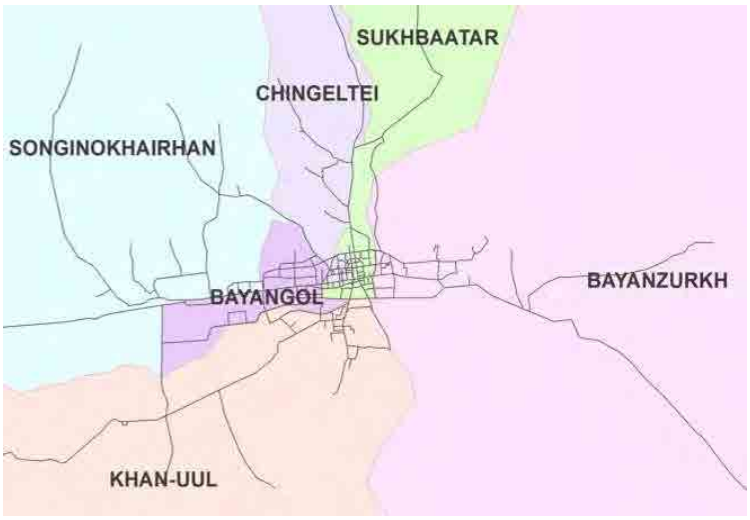
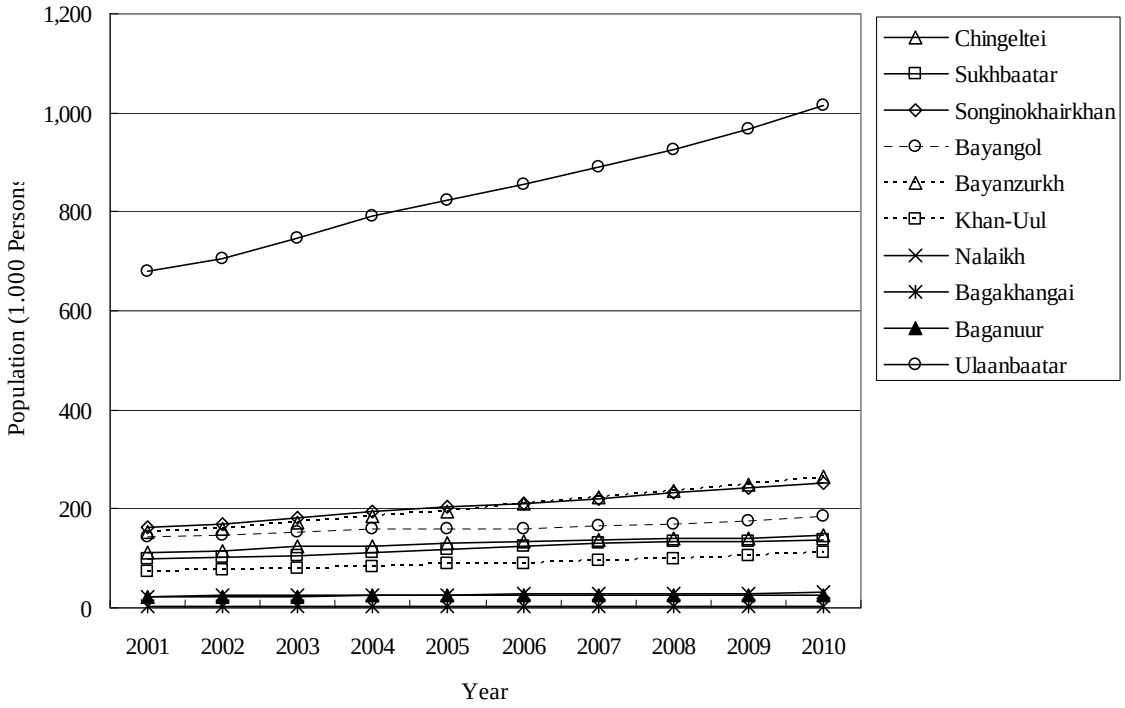


Figure 80. Boundaries of Districts of Ulaanbaatar city



Source: Road Authority, Ulaanbaatar city, 2011

Figure 81. Population displacement and movement in each district of Ulaanbaatar city (2001-2010)

Mongolia is developed by socialist socio-economic development for 70 years and number of population is relatively small compared to total territory and it can be a feature of historical development that differs from other Asian countries.

In 2009, economic growth of Mongolia was 0 percent due to work economic decline but in 2010 it was rapidly developed and GDP reached to 6%. Driving force of such intensive growth was that industrial growth reached to 10.0% and it reached to two-place numbers from minus growth. Growth in the mining sector reached to 10.1% and industrial growth reached to 11.4%.

caused over centralization of the city planning which is the main social issue of Ulaanbaatar city.

We can see population's literate level and educational level which was the main socio-economic index from the table of educational backgrounds with positive indexes. In addition, recent economic growth declined poverty rate too.

Table 32. Population and Economic growth

	2000	2008	2009	2010	2011
Population (1,000 people)	2373.5	2,666.0	2,716.3	2,761.0	2,811.6
Population in Ulaanbaatar city (1,000 people)	760.1	1147.4	1,196.8	1,244.4	1,287.1
Population in Ulaanbaatar city (%)	32.0%	43.0%	44.1%	45.1%	45.8%
Growth in GDP	1.1	8.9	-1.3	6.4	17.3

1. Land acquisition

Issues in relation to land acquisition are regulated by several articles of Mongolian laws.

Legal environment in relation to land relations:

In 2000, Mongolia has provided revised legal environment that regulates land relations (land exempt and resettlement (LER)). legal environment on land are as follow:

Constitution of Mongolia. Constitution of Mongolia confirmed that citizen of Mongolia must have personal property and rights to live in the healthy and safe environment and to get material financial assistances.

Article 6.4 of the Constitution reflected that if citizens use land for public demands, the state collect back the privatized or possessed land. Article 16.3 of the Constitution reflected the issue that issues compensation to land owner if the state collects back possessed land for public needs. There is an article reflected that if land owner uses the land as harmful or toxic for safety, environment and population's health of the country, the state directly collect back the land.

Land law. The land law was reflected to use the land by 3 types: first, ownership and full utilization rights. It is only related to citizen of Mongolia; second, It was reflected to possess, to be possessed a land by citizens, enterprises and organizations of Mongolia based on the agreement, also reflected that ownership right period is 15-60 years which can be extended by 40 years; third, use. It means that owner of the land can define or use any useful properties of land according to the agreement which was made to land owner and holder at the accepted scope under the law and it is issued to citizen of Mongolia and foreign legal body for period of 5 years which is entitled to be extended for 5 years.

At the article 5 of the Law reflected that issues compensation for changing or repossessing other's ownership land prior to expiry date of agreement valid. At the decision about changing or repossessing other's ownership land with compensation must be included market price of construction buildings and other properties which are not separated from the land and land exemption costs.

Detailed agreement will be made to Governor of the administrative unit, enterprises and organizations and will change or repossess the land with the compensation. Governor of the administrative unit will issue compensation to the citizen, enterprise and organization that used to possess the land within 60 days since agreement was made. Land owner must exempt the land within 30 days since he/she was fully paid compensation.

Civil code: Civil Code included several articles about land exemption. Article 1 of the law, citizen and the government must be the subject who has same legal rights for civil relations. Articles 6, 7, 8 of the law, reflected that citizens, enterprises, provinces, soums and districts are entitled to possess material or non material items or to participate to legal relation in connection to displacement. Article 10 of the law, reflected land and other real estates and article 11 reflected about land ownership rights.

Land possession right to citizen of Mongolia. This law stated exemption of owned land. Article 32.1 of the law reflected to repossess owned land for state special needs based on below special demands. Here includes:

- to provide state defense and safety;
- to create permanent observation field for scientific & technological tests, experiments and environmental and climate characters;
- To build state road, lines, networks and construction buildings

At least one year ago to make decision about changing or repossessing citizen's land based on the state special demands with compensation, governmental and administration organization in charge of land issues must agree about it to land owner in advance.

Here includes: a) land and real estate prices on it, b) displacement cost, c) investment amount made by land owner to the land, d) location, size, character and quality of land which is replaced by purchased land for state special demand, e) land exemption condition and period, f) compensation size, terms of payment and duration.

If they could agree, land owner will exempt the land within 1 year. If they couldn't agree, dispute will be solved by court.

Article 33 of the law: In case that governor of the soum and district is necessary to provide public interests of population in the country or territory, may define following servitude for possessed land by citizen. Here includes:

33.1.1. to transit through the land;

33.1.2. to place land border and permanent geodesic point in this area;

33.1.3. to execute works for reducing marsh;

33.1.4. To implement other land organization activities

Compensation will not be issued for taking such measures. In case that citizen who possesses the land, is not available to use or difficult to use due to public servitude in the ownership land owner citizen is entitled to claim authorized body who defined public servitude to purchase the land and also to pay caused losses or to pay costs equal to such difficulties or troubles.

37.1. Changing or repossessing process of citizen's ownership land based on state special needs under the compensation, will be done after following measures are implemented.

37.1.1. in case that replaces ownership land must be possessed good quality land which will not be disapproved from possessed land for its character and quality based on citizen's request.

37.1.2. in case that repossesses a land, must pay land price;

37.1.3. must pay price of real estate, placed in the citizen's ownership land;

37.1.4. must reimburse properties which were spent to land by owner;

37.1.5. Must fully reimburse any losses caused to owner due to that land was replaced or repossessed based on state special needs under the civil law and regulations.

Moreover, land law and law about land possession to citizen stated that must exemption of the owned land must be compensated by market price.

3.4.2 Historical and Cultural Resources

There is no any historical & cultural places and monuments recorded and registered in the territory where the "Ajilchin" flyover project will be implemented.

3.5 Socio-Economic features

3.5.1 Productions and services

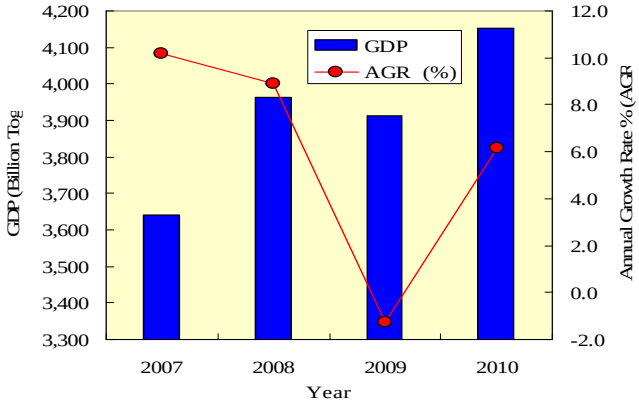
We have shown current situation and approaches of productions and services in Ulaanbaatar city by percent in Gross Domestic Products (GDP) at the table.

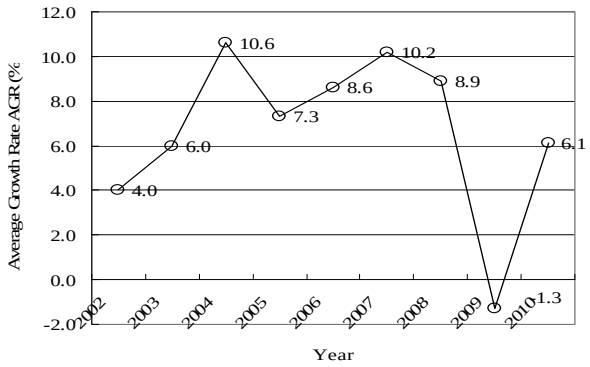
Table 33. Percent of productions and services of Ulaanbaatar city to GDP

2010				2011			
GDP, mln.tug	Percent to GDP			GDP, mln.tug	Percent to GDP		
	Agriculture	Industries & construction	Services		Agriculture	Industries & construction	Services
5 225 921.7	0.5	32.1	67.4	6 991 314.8	0.4	30.7	68.8

As a result of table data, production percent of the city to GDP was 30.7 percent in 2011 and it was declined by 1.4 percent from 2010 but service index was increased by 1.4 percent. It shows that influences of service sector are increased to the growth of GDP in Ulaanbaatar city.

Retails and wholesale, automobile and motorcycle repairing services played main role to increase additional costs at the service sector.





Source: Book about Mongolian statistics, 2002-2010

Figure 82. GDP and annual average growth

Figure 83. GDP annual average growth

We have shown total manufacturing capacity, annual average growth and growth changes of Ulaanbaatar city at the table 34 and figures 82 and 83 by the index 2007-2010.

Table 34. Total production sizes in the territory of Ulaanbaatar city (2007-2010)

Year	Production size GRDP(Unit：10billion.tug)	Average
2007	1,862.2	-
2008	2,173.7	16.7
2009	2,324.2	6.9
**2010	2,603.6	12.0
2007-2010	-	11.8

Source: Book about Mongolian statistics, 2002-2010

*Remark: **Preliminary estimation, AGR: Average growth (%)*

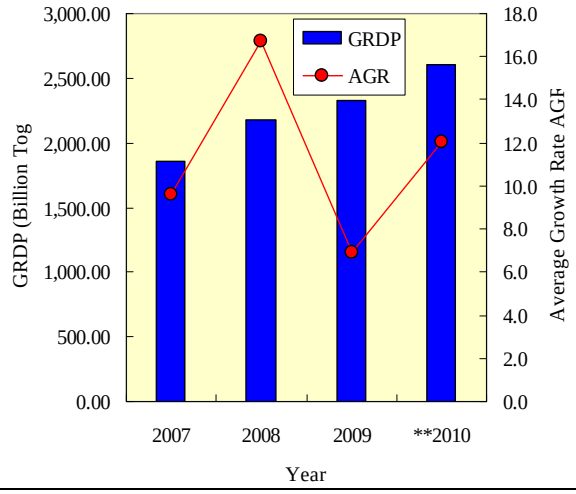


Figure 84. Production size of Ulaanbaatar city（GRDP）and annual average growth

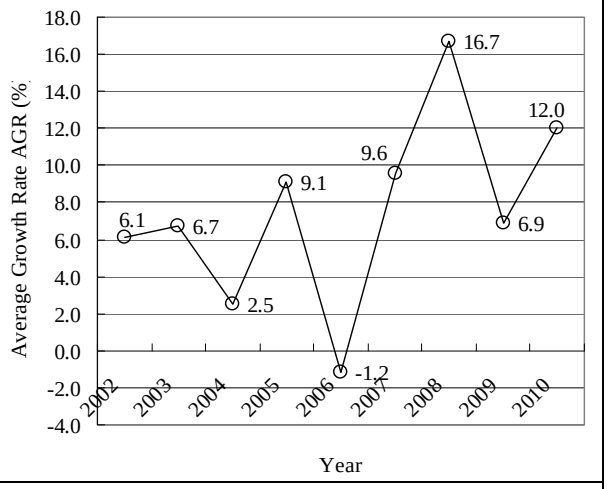


Figure 85. GRDP change to annual average growth

3.5.2 Infrastructure

For infrastructure, project location is in the city center and different kinds of engineering lines and networks are located above or underground in around the central part of city.

During the project preliminary surveys, JICA Study Team collected data about these lines and networks from Construction & Urban planning authority of Ulaanbaatar city, also they considered that information is not enough or complete, may have secret lines and networks which were not registered to the consolidated networks and they met each organization in charge of lines and networks and revised information.

Table 35 shows networks that can impact project works among the engineering & technical lines and networks included to the surveys.

JICA Study Team selected 10 points (D-1 ~ D-10) from engineering & technical lines and networks at the research scope, defined general location of the secret lines and networks by using ultrasounds device on each point, then defined location of drilling point based on the result of defined locations, drilled at 19 points and confirmed information.

Also they got information about proposed high voltage lines and its columns and new sewerage lines and also revised plans of railway authority.

Information is shown in table 35.

Table 35. Plan for future engineering and technical lines and networks

Type	Lines and networks	Work process	Remark
Energy	High voltage lines and its columns	Civil engineering work is being executed by now	Civil engineering works for new sub-station and (35kV) high voltage lines and its columns (H-26m) with financing of World Bank
		Planned to start civil engineering works in the middle of 2012	To draw and connect lines from above mentioned high voltage lines to the newly built apartment for railway employees (Golden park) (underground cable; GL-0.7-1.0 m) It is being implemented by funding of Ulaanbaatar city in the mid of 2012
Drainage	Sewer pipes	Civil engineering works are being executed	Large diameter sewerage lines (1 m size) will be installed in the east and west sides of cross section of Narnii zam near to ending point of the project
Railway	Railroad	At the proposal stage; Implementation period and detailed plan are not clear	New railway plan: Now offered to build one railway as 3 main railways but implementation period, actual extension limits of railway was not defined.

We planned to solve such infrastructure as follows in relation to civil engineering work of flyover.

Transfer plan for Engineering & technical lines and networks:

1. Baruun Teeverchid street

a/ Underground Engineering & technical lines and networks

In the Baruun Teeverchid Street, we are planning to build parking and road insulation lines with enough width between current roads and newly built roads. For that, we are planning to transfer and remove outside underground lines and networks below the routes of expected roads by providing enough fields for parking and road insulation lines.

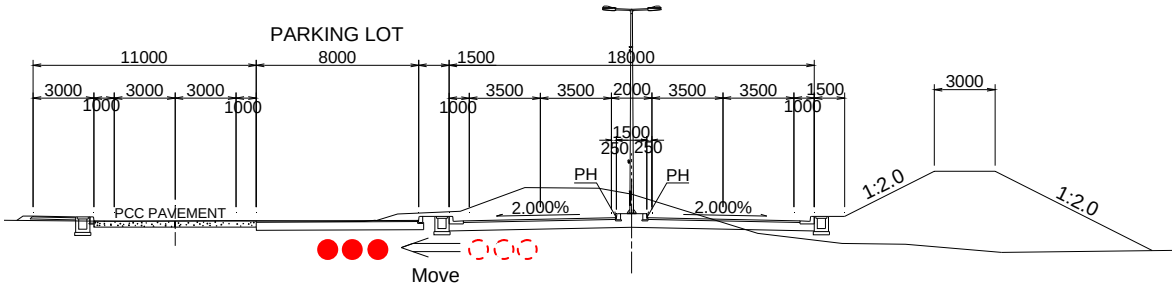


Figure 86. General settlement plan for Engineering & technical lines and networks in Baruun Teevershid street

b/ Heat Pipelines

Heat Pipelines are going across the expected roads of the project near STA. 0+440. In case that we repair road under the project, it is necessary to change it because current Heat Pipelines will pass through border of the road engineering works.

Moreover, for Heat Pipelines (φ300) which were connected to the railway ownership land from Narnii zam, we need to transfer it around south and north sides of STA1+500 without interrupting to foundation of the flyover. For other lines, settlement work volume becomes very high. Therefore, flyover is planned without removing lines. Locations are shown at the figures 87 and 88.

Figure 87. Heat pipeline near STA. 0+440

Figure 88. Heat pipeline near STA.1+500

1. Flyover section

There are many lines and networks which are hazardous to install close to lower structures-foundations of middle columns and flyover bridge. Also we expect that there are many engineering and technical lines and networks which are required to remove as we consider borders and limits of areas where install temporal protection equipment during the construction process even if it is not directly approached to design carcass. Moreover, these engineering & technical lines and networks must be removed far enough without interrupting flyover engineering works.

2. Narnii zam section

For underground lines and networks of Narnii zam, we considered future road repairing services, avoid changing routes and tried to remove it under the sidewalk. Moreover, cross breaks are planned to pave enough earth (above 0.8 m) and to make protection which are resistant in vehicle's loads.

3.5.3 Transportation

For all kinds of transportation, 44.1 mln/tons of freight and 296.2 mln people have been transported in 2011 and freight circulation reached to 4695.7 mln/per km. if detail transported passengers and goods: 25.6 mln/tons of freight, 291.8 mln people by auto road, 18.4 mln/tons of freight and 3.8 mln people by railway and 2.9 thous/tons of freight and 0.6 mln people by airlines.

Table 36 shows transportation indexes compared to previous year.

Table 36. Basic indexes of all kinds of transportation compared to previous years

Means of transportation	2008	2009	2010	2011
Freight circulation , mlnt/km				
Total	**9 051.4**	**9 016.4**	**12 127.8**	**16 336.7**
Railway	8 261.4	7 852.1	10 286.7	11 418.7
Auto	721.1	1 160.7	1 834.0	4 910.3
Airline	7.9	3.7	4.2	7.7
Transported freight thous.tons				
Total	**23 904.4**	**24 736.7**	**29 415.9**	**44 086.0**
Railway	14 646.9	14 171.5	16 804.0	18 447.7
Auto	9 255.7	10 563.8	12 610.2	25 635.3
Airline	1.8	1.4	1.6	2.9
Passenger circulation , mln per/km				
Total	**3 607.3**	**3 179.2**	**3 607.4**	**4 695.7**
Railway	1 400.4	1 008.5	1 220.0	1 399.7
Auto	1 215.0	1 535.9	1 480.2	2 321.8
Airline	991.9	634.9	907.2	974.1
Passengers , mln people				
Total	**231.6**	**232.5**	**250.7**	**296.2**
Railway	4.3	3.1	3.5	3.8
Auto	226.9	229.0	246.7	291.8
Airline	0.4	0.3	0.4	0.6

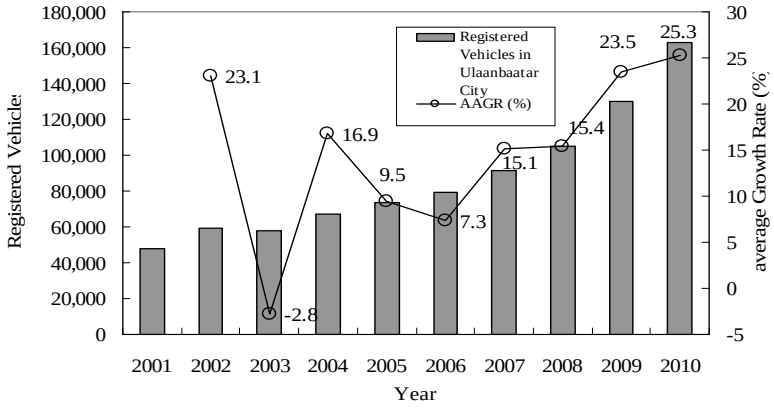
Freight circulation was increased by 14.7 mln/t or 49.9 percent and passenger circulation was increased by 45.5 mln passengers or 1.2 percent in 2011 compared to 2010. Freight on auto transportation was increased by 2.0 times compared to 2010 and according to technical control examination from 2011, number of all kinds of automobiles reached to 312.5 thousands, hence 208.5 thousands are cars, 75.1 thousands are trucks, 22.5 thousands are buses and 6.4 thousands are specially equipped vehicles. 67.1 percent of 209.8 thousands of total automobiles are in Ulaanbaatar city. Moreover, 18.2 percent of total automobiles was used for 9 years and 81.8 percent of them was used over 10 years.

Total length of improved auto transportation road in Mongolia reached 7633.4 km as of end of 2011 and hence paved road reached 4063.4 km. Total length of improved road was increased by 699.0 km in 2011 compared to 2010, hence paved road length was increased by 4063.4 km.

According to present transportation status, number of automobiles and quality issues are faced problems in Ulaanbaatar city. Thus, we consider growth in automobile quantities in relation to districts.

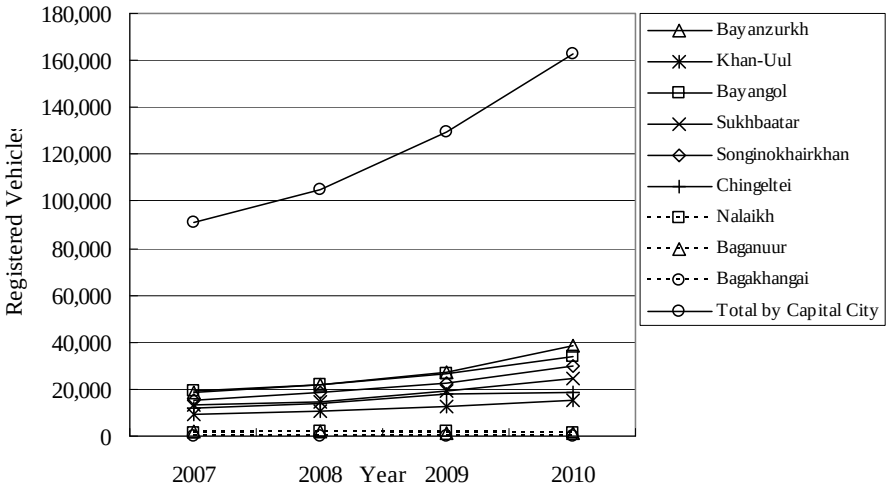
Quantity of automobiles of Ulaanbaatar city was increased by 14.5 percent a year within last 10 years (2001-2010). (Figure 82) This growth was declined for short period due to disaster in 2003 but it was intensively increased in 2007-2010 and as of 2010 reached to 162,000 and was higher index that was annually increased by 25.3 percent. Quantity of automobiles which was 48,000 in 2001 was increased by 3.4 times within 10 years. Due to influences of the rapid economic development in recent years quantity of automobiles may be rapidly increased.

Figure 89 shown quantity of automobiles which was reported by each district of Ulaanbaatar city (2007-2010). As of 2010, Bayanzurkh district had largest quantity of automobiles （23.6), Bayangol (20.7%), Songinokhairkhan （18.3%） and 63% of total automobiles is occupying in these 3 districts. Especially, in Songinokhairkhan district which has largest quantity of population quantity of automobiles was increased by 24, 8%, and 24, 6% in Bayanzurkh district.



Source: Book about Mongolian statistics, 2002- Road authority, Ulaanbaatar city 2011

Figure 89. Numerical changes to automobiles in Ulaanbaatar city (2001-2010)



Source: Book about Mongolian statistics, 2002- Road authority, Ulaanbaatar city 2011

Figure 90. Numerical changes to automobile holders of districts of Ulaanbaatar city （2001-2010）

Quantity of automobiles in right and east side districts of the city and also central district where the project is implemented is leading others and it confirms that “Ajilchin” Flyover will play important role to solve traffic jam.

3.5.4 Health And Labor Safety

Employees’ labor safety in Mongolia is regulated by the “Labor Law” and other applicable laws and regulations of Mongolia. The purpose of the Labor Law is to identify rights, obligations, mutual agreement, negotiations, sole or mutual labor dispute, labor conditions, administration, controls and liabilities for breaching laws and regulations of employee and employer who participate to labor relations based on the employment contract and to provide mutual equal rights and interests.

To make mutual agreement and negotiations parties will comply with following principles. 1. To become transparent

2. Must suit for laws and regulations
3. Number of parties’ representatives must be equal
4. Parties must have equal rights
5. To freely select and discuss issues which will be reflected to the mutual agreement and negotiations
6. To be obliged willingly
7. To clearly indicate liabilities

Following provisions must be appropriate to labor contract.

1. Work place or position name
2. Works and tasks
3. Basic pay or salary amount for the position
4. Labor condition

Work place conditions are divided as normal or abnormal labor conditions. Employer will be done evaluation to work places by professional authority. The law stated that an employee who works in the abnormal labor conditions will be issued pension under the flexible conditions.

Organization of work places must be suit for production technological requirements and provide safety and hygienic standards. Any chemical, physical and biological negative factors which can be caused at the work place during the production process must not be exceeded than hygienic norms and standards. Also must equip accommodation for employees at the work place according to hygienic standards. Employer must provide an employee through working uniforms and personal protective that meet safety and hygienic standards according to labor conditions, work and task features. Employer is obliged to clean, disinfect and repair working uniforms and personal protective.

Employer will confirm and be complied with internal rules for fire safety. Enterprises and organizations which were provided by fire alarm and fire extinguishing special equipment

must keep their permanent operations and train its employees to use them. Employer must implement all required measures against fire hazards.

Employer must provide, equip and furnish accommodation for temporary rest, warm and harboring purposes to the employee who is working at the open area in the inappropriate climatic conditions such as extremely hot, cold, windy and rainfalls or cool-work place according to labor standard.

Employer must provide an employee through work placed with convenient labor conditions and provide a condition that chemical, physical and biological factors which were caused during the production process don't make negative influences to labor hygiene and environment of work places. Employer will provide an employee who works in the abnormal labor condition through personal protective tools, special uniforms, toxic neutralization substance, foods and products.

Employer must be included employees to the necessary and preliminary or regular medical examinations in relation to productions, works and services according to regulations approved by the authorized organizations. Employer will be responsible for costs in relation to medical examinations.

3.5.5 Access to Health Services

Numbers of medical institutions which provide services to citizens and their growth and decrease dynamics are shown in table 37.

Table 37. Quantity of medical institutions

Index	2008	2009	2010	2011
State medical institution				
Clinical and specialized professional hospitals and centers	15	16	16	16
Clinical hospital of the district and province	36	35	35	35
Soum hospital	286	277	274	274
Inter-soum hospital	35	35	37	37
Private medical institutions				
Private hospital	1 063	1 082	1 113	1 184
Family hospital	228	226	218	219
Pharmacy	741*	636**	666**	703**

Remark. **Quantity of state and private pharmacies*
***Quantity of private pharmacies*

Total 41.1 thousands of employees worked for the medical sector in 2011 and it was increased by 3.8 percent compared to 2010. 7.9 thousands of total employees are physicians, 1.3 thousands are pharmacists and 16.5 thousands are medical assistant specialists; hence 9.4 thousands are nurses ad 15.4 thousands are other employees. According to the survey, number of family and soum physicians was declined compared to previous year.

It may have negative influences to access of medical services to urban and local citizens. But number of physicians was increased by 4.7 percent in 2011 compared to 2008, 11.2 percent compared to 2009 and 5.9 percent compared to 2010 and number of medical

assistant specialists was increased by 2.7 percent compared to 2008, 4.4 percent compared to 2009 and 4.2 percent compared to 2010.

We have shown accesses of medical services by regions or compared indexes at the table 38-40.

Table 38. Number of people who are available to one physician or nurse (state average index as of 2011)

Regions	Per physician	Per nurse
State average	337	284
West zone	517	301
Khangai's zone	531	321
Central zone	450	329
East zone	473	299
Ulaanbaatar city	240	253

Table 39. Number of people who were treated at the hospital, thous.per (compared to 2010, 2011)

Regions	2010	2011
State average	679.6	694.2
West zone	97.3	97.1
Khangai's zone	122.4	119.8
Central zone	100.8	98.6
East zone	45.5	46.4
Ulaanbaatar city	313.6	332.3

Table 40. Expenses at the medical sector (compared to 2010, 2011)

	2010	2011
Total expenses of total state budget, mln/tug	30 806 851.0	4 792 030.9
Total medical expense mln/tug	250 264.7	331 262.9
Percent of medical expense at the total state	8.1	6.9
Medical cost per person, thous.tug	91.4	123.6

3.5.6 Access to Education

Access to Education chapter includes number of educational training institutions, students, graduates, recruits and teachers at the all educational stages by its educational levels, zones and regions. Moreover, we considered training percent and student-teacher's relations and school omission percent at the general educational schools. Also we compared educational indexes of the countries which have different development levels.

As of today, there are total 752 general educational schools in Mongolia, hence 62 schools are elementary, 144 schools are basic schools, 545 schools are high schools and 74 schools are general educational schools with evening classes. There are total 172 universities, institutes, colleges and 49 vocational training and production centers, hence 5 institutes and colleges, 10 universities, nongovernmental: 22 vocational training and production centers, 77 institutes and colleges and 4 universities. There are 5 foreign universities which run their activities in Mongolia.

We have shown number of students at the all stages of educational institutions at table 41.

Table 41. Number of students in all types of educational institutions

/thous.tug/

Types of educational institutions	2010/2011	2011/2012
All students	732.0	729.6
Total of day class students at the general educational schools	512.2	505.4
Hence: Elementary	265.6	256.6
Secondary	172.9	169.2
High	73.7	79.6
Evening or home course students of the general educational schools	2.9	2.4
At the university, institute, college and vocational training & production center:	216.9	221.8
	139.1	141.3
where: 1.State owned:	34.7	37.2
where: Vocational training & production center	6.0	15.3
Institute and college	98.4	88.8
University	76.7	79.2
2. Nongovernmental:	11.4	10.9
where: Vocational training & production center	49.2	51.2
Institute and college	16.1	17.1
University		
Foreign schools which run their activities in Mongolia	0.4	0.4

In the session 2010-2011, total 133.7 thous. people graduated from the all stages of educational institutions, hence 86.7 thous. people completed general educational schools, 11.2 thousands graduated from vocational training and production center and 35.8 thousand people graduated from universities and colleges.

As we considered teacher's status, total 40.8 thousands teachers have been working for the all levels of educational institutions. Hence, there are 4.9 thousands kindergarten teachers, 26.5 thousands general educational schools, 2.1 thousands teachers of vocational training centers and 7.3 thousands teachers of the universities.

Figure 91 shows correlation between students and teachers.

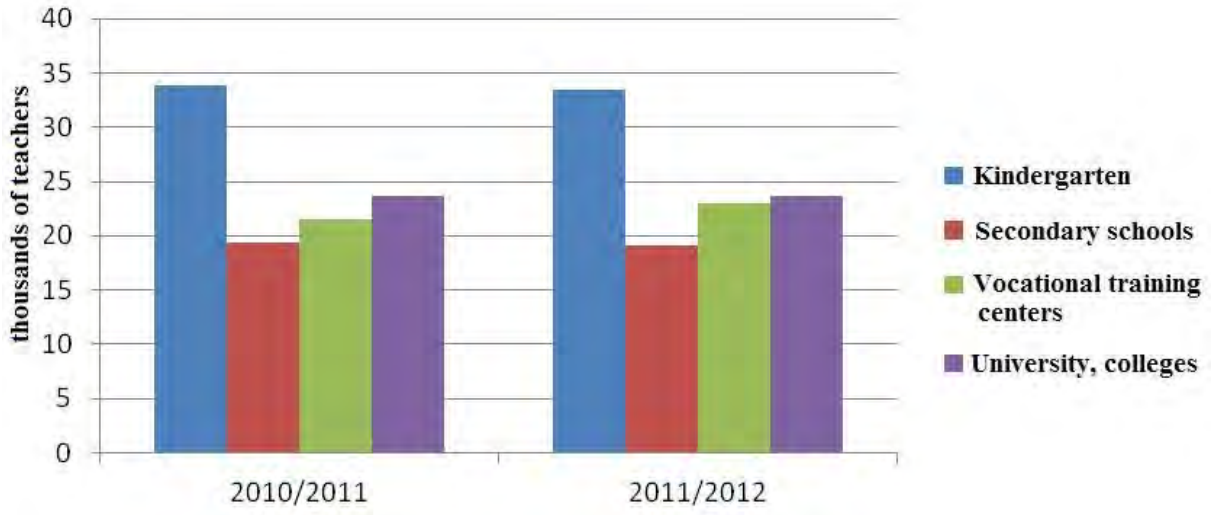


Figure 91. Student-teacher correlation at all levels of educational institutions

Table 42 shows compared indexes to countries which have different educational development levels

Table 42. Educational comparison, by percent

	Literacy	Elementary education	Secondary education	Complete secondary education
XXY higher countries	92.3	94.4	74.9	43.2
XXY average countries	80.7	88.5	57.0	17.6
XXY lower countries	61.2	73.4	30.9	6.0
Mongolia	97.3	88.7	82.0	49.8

3.5.7 Water supply and Sanitation

As research result shows, 62.1 percent of households in the city has improved water supplies, among which 40.8 percent uses water from centralized pipelines, 12.5 percent use from water distribution point which was connected to pipelines, 8.7 percent uses water from deep water wells and 0.1 percent used water from protected water well. For rural citizens, only 17.3 percent of total citizens use water from protected water sources and main source are deep water wells.

Table 43 shows result of the access of water supplies and sanitation buildings which was reported by households

Table 43. Access of water supplies and sanitation buildings, %

	From networks that were connected to centralized lines	From water distribution point, connected to lines	Depth hole water	Protected wells	Protected springs	Total
Urban households	40.8	12.5	8.7	_	0.1	62.1
Rural households	_	-	16.6	-	0.7	17.3
Total	25.0	7.5	11.7	-	0.3	44.6

Mongolia has been complying with following standards and norms for water supplies and sanitation.

- Regulation for saving water resources from pollution
- Pure classification of surface water
- Quality standard of drinking water UST 900-92
- Quality standards to Drinking-household and culture-household use water

It is still possible that some citizens, specially citizens migrated from rural areas and citizens in ger districts who are living in the suburb near the downstream in project implementation area may use water of Tuul river for their household consumption.

Thus, they must know pure classification and uses of surface water for sanitation.

1. Very pure water. This water is accepted to be used for all kinds of water consumption in case that implemented sanitation protection but we can directly use for household centralized or non centralized water uses at first or use after disinfection.

2. Pure water. This quality water is appropriate for using for all kinds of water uses in case that don't require high standards, also use it for the first type of water uses in the fish farm; only disinfect or filter it for drinking-household centralized or non centralized water supplies and food manufacturing use after disinfection.

3. Less contaminated water. This quality water is inappropriate for public drinking-household water supply and manufacturing uses in some cases but it is permitted to use it after purifying and disinfection process in case that strictly implemented sanitation protections; also it can be used for the 2nd type of water uses in fish farming and for cattle breeding water and recreation, physical educations sports of population.

4. Contaminated water. This quality water can be used for agricultural irrigation and also for water supplies of production technology by processing, filtering and softening it in advance.

5. Much contaminated water. Such water can be used for water supplies of production techniques which don't require direct human involvement by purifying, filtering and softening it in advance.

3.5.8 Roads and Communications

(1) Road

The railway that connects Ulaanbaatar city in the east-west routes is important transportation infrastructure of Mongolia, it simultaneously divides the city into south and north sides and it is the reason that causes obstacles to the traffic movement networks. Nowadays, there are Peace bridge and Gurvaljin bridge and 3 railway gates which intersect at the 5 railway points in the city center and it will be intersected at 6 points including "Narnii" flyover (Grant project from Japan) which will be commissioned in November of this year.

Peace Bridge was built by Chinese construction workers in 1960. Now, problem are faced regarding bridge loading and restricted movement of heavy-duty trucks. In contrast, magisterial road that connects Ulaanbaatar city in the east-west route, was restricted by Peace avenue and it increases movement intensity and is the reason for traffic jam.

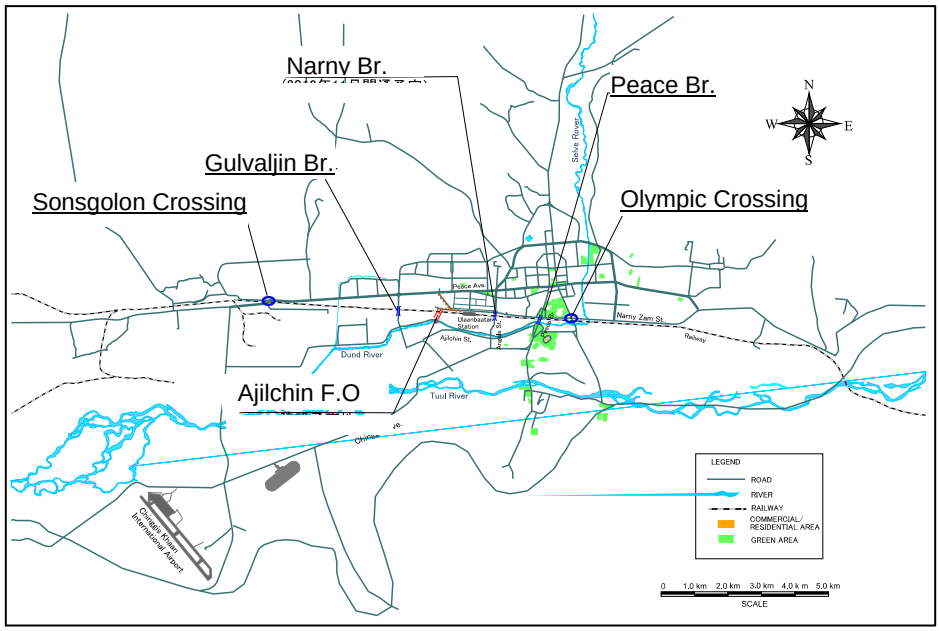
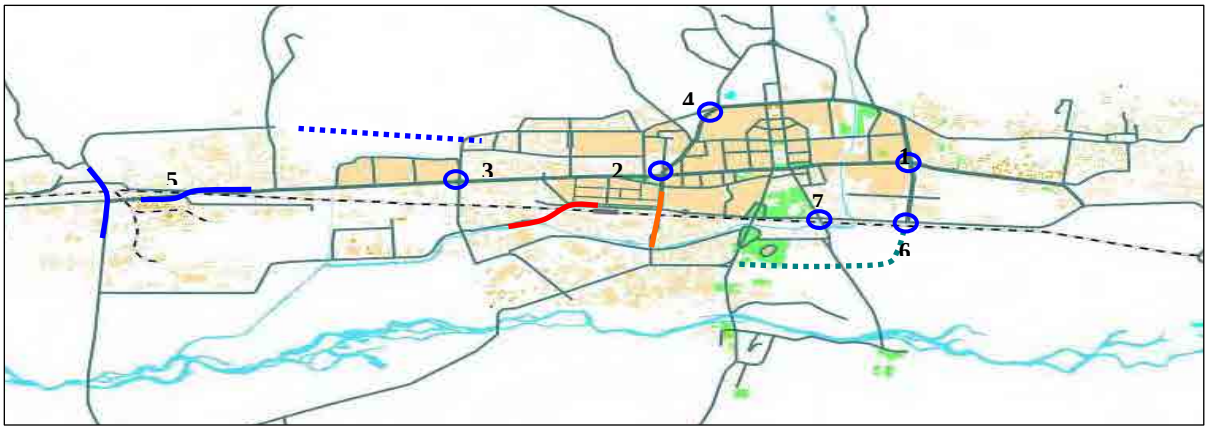


Figure 92. Points which are intersected by railway in Ulaanbaatar city

General development plan of Ulaanbaatar city till 2030, drafted proposal about auto road networks which improve east-west and south-north roads in order to solve these issues and also considered that “Ajilchin” flyover can be only bridge that is connected to the main magisterial in the east and west, which is connected through Peace avenue. Also it is impossible to freely convey the movement as a result of increased traffic intensities due to that crossing of the main roads of the city is intersected at the same level. Thus, we plan multilevel crossing at the 7 points besides “Ajilchin” flyover.

Figure 93 shows diagram for location planning of the multilevel crossing within the city according to research, executed by JICA Study Team.



Source: JICA Study Team. Plan for improving auto roads in Ulaanbaatar city

Figure 93. Planning to multilevel crossing locations in Ulaanbaatar city

(2) Communication

Base communication indicators have been shown by numbers of telephone and mobile phones, wireless telecommunication, in-line radio point, satellite telecommunication users, quantity of internet service (internet cafe), permanent internet users and computers.

Table 44 shows base communication indicators.

Table 44. Base indicators of communication sector

Base indicators	2010	2011
Number of communication sector	320	221
Number of postal branch	405	397
Telephone point, thous.	143.2	131.8
Number of television broadcast plants	378	378
In-line radios, thous.	56.2	50.5
Television, thous.	554.4	708.1
Number of cable television users	120 551	180 052
Number of mobile phone users (duplicated number) thous.	2 532.9	2 942.3
Wireless telecommunication users	45 461	44 999
Satellite communication users	773	986
Number of internet service organizations Internet café	77 200	85 180
Number of permanent internet users, thous.	199.8	457.6
Number of computers	373 075	421 901

According to indicators in table, quantity of mobile phone users was increased by 16.6 percent in 2011 compared to previous year, number of satellite communication users was 773 in 2010 but reached to 986 in 2011. According to it, quantity of landline telephone was reduced by 11.4 thous. In 2011 compared to 2010. Quantity of internet service organization was 77 in 2010 and it was increased as 86 in 2011.

Quantity of economic entities and organizations at the information and telecommunication sector reached to 1713 in 2011 and 35.8 percent of them are computer programming, consulting and related activities, 29.7 percent of them are layouts and publication services, and 17.3 percent is telecommunication and 8, 1 percent of them runs broadcasting and transmission activities.

3.5.9 Access to Energy

Table 45 shows access to Energy and its consumption.

Table 45. Access to Energy and its consumption, mln/kwt

Items	2010	2011
Resource-total	4 575.7	4 811.9
Produced	4 312.8	4 536.4
Import	262.9	275.5
Allocation – total	4 575.7	4 811.9
Used: where: Industries and construction Transportation and telecommunication Agriculture Families, apartments and public utilities Other	3 375.9 2 093.8 140.4 35.6 809.7 296.2	3 453.0 2 140.8 143.7 36.4 829.5 302.6
Distribution and line loss	505.4	644.3
Domestic uses of power plant	672.2	690.8
Export	22.2	23.8
Produced power per one person, kwt/hrs	1 574.8	1 628.1

4. SCOPING AND PRIORITIZATION OF IMPACTS/RISKS

4.1 Methodology

An Environmental Impact Assessment of a project pursue the general methodology, which described below:

- Scoping and prioritization of Impacts must be conducted within the limits of project scope. (see 4.1.2)
- Environmental parameters will be measured to wide ranges of expected changes due to a project proposed activities: change in biodiversity species and natural resources; environmental changes, social impacts, impacts to natural beautiful places, historical and cultural items, archeological and paleontological findings and impacts to economics and environment and examine their impacts.
- Impacts can be divided as direct or indirect through its type, long-term and short-term through its duration and strong, medium and lower by its intensity.
- Both negative and positive factors that lead to impact are estimated.
- To assess impacts, justification must be based on results of data analysis and conclusions of experts of assessment team, as well as comparatively study findings of assessment report on feasibility study of JICA team and a system approach method.
- Project expected impacts as well as prioritization of impacts will be done in two steps: during construction of flyover bridge and during flyover exploitation and maintenance through assessing scope of impact, duration and intensity.
- To estimate assessment, will use average normative method for system selection. (See details of specific method in chapter 4.3)

To evaluate impacts by using system approaches, checklist and matrix methods are used. Checklist method is based on principle that if a certain impact “exist” or “does not exist” and mark any negative impact as “x” and positive impact as “+”.

4.2 Environmental Impacts

Environmental and socio-economic impacts have been identified based on general methodology and checklist methods. Project location is a part of City's central district, where density of human population is high and many production and services are concentrated. Table 46 shows results of assessed impacts.

Table 46. Forms, duration and intensity of environmental impacts

№	Environmental parameters	Form			Duration		Intensity		
		Direct	Indirect	Self-regulated	Short	long	Strong	Medium	Low
1	2	3	4	5	6	7	8	9	10
Changes in ecological components									
1.	Changes in surface water flows								
2.	Changes in surface water quality		x		x				x
3.	Changes in vegetation cover								
4.	Soil deterioration and erosion	x			x				x
5.	Changes in geological formation								
6.	Changes in wildlife								
7.	Climatic changes								
Natural resource use									
8.	Earth surface resources								x
9.	Pasture and forage								
10.	Minerals and raw materials resources								
Environmental changes									
11.	Quality and resources of drinking water								
12.	Quality and resources of surface water								x
13.	Air pollution	x			x			x	
14.	Soil pollution	x			x				x
15.	Impacts of contaminating substance to population through water								
16.	Noise and vibration impacts		x						x
Social impacts									
17.	Impacts to infrastructure development	+				+	+		
18.	Impacts to service sectors		x/+		x	+			x
19.	Increase in population's income	+							+
Natural beautiful places, historical & cultural memorials and archeological and paleontological findings									
20.	Changes in natural view								
21.	Changes in landscape contour and color		x						x
22.	Impacts to protected areas								
23.	Impacts to historical and cultural memorials								
24.	*Archeological and paleontological findings*								
Economics and environment									
25.	Increase in local income	+			+				+
26.	Increase in job places	+			+				+

Expected negative and positive impacts, its duration and intensity have been identified and described:

Direct impact:

- During the installation of equipment and machinery as well as civil engineering and construction works of flyover project, soil will be slightly disturbed and dust pollution will be created because of released soil and dirt.
- Earthworks during construction will change geological formation slightly.
- Civil engineering, construction works and heavy machinery will cause air and soil pollution in short term.
- After construction, the flyover bridge and its access roads will positively impact infrastructure and economic development for long period.
- Civil engineering and construction works during construction of the flyover will positively affect in increasing local work places and income

Indirect impact:

- Waste of civil engineering works will affect quality of soil and surface water
- Noise and vibration from machinery and mechanisms during construction stage, will slightly impact construction workers slightly.
- It will negatively influence to activities of service sector in around project areas shortly however, in long term it will positively impact service sector in the city, as a whole.

Long term impact:

- After completion of the flyover construction, will be used for long period and make positive impact to infrastructure development.
- Flyover bridge will positively impact local population's health and economy by reduced traffic jam on the road and air pollution reduction.

Short term impact:

Train noise and vibration, which is passed below the flyover, will be increased within short period and small amount of air, soil, river and water pollutions may be caused due to dust and waste of engineering and construction works.

Strong impact:

As a result of study on expected impact assessment, there is no strong and negative impacts will produced from the project.

4.3 Prioritization of environmental impacts

We have done prioritization assessment to impacts by using average normative method which is widely used to system selection method. Features of the method can be identified by following formula.

$$S = \frac{\sum I_i}{\sum I_i \times R_i}$$

Where, S – negative impact assessment or arithmetical sum of assessment scores. It ranges between 1-10 and in case, if sum is less than 4, it means less negative impacts; if it is between 4-7, it means medium negative impacts and if it is more than 7, it is expected more negative impacts. Prioritization of negative impacts will start from higher scores.

I- index grading that expresses demands to do impact assessment of a project. An expert who does assessment, will assign relevant scores based on his expert knowledge and experiences. Scores are expressed quantitevily and qualitively within range of 1-5 in relation to other activities.

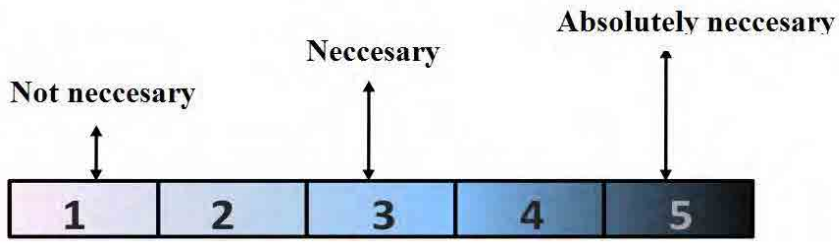


Figure 94. Index grading

R-negative impact of the project to the environmental factors. Negative impacts are expressed in number in range of 1-10 scores and an expert who makes assessment, will identify numerical meaning based on his expertise.

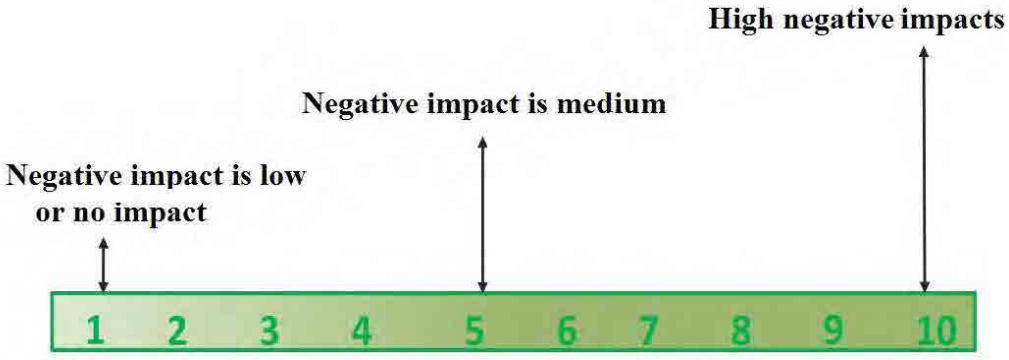


Figure 95. Scoring of negative impact for a project

Table 47 shows prioritized impacts of assessment for Ajilchin Flyover project.

Table 47. Prioritization of Ajilchin Flyover project impacts

No	Environmental components to be impacted	Negative outcomes from flyover bridge construction activities						Sum	Prioritization of impacts
		Flyover earthworks	Waste from flyover construction works	Noise and vibration from flyover construction works	Dust caused from flyover construction works	Emissions from machineries during the flyover construction	Accidents during the flyover construction		
1	Changes in surface water quality	1	7	-	2	1		**11**	**3**
2	Changes in underground water quality	1	-	-	-	-	-	**1**	**8**
3	Soil deterioration, erosion and pollution	7	2	-	1	1	2	**13**	**2**
4	Air pollution	3	1	-	6	3	1	**14**	**1**
5	Vegetation cover reduction	5	3	-	1	1	1	**11**	**3**
6	Wildlife disturbance	1	1	3	1	1		**7**	**5**
7	Impacts to activities of service sector	4	-	-	-	-	1	**5**	**6**
8	Resident's health	-	-	2	1	1	-	**5**	**6**
9	Employees' health	-	-	3	2	2	3	**10**	**4**
10	Traffic movement	-	-	-	-	-	1	**1**	**7**
Sum		**22**	**14**	**8**	**14**	**10**	**9**		
Number of prioritization of impacts		**1**	**2**	**6**	**3**	**4**	**5**		

Experts analysis and reviews yields the following prioritization results, which are reflected in table 47.

1. Prioritization of impacts that will be created during the flyover construction process:

- Among those environmental elements, which will be changed due to construction works of Flyover bridge, air quality is ranked highest to be impacted by the project with scores -14. Ai pollution is expected to increase due to construction. In the second place of prioritization is soil quality with score of 13. Soil depletion and pollution will be expected with construction.
- Degradation of vegetation cover is expected and this problem was ranked in third with score of 11. Same score is also with degradation of surface water quality. Both these elements will be affected by the project, in case if proper activities to prevent/avoid are not taking. Employee's health problem (score 10) and wildlife disturbance (score 7) problems were lowest ranked in prioritization of impacts.

All of these negative impacts can be caused during the engineering and construction works and their impacts will be reduced as Flyover bridge is constructed and got into exploitation.

It is expected that no negative impacts will be when the Flyover bridge got into exploitation. Regarding the positive impacts, when the flyover bridge will be built, traffic intensity will be reduced, air pollution from dust and emissions due to traffic jam will be reduced and thus, will make positive impacts to local economic activities and public health and brings savings to gasoline and timing.

2. Prioritization of project activities with negative impacts that will be carried out during the flyover engineering and construction periods:

- Flyover earthworks make negative impacts to the 6 environmental components and it was prioritized as highest impacts with 22 scores.
- Then, negative impacts from solid waste is prioritized with 14 scores, negative impact of dust due to construction activity is prioritized with 14 scores and Vehicle emission is prioritized with 10 scores, Road and construction accidents is prioritized with 9 scores and noise impact is prioritized with 8 scores.

Project implementing agency should pay attention to employees' health and labor safety As there is no massive population or social organizations are located within or close to project territory and the first receptors of negative impacts of air pollution, dust, noise and accidents will the construction workers during the Flyover construction period.

5. ANALYSIS OF ALTERNATIVES

5.1 "Do-Nothing" Alternative

Demand for building flyover is related to settlement and displacement features of population, growth to automobile quantity and current situation of road networks of Ulaanbaatar city. Songinokhairkhan district (24,8%) and Bayanzurkh district (26,2%) where half of population of Ulaanbaatar city lives here, lead in population growth and each of them was increased by 5% and 6.3% within last 10 years. (2001-2010)

In relation to that quantity of automobiles of Ulaanbaatar city was increased by 14.5 percent annually within last 10 years (2001-2010). This growth was declined for a short period due to winter disaster in 2003 but it was intensively increased in 2007-2010 and as of 2010 reached to 162,000 and was higher index that was annually increased by 25.3 percent. Quantity of automobiles which was 48,000 in 2001, was increased by 3.4 times within 10 years. Due to influences of the rapid economic development in recent years quantity of automobiles may be rapidly increased

As of 2010, Bayanzurkh district had largest quantity of automobiles （23.6), Bayangol (20.7%), Songinokhairkhan （18.3%）and 63% of total automobiles is occupying in these 3 districts. Especially, in Songinokhairkhan district which has largest quantity of population quantity of automobiles was increased by 24,8%, and 24,6% in Bayanzurkh district.

All these statistics show that traffic movement from east and west sides to the city center will be increased in future.

The railway that connects Ulaanbaatar city in the east-west routes can be important transportation infrastructure of Mongolia, simultaneously it divides the city into south and north sides and it is the reason that causes obstacles to the traffic movement networks. Nowadays, there are Peace bridge and Gurvaljin bridge and 3 railway gates which intersect at 6 railway points in the city center, including Narny Flyover bridge, which was recently constructed with support of Japanese government.

Main roads that connect Ulaanbaatar city in the east-west route, was restricted by Peace avenue and it increases movement intensity and is the reason for a constant traffic jams in the center of city.

Ulaanbaatar city development Master plan of 2030 included "Ajilchin" flyover bridge project into its plan and it pinpoints that the Ajilchin Flyover Bridge can be only bridge that connect the main road with east and west as an alternative road to current main road. Also it is impossible to freely convey the movement as a result of increased traffic intensities due to that crossing of the main roads of the city is intersected at the same level.

In case if "Ajilchin" flyover bridge is not built, traffic movement intensity will be increased in the west side of the city, causing frequent traffic jams and people traveling will lose their precious time and spend fuels without effectiveness, feel depression and health

problems associated with increased air pollution and noise will be increased and productivity will be reduced etc many negative impacts to economics, society and health will be caused.

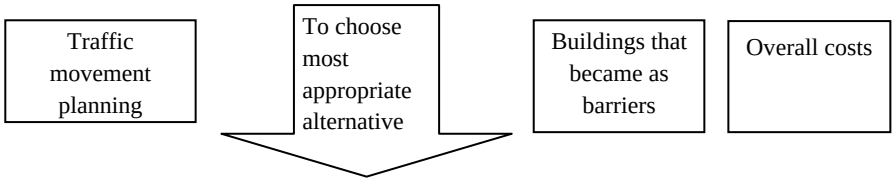
5.2 Technical Alternatives

(1) Identifiction of Flyover Routes

1. General sketch for comparison of flyover routes

In order to define the final route for "Ajilchin" flyover bridge two alternative routes have been comparatively studied: ①East-west route ②South-north route. Compared surveys were carried out based on traffic characters by using methodology described in figure 96.

①Alternative west-east route	②Alternative south-north route
Alternative-1: Shortest route Alternative -2: Offer to avoid removing storage Alternative -3: Offer to flyover which is passed over shortest railway section	Alternative -1: Offered route Alternative -2: Offer to avoid removing storage Alternative -3: Offer to connect to west industrial road of Dundgol



Comparisons of 3 alternatives		
1. East-west (Alternative - 2)	2. South-north (Alternative-1)	3. combination of east-west and south-north routes

To choose most appropriate offer⇒ East-west (alternative 2)

Remark: To estimate approximate costs, we used examples of "Narnii zam" flyover project costs (grant project).

Figure 96. Identification method for flyover route and project scope

JICA Study Team has conducted comparative surveys for two alternative routes, each of which has 3 sub- alternatives for "East-West" and "South-North" two routes. Survey parameters to compare were affected buildings and engineering and communication networks, total road length, road trace, total flyover bridge length and overall costs. In addition to mentioned parameters, the study team included traffic movement specifics in order to examine combined alternative of above mentioned two routes.

As a result of survey, bid for flyover length in the east-west route will be reduced compared to south-north route but auto road length will be increased and construction cost will be increased by 4%. On the other side, displacing or removing buildings will be reduced, compensation cost and transmission cost (displacement cost for industries is about 400,000-

600,000 MNT/m^2 under the Government resolution No. 36) for engineering and technical lines and networks will be decreased and it provides an opportunity without certain changes to overall cost of the project. Same time, they defined that using flyover to pass over the main railway line and branch railways has strength to remove probabilities of traffic jam due to railway and accidents and with these advantages, the study team selected the east-west route.

Alternative -2 within other alternatives of "East-West" routes was chosen the most suitable route in terms of traffic safety, project implementation and environmental sustainability.

(2) Environmental Costs

Impacts and benefits of two alternatives

Several environmental impacts with short and long term effects have been identified during the DEIA process of proposed Ajilchin Flyover project: air quality, noise, soil, vibration, vegetation cover and water resources.

The Terms of Reference suggested conducting analysis of environmental costs of alternatives and discussion of impacts that have not been expressed in monetary values, in quantitative terms, where possible.

As chapter 4 finds, there are not significant impacts anticipated while constructing and running the flyover.

Soil

In both considered alternatives of East-west and North- South routes, the most valuable soil with dimension of 0.34 ha, which located in the green park area in the north west of Ulaanbaatar Railway Station and which still contain untouched and natural quality soil will be affected.

In addition to 0.34 ha mentioned above, 0.39 ha of soil with some degree of degradation but still with quality, which contain six households to the east of Gobi factory in the North-South route will be impacted.

The soil losses have been calculated using the following formula:

Es=Ors x Kp x Kg x Ks x S x He

Es- Soil loss, in tugrug

Ors- soil humus, ton/ha

Kp- coefficient for soil property

Kg- soil geographical coefficient

Ks- Soil type coefficient

S-affected dimension of soil , ha

He- value of 1.0 ton of humus, tug/ton

The table 62 shows costs of soil losses in two alternatives.

Sampling point №	Soil depth, cm	Humus content %	Weight gr/cm^3	Humus reserve in a layer reserve / ton	Humus reserve ton/ha	Coefficient for soil property	Coefficient for natural geography	Soil type coefficient	Affected soil dimension ha	Value of humus, tug	Total value Thousand tug
Meadowy chernozem in the east-west route											
P-1	20	2.5	1,3	65	65	0.72	0.40	1	0,34	276000	1,756.0
Meadow + slightly degraded meadow like chernozem in the north-south route											
P-3	20	2.8	1,3	72.8	72.8	0.70	0.45	1	0.73	276000	4,630.3

Economic cost of soil losses in the East- West Route: Es= 1,756,000 tug

Economic cost of soil losses in the North- South Route: Es= 4,630,300

Air quality

Current air quality study reveals that one of main polluters of UB air quality –exhaust gas NO_2 from vehicles exceed 1.3-2.47 times in a single measurement the air quality national standard in all 5 sampling locations around the project site. Daily average of NO_2 measurement -1.2 times. Moreover, dust content exceeds its acceptable level by 52.5% in average in all sampling locations.

In 2030, it is anticipated that 58,000 vehicles will use East-west route whereas 41,000 vehicles North –South route. If compare these numbers, it looks that North-South route will be less pollute the air than the East-West one in the future. However, traffic projection model findings tell that traffic volume at Gurvaljin bridge, one of heaviest traffic roads will be reduced by 20%. Whereas, traffic volume will be reduced in the North –south route by 11%.

It requires a rigorous calculation using various models in order to monetize impacts and benefits of air quality in project area. In addition, more strategically located sampling points will be required to make the calculation. Due to limited time and limited air sampling points, we are not able to quantify approximate cost and benefits due to air quality variation based on traffic data.

Noise

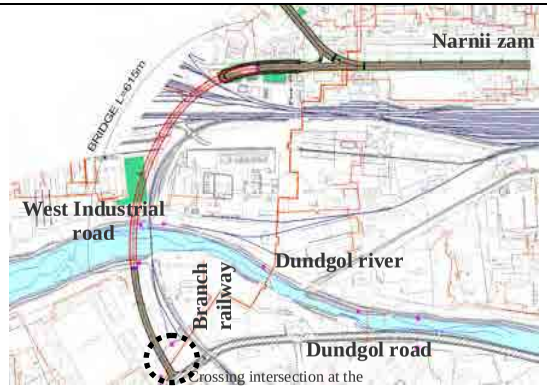
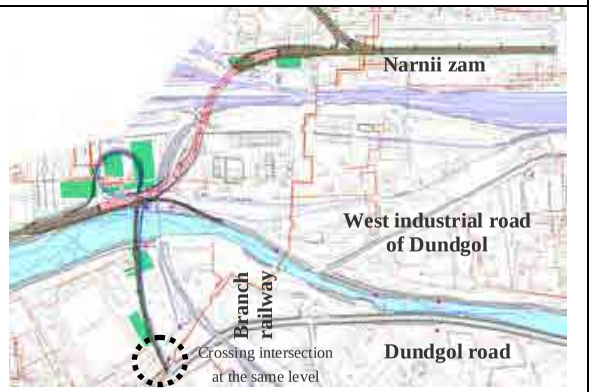
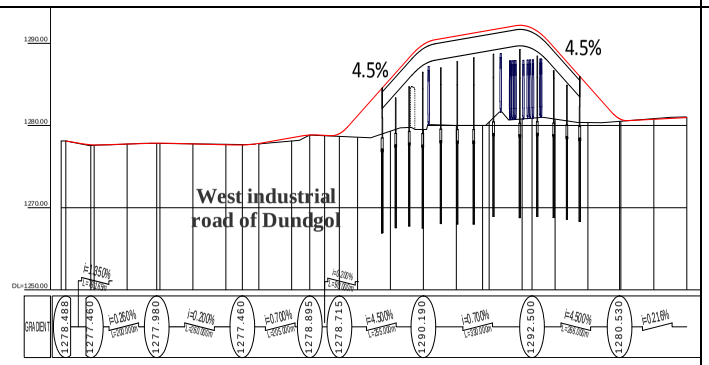
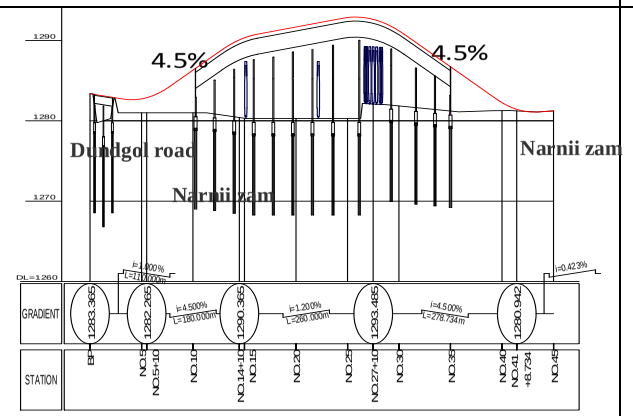
Using traffic projection data of 2030, study team concludes that average noise level will be around a little more (82.25±3.10 dB) than the acceptable health level of 60-80 dB (WHO) in case of North –South Route with 41,000 vehicle/day rate. This may create little unconventional condition for people close to the route. However, as mentioned, surrounding the flyover location is industrial zone of the city and the noise level thus, is does not make impact.

In case of East-West Route, average noise level will range within 87.53-90.63 dB with 58,000 vehicle/day. If the noise is constant for more than 8 hours or longer period of time (see table 50, chapter 6.1.2. for reference), it could create some hearing problem for nearby located population. However, the measured and projected noise levels are based on one time and there is no constant source of nouse at such level on the roads of Ulaanbaatar city. In addition, location of proposed flyover project is in the industrial zone and there is no residential areas closer. Taking all these consideration into account, noise level to be generated by passing vehicles through Flyover brlidge will not create a problem in both of alternative routes.

Vibration

Current vibration level does not indicate any alarm for environment and public health and the flyover construction and its exploitation as we anticipate, will not create a high level of vibration. Situation is same with environmental elements such as vegetation and wildlife, if construction follows environmental and safety regulations.

Table 48. Comparison of East-West and South-North routes and combined alternative

	1. East-West route	2.South-North route	3. Combined alternative of east west and north-south routes
Plan			
Vertical section			same as ① alternative

	1. East-West route	2.South-North route	3. Combined alternative of east west and north-south routes
Traffic specifics	・Planning the new movement axis in the east-west route in parallel to Peace avenue will assist development of the city in 4 routes. Expected traffic intensity of the flyover will be approximately 58,000 pcs/day (2030). ・Rotation intensity of the flyover is more than 30 percent compared to south-north route traffic intensity of Narnii zam will be increased by (+31～＋44%) ・62% of TPP road and 30% of Peace avenue road are entered to the main axis and there are much movement of cars and heavy-duty trucks from west side of TPP-4. ・Traffic intensity and load of the Gurvaljin bridge will be reduced by 20%. ・Traffic intensity of Peace avenue will be reduced by 2-19% due to road section.	・As a result that flyover above the railway is built and gate above the Dundgol is increased, approach in south-north route will be improved. Expected flyover traffic intensity will be **41,000** pcs/day ・Flyover rotation intensity will be reduced at least 30% compared to east-west route. ・Power plant road, Chinggis avenue, Ajilchin road is entered to the main movement bias from front of Dundgol road and movement load will be dispersed. ・Traffic intensity and load of current Gurvaljin bridge will be reduced by approximately 11%.	・Expected traffic intensity of the flyover will be 55,000 pcs/day approximately. (2030) ・Quantity of vehicles that are passed by south-north access road will be **8,000** pcs/day.
Affected buildings	20 pcs (6919.1 m^2), displace 2 families (7 citizens)	13 pcs (5,291 m^2), 6 gers (displace 30 citizens)	16 pcs (21,000m^2)6 pcs of gers (displace 30 citizens)
Affected comm/eng lines	・ High voltage lines of Golden Park (35kV), Heat pipelines (hot water) (Dia.350x2)	・High voltage lines of Golden Park (35kV), Heat pipelines (hot water) (Dia.800x2)	・High voltage lines of Golden Park (35kV), Heat pipelines (hot water) (Dia.800x2)
Road length	2200m	1,550 m	2200m+Рамп (ON,OFF)790m

	1. East-West route	2.South-North route	3. Combined alternative of east west and north-south routes
Road trace	Minimum rotation radius：200m / Sharpest bias size of the along crossng：4.5%	Minimum rotation radius：300m / Sharpest bias size of the along crossng：4.5%	Minimum rotation radius：200m / Sharpest bias size of the along crossng：4.5%
Total flyover bridge length	600 m	615 m	600m+Рамп bridge (180m)
Evaluation	・Bid for flyover length in the east-west route will be reduced compared to south-north route but auto road length will be increased and construction cost will be increased by 4%. In other way, displacing or removing buildings will be reduced, compensation cost and transmission cost (displacement cost for industries is about 400000-600000 MNT/m^2 under the Government resolution No. 36) for engineering and technical lines and networks will be decreased. ・Using flyover to pass over railway main magisterial and branch railway will remove probability of traffic jam and accident due to the railway. ・It is available to provide total project outcome	・It is necessary to displace and compensate storage building for fuel products (approximately 5400m^2). Also there are many social and economic issues to remove citizens (26 citizens) compared to bids in the east-west route. ・It is impossible to solve any issues in relation to traffic jam and accidents because branch railway and junction closely passes through road crossing of Dundgol road. ・Project outcome will depend on work result to complete road repairs of Dundgol road with 4 rows	・It was estimated that displacement and compensation for fuel product storage building and neighbor cement industry building will be caused and compensation rate will be higher. ・It is necessary to additionally build Ramp and approaching road and construction building cost will be increased by approximately 30% than bidding amount. ・. In case that Ramp and approaching roads of Dundgol road are fully solved, it will revise the schedule and complete construction.
	Recommended	Not recommended	Not recommended

6. ASSESSMENT OF IMPACTS/RISKS FOR PREFERRED ALTERNATIVE

6.1 Project Related Significant Impacts

6.1.1 Pre-construction stage

Air quality

As of today, total 48,673 vehicles travel through Ajilchin Street near to the project on business day and on weekends it is less by 36.3% or 30,990 vehicles are travelling here. At the Narnii street 40,757 vehicles are travelled on business day and it was decreased by 15% or 34,457 vehicles are travelled here. At the Peace avenue 75,400 vehicles are traveled (Source: CTI "Ajilchin" flyover feasibility study progress report, 2012).

By using these data, we estimated total air pollution which is emitted from vehicles which pass through the flyover per day according to following methodology as of 2012. (source: Methodology adapted from Asia Least-cost Greenhouse Gas Abatement Project)

Explanation on terms of methodology:

A- Quantity of vehicles which are traveling

B- Annual average travelled road of each vehicles (km/year)

C- A x B –total travelled road (km)

D – NOx –emission grade (g/km). In fact, heavy-duty trucks are mostly travelled in the territory of the project, there is no information of excretion grade of pollutions of these vehicles and we calculated based on emission rates of cars.

E- NOx – emission, (ton)	E = C x D/1000000
F – CO-excretion rate, (g/km)	
G- CO – emission, (ton)	G= C x F/1000000
H – NMVOC - (g/km)	
I – NMVOC - emission, (ton)	I= C x H/1000000
J- PM_{10} - emission rate, (g/km)	
K- emission, (ton)	K= C x J/1000000
L- PM_{25} - emission rates, (g/km)	
M - PM_{25} - emission, (ton)	M = C x L/1000000

Table 49 shows estimation results of emissions from traveled vehicles.

Table 49. Amount of air polluter from vehicles

No	Street name	Quantity of vehicles , t/day	Polluters discharged from vehicles /ton/			
			NO_x	CO	NMVOC	PM_{10}
1	Narnii road	40757	77.03	2046	209.1	2.61
2	Ajilchin street	48673	91.99	2443.38	249.7	3.12
3	Baruun teeverchid street	4300	8.13		22.1	0.28
4	Peace avenue	75400	142.51	3785.1	386.8	4.83
	Sum	169130	319.66	8490.33	867.64	10.82

About 319.7 tons of nitrogen dioxide, 8,490.3 tons of carbon monoxide and 867.6 tons of non methane volatile organic compounds 10.8 tons of dust are being emitted from over 170,000 of vehicles which are being travelled in the territory of the project per day.

According to air quality status, negative impacts of polluting substances (average content of nitrogen acid compounds, carbon monoxide and dust with large particles) in the territory of project exceeded daily acceptable concentration set forth in the air quality standard. Especially, nitrogen dioxide, which emitted mainly from vehicle and dust and dust-like substances are becoming the major pollution sources.

Soil status

Soil covers along the trace were strongly affected by impacts of human activities and morphological status and nutrition levels were destroyed.

Most of soil in the territory were covered by the asphalt road and also fully covered by cement covering of the construction site, lawn in around of buildings along the auto road were removed, became bare and also they were covered by dikes and dams thus, soil natural properties have been changed. In a limited area of garden located to the north of the Central Railway Station, soil quality was like in natural condition and so does some narrow stripes along the river shore and soil in some areas under the household's fences.

0.34 hectares of soils, which was less affected by human activities and keeps natural morphological properties and its nutrition in above mentioned garden and 0.39 hectares of soils inside of the fences of households next to Gobi Factory can be affected by negative impacts during the Flyover Project's engineering works.

Vegetation cover status

The area, where Flyover bridge will be built in the territory of Bayangol district of Ulaanbaatar city, is located in a transition zone of Mongolian-Daurian mountain steppe and steppe region of Mid-Khalkha. Flyover project area represents more the characteristics of Tuul river basin and meadow of the Dundgol River. Rare and endangered plants have not been registered in the project and neighboring sites.

Plants along the railway were affected by various human activities and polluted. Dominant species of plants are sage brush, feather-grass, nettle, anise and rib-grass.

Along the Dundgol River basin, meadow strips have been polluted with household waste, plants along railway and auto roads are polluted by lubricants and oil spellings.

Even though biological species in the project site are poor, areas partially degraded by the bridge construction and road construction works, the rehabilitation should be done after flyover project is completed. Majority of species in this area are of meadow and shore plants as well as of weeds, which are prone to quick deterioration and depletion under intensive activities.

Noise

Variable range at the maximum noise level around Flyover project area will be fluctuated at 62.3-104.0 dB a day and variable range at the minimum level will be fluctuated at 55.0-83.0 dB and average relative meaning at the maximum and minimum levels will be 74.80 dB and 64.13 dB respectively.

Average daily noise rate is 69.38 dB around Flyover project area and if refer to World Health Organization's guidance, it states that 70 dB of noise throughout 24 hours nearby industry, public service facility and auto road in settlement area will not cause negative impact to human health. With this situation, it is considered that there is no negative impacts on noise posed to population around the Flyover bridge project.

Freezing and thawing regime of soil

As of today, small cavities were generated on the surface due to human activities by building dam and dikes in the territory of the project site. Also it covered by dump soil with 1-2 m in depth. In contrast, this area has been considerably changed. According to our observation, seasonal freezing and thawing dynamics of soil in project area might be changed due to various human activities.

6.1.2 Construction stage

Air quality

For flyover construction works, machines and mechanisms will operate such as bulldozer, grader, excavator and heavy-duty trucks for earthworks in all seasons, except winter. During the technological process of the bridge construction (activities such as digging of ground, hauling, removing and transporting earths, dumping sand and gravel, compacting, carrying cement and mixing) air pollution (dust, nitrogen dioxide, polluting substance which is discharged from machines and mechanism) will be increased. It may cause negative impacts to surrounding environment and organizations and employees depending on predominant wind direction and speed. Thus, it is necessary to plan preventive measures to

reduce negative impacts which can be caused by dust and other emissions during the flyover construction activity.

Water quality

During the construction process, soil surface and surface water can be polluted. Especially, large amount of absorption substances can enter to the surface water causing mechanical pollution. It is the biggest factor to destroy living habitat of aquatic species such as fish and macro invertebrates. Thus, we must know chemical ingredients and compounds of materials which are used for flyover construction work and assess its quality so that leftovers of construction materials and wastes are not dumped or disposed through snow melts and rain water into Dundgol River causing water quality reduction. All precautionary measures should have taken to reduce the risks.

During flyover construction work process, it's possible to remove ground water while installing the column foundations depending on foundation depth. In case that foundation is located below 3-4 m, underground water current may be changed due to removal of soil water. Also during the foundation installation process, in case of use of any kind of chemical substances, one must ensure that chemicals are not spilled into underground water.

If reinforcement of existing dyke along the Dundgol River basin will be done, it will increase protection of water resources, aquatic species as well as woods and plant species. Renewing and expanding existing auto road along the Dundgol River basin will make positive impacts to reduce current dust pollution due bumpy and unpaved dirthy roads and increase auto road networks and to protect river basin.

While constructing the auto road along the river, increased dust and air pollution from operating heavy-duty trucks and mechanisms can be sources of pollution of river water and impact negatively river basin environment.

Impacts to soil

Negative impacts to the soil layer due to asphalt road and bridge construction activities.

Construction of access road will involve soil and earthworks total of 28,000 m^2 areas or 1600 m in length and 17.5 m in average width area. However, most soil is located under the used asphalt road and concrete field and therefore, it will not be negative impact for these hardened and barren soil due to the Flyover project. But 0.34 hectare land which is keeping its natural nutrition in the Garden area located to the north of the Railway Central Station along the Narnii zam and 20 cm compacted and deteriorated soil with 0.39 hectare area which is keeping humus "A" layer may be destroyed.

Together with 20 cm depth surface earth in total 0.73 hectare land, following amount of nutrition elements such as humus substances nitrogen, mobile phosphorus and mobile potassium will be destroyed. Here includes:

a) 0.73 hec x 1.3g/cm^3 x 20cm x 2.3% = 43.65 tons humus

b) 0.73 hec x 1.3g/cm^3 x 20cm x 0.3% = 5.7 tons total nitrogen

c) 0.73 hec x 1.3g/cm^3 x 20cm x 1.6mg/100g = 30.4 kg mobile phosphorus

d) 0.73 hec x 1.3g/cm^3 x 20cm x 22 mg/100g = 417 kg mobile potassium

While transporting sand and gravel to project sites, unpermitted dirt roads can be created between the sand and gravel mining and project area, as this is unfortunately common practice among underdisciplined truck drivers in Mongolia, which cause depletion of plant species and soil, pollution of surface water and air.

While project is implemented, it is estimated that about one hectare area of soil layer and vegetation cover will be destroyed in sand gravel mining area for carrying sand and gravels to the project site.

Occasional spills of oil and lubricants of machines and techniques, dirty water and liquids, chemical substances used for washing and cleaning of machinery and tools, disposals of household solid and liquid wastes to the environment may create pollution of soil, plants, surface and underground water and this also negatively impacts human health.

Impacts to vegetation cover

Any changes to vegetation cover will depend on following factors:

- During the flyover construction works, vegetation cover will be deteriorated and resilience capacity of plants will be declined due to human and technical impacts.
- There is a trend in increased frequency of extreme droughts, deficiency of water supplies and flash floods, which force change in soil properties.
- Pollution will be increased by disposal of household waste and poisonous emission of machineries and techniques.
- Once it is located next to railway and main roads, the vegetation cover can be polluted by various wastes and unwanted dirt roads created during the material and goods transportation seasons will destroy vegetation covers and its ability to recover of some plants which are grown in the ravine and cavities.

Noise and vibration impacts to population's health

Main noise and vibration sources in the environment are caused by movement of different kinds of vehicles and trains, construction of building, operations of mines and industries. Noise and vibration which exceed the acceptable level damages human hearing and brain organs and cells and impacts to central nervous system and also negatively impacts

to human health becoming as sources of fatigue, misconcentration, startling, insomnia, and eventually affects the cardiovascular activities causing high blood pressure, indigestion and poor digestion

Acceptable maximum level of noise which person is hearing continually for a day without negative impacts to hearing organ is established and followed by many countries of the world (table 50)

Table 50. Acceptable noise limit

Noise continuation, hrs	8	6	4	3	2	1.5	1	0.5	0.25	0.02	0.01
Acceptable noise limit, db	90	92	95	97	100	102	105	110	115	117	120

If people work in a room which has at least 90 dB noise level for period over 8 hours, it will negatively impact to human health. In case of more than 120 dB noise, a person should not hear over 0.6 minutes. Otherwise hearing organ of this person will be damaged irreversibly.

During the construction heavy machinery operation may create some increased noise in shorter period, which may pose some impact to construction workers. Operators of heavy machinery, working in the site, should wear personal protection device to avoid hearing problem. In the construction site, where flyover bridge will be built, there no residential settlements and therefore no impact disposed to population.

6.1.3 Operation and maintenance stage

Main project impact during the flyover operation is directly related with number of vehicles travelled through the flyover bridge.

When the flyover bridge is opened, it will connect Ajilchin road with Narny road and traffic volume will eventually increased.

According to preliminary schedule of construction and exploitation of Flyover bridge, it will be built and commissioned within 5.6 years since intergovernmental loan agreement is approved. It is estimated that 26,600 vehicles will be travelled on the flyover per day in 2020 and 57,900 vehicles per day in 2030 once the flyover is commissioned.

It is estimated that traffic intensity at Peace Avenue will be declined by 11%, Chinggis avenue by 21% and traffic of Gurvaljin Bridge will be declined by 20% respectively. As a result of flyover is operated, it will positively impact the surrounding environment with reduced air pollution and dust formation near Peace and Chinggis avenue and Gurvaljin bridge.

Table 51 shows pollution rate per day during the flyover utilization period in 2030.

It is estimated what environmental impact the growth of vehicles, travelling on the flyover bridge will cause:

Table 51. Shows pollution rate per day during the flyover utilization period in 2030.

Street name	Vehicle quantity, veh/day	Pollution from vehicles, ton			
		NO_x	CO	NMVOC	PM_{10}
Ajilchin flyover	57,900	109.43	2,096.58	297	3.71

Air quality

As we estimated emission volume from automobiles (NO_x, CO, NMVOC) in 2030 will be increased by 24.04 percent compared to 2012 (table 51), estimated traffic intensity reduction near project location and growth of vehicle numbers on 2030. But JICA Study Team considered that vehicle emission volume in air will not be increased because traffic speed will be increased and traffic jam will be declined. Despite this consideration, project needs to plan measures and regulation aimed to reduce possible negative impacts.

Noise

To date, average daily noise level was assessed 68.36 dB in and around proposed flyover bridge project site and average maximum level was 76.66 dB and average minimum level was 61,68 dB. If assume that maximum and minimum levels of noise as well composition and structure of vehicles will be kept same as in 2012 and only number of vehicles will be increased, the following conclusion can be made:

- It is projected that average noise level per day near the Flyover project will be increased by 4.88% from current level (68.36 dB) to 71,7 dB in case number of vehicles will be 13,300 per day in 2016 and it will be increased by 9.76% and noise level will be 75.3dB in 2020, when number of vehicles reaches 26,600.
- As per Mongolian standard (MNS 4585:2007), average level of outside noise is 60 dB in daytime (07.00-23.00 hrs) and 45 dB at night (23.00-07.00 hrs). If compare these standard with 2020 project noise level data, acceptable noise level will be exceeded by 13.6 dB in daytime and 23.54 dB at night in 2020.
- Since, there is no apartments and residential areas in project area but only railway employees and employees from industrial enterprises are working here. As the workers wear personnel protective devise as required by work safety regulation, noise will not negatively impact.

Vibration

Light and heavy duty automobiles which run through the flyover are becoming source of vibration. Vibration caused by automobiles, running below and above the bridge as well trains through railway can impact health of population.

Quantity of automobiles which run through the new bridge in 2030, will be increased by 29.7 percent and also vibration will be increased by 29.7 percent but expected vibration

rate will not be exceeding current hygienic standard. Vehicle accident or vibration due to earthquake can negatively impact population health. But this type of incident and emergency is rare.

6.2 Project Related Significant Risks

6.2.1 Construction stage

Earthquake risk

Highest risky natural disaster which can be occurred during the bridge construction or exploitation period, is earthquake.

According to BNbD22.01.01/2006 standard for earthquake resistance of Mongolia, it considers that magnetic index is MSK 6,7,8. "Ajilchin" Flyover project is located at MSK7~8 scale zone (Figure 97). As recent study of Ulaanbaatar city authority on 2010 reveals it is possible to occur magnitude 7 scale earthquake, study team of the Academy of Science of Mongolia is revising maps of earthquake regions of Mongolia.

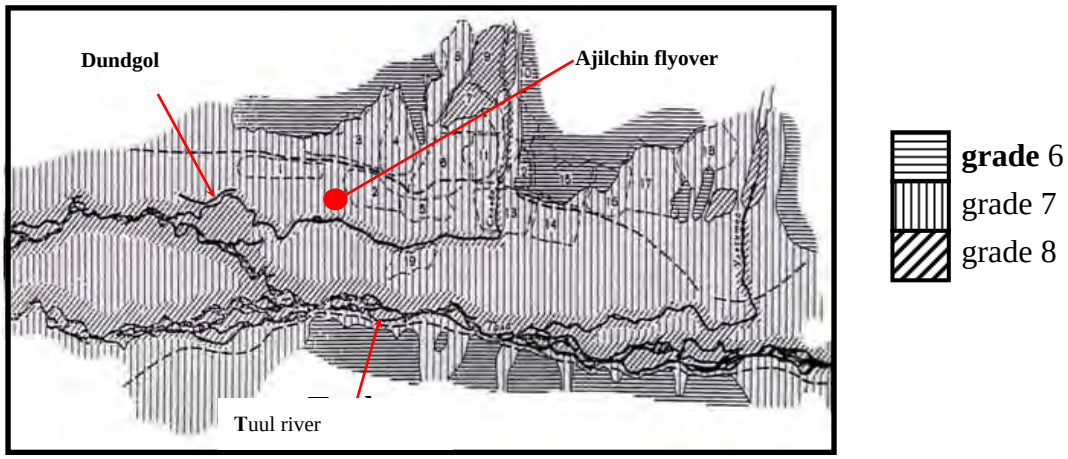


Figure 97. Map which shows earthquake rates of Ulaanbaatar city

Flood

We identified maximum rainfalls which can be occurred in the river basin by using intensity method for rainfall restriction, which is suitable in our country and method of flows ratio. Based on such method, we estimated maximum flows of small rivers with at least 200км^2 water accumulation areas and dehydrated pebble as follows.

$$Q_{1\%} = \grave{q}_{1\%}\varphi \quad \grave{H}_{1\%}\sigma\lambda_{1\%} \quad F$$

Hence, $Q_{1\%}$ - 1% sufficient stream

$\grave{q}_{1\%}$ - 1% - module of maximum stream, l/sec км^2

φ - stream ratio

$\grave{H}_{1\%}$ - 1%- maximum precipitation per sufficient day, mm

σ - lake, forest and marsh ratio

$\lambda_{1\%}$ - transfer ratio to sufficiency besides 1% sufficiency

F - water accumulation area, км^2

To estimate rainfall and flood stream which flows along the dehydrated pebble, maximum rainfall level per day is used and estimated that 1% sufficiency or much precipitation once every 100 years as 125 mm (Data of Ulaanbaatar meteo station). (Figure 98)

We identified maximum rainfalls which can be occurred in the river basin by using intensity method for rainfall restriction, which is suitable in our country and method of flows ratio. Based on such method, we estimated maximum flows of small rivers with at least 200км^2 water accumulation areas and dehydrated pebble as follows.

$$Q_{1\%} = \grave{q}_{1\%}\varphi \quad \grave{H}_{1\%}\sigma\lambda_{1\%} \quad F$$

Hence, $Q_{1\%}$ - 1% sufficient stream

$\grave{q}_{1\%}$ - 1% - module of maximum stream, l/sec км^2

φ - stream ratio

$\grave{H}_{1\%}$ - 1%- maximum precipitation per sufficient day, mm

σ - lake, forest and marsh ratio

$\lambda_{1\%}$ - transfer ratio to sufficiency besides 1% sufficiency

F - water accumulation area, км^2

To estimate rainfall and flood stream which flows along the dehydrated pebble, maximum rainfall level per day is used and estimated that 1% sufficiency or much precipitation once every 100 years as 125 mm (Data of Ulaanbaatar meteo station). (Figure 98)

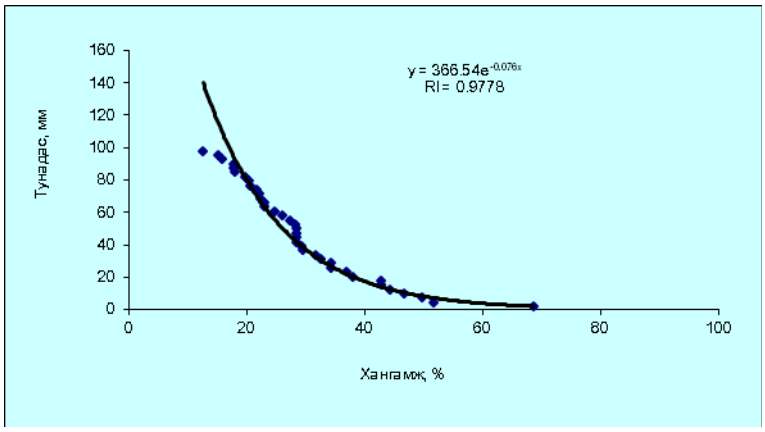


Figure 98. Data from Ulaanbaatar meteo station

We defined water source ratio /Φ_r/ and water outflow period /t_{xb}/ along the basin, which are required to determine maximum outflow module / $\grave{q}_{1\%}$/ by using following formula.

$$\Phi_r = 1000\ L/K_g\ J^k_g\ F^{1/4}\ (\varphi H_{1\%})^{1/4}$$

Hence: L - basic river and dry riverbed length till certain route, км

K_g - coefficient for Riverbed and holm

J_{gol} - river and pebble average bias , %o

We defined bias forms /Φ_{xb}/ which are required to water outflow time /t_{xb}/ along the slope of water accumulation field by using following formula.

$$\Phi_{xbel} = (1000\ l\ )^{1/2} / nxb\ J^{1/4}_{bel}\ (\varphi H_{1\%}))^{1/2}$$

$$l = F/1.8\ (\sum l + L)$$

Where , l -average slope length along the water accumulation field, km

N_{xb} - rainfall ratio of slope

J_{bel} - average basin bias, km

$\sum l$ - total pebble length, km

We defined flood outflow ratio as follows.

$$\varphi = C_2\varphi_o\ /(F+1)^{n6}\ \ (J_b/50)^{n5}$$

Where, C_2 - Ratio depending on soil quality

φ_o - outflow ratio in case of F=10 км^2, J_b = 50

n_6 - Soil quality ratio

n_5 - Climate ratio

To define maximum flood outflow, it requires calculating statistical estimation for maximum precipitation per day. Estimated that in the water accumulation field of Selbe River, maximum precipitation per day with 1% sufficiency must be 125 mm.

Table 52. Maximum outflow with 1% sufficiency

No	Indexes	Estimation
1	F ,км^2	195,4
2	L,км	31.2
3	$H_{1\%}$,mm	125
4	N_{xb}	0.3
5	J,$\%_0$	15
6	K	0.33
7	φ	0.22
8	Φ_{xb}	10.2
9	Φ_g	119
10	$T_{xb,min}$	155
11	$q_{1\%}$, l/s, km^2	0.023
12	$Q_{1\%}$ m^3/s	147.3

As a result of much flood estimations with the probability once every 100 years, result is 147.3 m^3/sec. (Table 52)

Table 53 shows maximum outflow rate with different sufficiency which were calculated as above.

Table 53. maximum outflow rate with different sufficiency, m3/sec

1	Basic-direction	Sufficiency , %				
		1%	2%	5%	10%	25%
1	Estimation result	147.3	130.0	107.9	90.7	68.7

Considering similarity of the Selbe River and Terelj River and taking calculation of maximum outflow by following formula based on multiyear data, we found that probability of outflow once every 100 years is **315 m^3/sec.**

$$Q_{P\%} = q_{p\%} * \delta_1/\delta_{1T} * \delta_2/\delta_{2T} * (A_T/A)^{n3} * A ,$$

Where: $Q_{P\%}$- outflow with estimated sufficiency m^3/sec

$Q_{p\%}$ - outflow module with estimated sufficiency, l/sec км^2

δ_1,δ_{1T} - lake coefficient of estimated and same rivers

δ_2,δ_{2T} - marsh coefficient of estimated and same rivers

n_3 - reduction coefficient

A, At- water accumulation field of estimated and same rivers, км^2

Riverbed coefficient n=0.025-0.03

Within the scope of flyover project, it is planned to reconstruct Baruun Teeverchid street and Dundgol shore dyke.

In order to implement dyke reinforcement, it is estimated overflow level of water of Dundgol, considering that maximum discharge of water is 346m^3/sec (100-year probability).

Table 54. Expected overflow level of Dundgol

STA. No.	0+120	0+220	0+320	0+400	0+500	0+600	0+700	0+800	0+900
HWL	1278.4	1277.9	1278.6	1279	1279	1278.7	1278.5	1279.5	1279.7
Dundgol	←Downstream (Ajilchin street)				←		←	←(Upstream)	

We calculate dyke reinforcement height of the oligopoly section by adding 0.8 m to the above mentioned expected overflow level.

Building of dyke reinforcement according to this calculation will reduce probability of flood risk, which can be occurred to organizations and buildings along the Dundgol. (Figure 99)

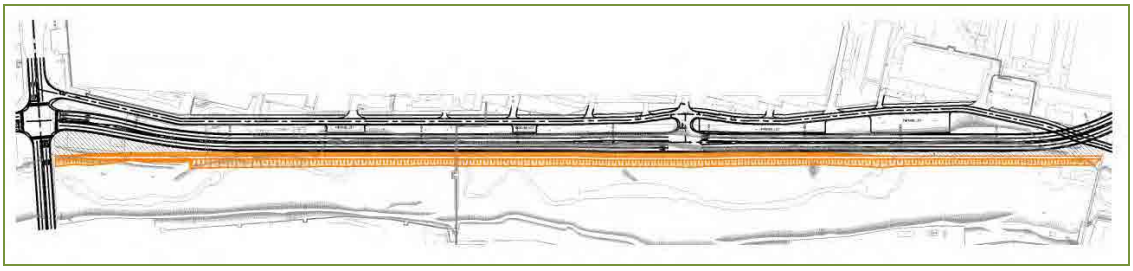


Figure 99. Dyke structure on the right shore of Dundgol River

Industrial accident

Accidents can happen due to following causes:

- Work of untrained or unprofessional person for electrical equipment
- Not follow up actions for maintenance and repair of external and internal electrical connections of a building
- Not comply with labor safety procedures, while working
- Due to employee's imprudent actions
- Left flammable substances in open area

Thus, it is necessary to plan and implement activities against accidents in relation to human activities.

6.2.2 Operation and Maintenance Stage

Risks to geomorphologic changes

Flyover bridge construction activity forces the landscape relief to change. Unless find the optimal location of a gutter for rain or snow melting, it can pose a risk for flooding or undesirable water accumulation.

Moreover, because of change of surface relief and vegetation cover sunlight direction and duration can be changed and thus, influence seasonal freezing and thawing dynamics and freezing depth. In case groundwater depth is relatively increased, water formed over melting ice during cold seasons can cause risks for any accident.

Risks to auto transportation road

Increased traffic intensity and increased density of vehicles at one location and one time may pose serious risk for traffic accident.

6.3 Mitigation measures

6.3.1 Pre-construction stage

In areas where the Flyover Bridge will be built, there are 31 households are living permanently. If detail 27 households are living nearby Ajilchin Intersection, including 22 families that rent rooms in a public house, owned and operated by Mr. Erdenebaatar and 3

households living in gers on the north shore of Dundgol River. Also, 6 households are living in southeast corner of Gobi Factory. All these inhabitants will be exposed to health risks (increased noise and vibration levels, dust and air pollution etc) due to construction activities. Special care should be taken to protect health of these families during construction stage. At pre- construction, health protection issues of inhabitants should be topics for discussion with inhabitants and all precautionary actions should be planned and implemented in accordance with national standards and regulations to ensure healthy and safe living of citizens.

It is important to use materials which meet standards and requirements after examined materials' quality and standards by authorized organization by ensuring that required solidity, quality and requirements of sand and gravels meet standards.

6.3.2 Construction stage

With the purpose to reduce and eliminate negative impacts to air, soil and vegetation cover in project area the following measures have to be taken:

- In order to conserve valuable soil in 0.34 hectare area inside of the garden in the north of Railway Central Station, which will be affected by Flyover bridge access road construction works, first must peel surface layer (dark colored humus) with 20 cm in depth and must store them in distance from other earth during the construction work. This dark colored humus layer will be used for recovery activities of land surface which would be destroyed by road-bridge construction works after the construction is complete. The conserved humus layer should be used for filling excavated holes or careers for making lawn.
- Before excavating holes for carrying sand and gravel in the mining site for sand and gravel exploitation, responsible person must peel and store the nutrient soil with 20 cm in depth for further recovery of soil after mining is closed.
- Before construction start, implementing agency must identify all work roads to be used by heavy machineries, trucks and other vehicles and only those identified roads should be used. It is prohibited to drive outside of established road. Also must provide condition and requirement to carry sand and gravel through joint single road not by branch roads in order to transport sand and gravel.
- Rehabilitation actions should be carried out after completion of Flyover project. For formation of species of plants and herbs in the environmental regions, occurred meadow and beach plants, herbal layer can be easily changed due to operation and must define local herbal species in details and collect their seeds and to do rehabilitation.
- Avoid spilling and disorderly removing fuel and oil from machine and techniques; drainage and liquids contained chemical substance which was caused by washing and cleaning equipment and tools; and solid and liquid waste caused by employees.

Must remove and liquidate them in accepted point and clean according to appropriate regulations.

- All kinds of maintenance services for machineries and techniques, which are used for road construction works, should be taken place in specifically appointed area, which fully provides the condition without negative impacts to soil and environment. Must have technical maintenance point.
- After completion of the road construction work, must fill all excavated and deteriorated holes, cover nutrient soil with 20-30 cm depth (previously stored) above it and plant local perennial plants.
- Must organize employees' accommodation as it is ordered and no negative impacts to the environment. Must do qualified protection from rainfall and flood.
- If necessary, it is important to easily remove dusts and clay by spraying water.

Measures for reducing noise level

Average noise level per day near to the flyover will be increased by 4.88% from current level (68.36 dB) to 71,7 dB in case that number of vehicles is projected 13,300 per day in 2016 and in 2020, thus, noise level will be increased by 9.76% and reached to 75.03 dB.

As construction site is located far from residential zones, impact receptors will be construction workers, engineers, technicians and operators of machineries and vehicles. All personnel working on the site should wear personal protective devices, including helmets, goggles and earmuffs or earplugs to protect hearing organs.

To comply with approved regulations such as forbids using sound signals in micro-regions and near to the schools, kindergarten and clinics where patients are being treated (Mongolia has legal regulation on use of horn signals), forbids vehicles without any muffler to travel around; restricting movement in certain hours;

It is appropriate to implement following advices about safety and implementation of laws and regulations. These include:

- In case, if new buildings and extensions that were not planned in project are will be built during the flyover construction, it must undergo additional examination for environmental impact assessment and its impacts should be monitored and reduced with constant control through involving environmental organizations.
- Climate conditions usually make positive and negative impacts to labor conditions of road employees and road and transportation environment, it also impacts to traffic. Thus, we recommend in studying and identifying micro climate around road and flyover bridge environment in the different weather conditions to ensure traffic safety. Also the constructors must use climate and geotechnical

construction norms, regulations and technical documents for auto road construction renovation and bridge building.

- To conduct fire safety training and awareness rising, prepare fire extinguishing equipment and tools according to appropriate standards and place them at the special place.
- To implement laws and regulations on environmental conservations and to promote preventive measures to avoid pollution and deterioration of surrounding environment
- To comply with safety guidelines

6.3.3 Operation and Maintenance Stage

It is necessary to create monitoring points that measure air quality and noise levels, to regularly control air pollution and noise levels; in case that it exceeds the standards requirements, must plan and implement measures to reduce it.

It is important to use materials which meet standards and requirements. Therefore, all materials, especially sand and gravels should be examined by authorized organizations and laboratories on quality demand to ensure that required solidity, quality and requirements of sand and gravels meet standards.

7. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

7.1 Institutional framework for Implementation of EMP

7.1.1 Structure and organization for implementation of EMP

Environmental Management Plan identifies main impacts of the proposed project activities to the environment and society and based on the identified impacts, it proposes activities aimed to reduce or remove negative impacts of the project and estimates required funding and costs to implement stated activities.

To develop Environmental Management Plan, we considered all the environmental protection activities that have been reflected in the Detailed Environmental Impact Assessment Report, its duration, required costs, institutional framework and implementation management, and monitoring mechanisms.

Once EMP is developed together with DEIA report and approved by the Ministry of Environment and Green Development (MEGD) of Mongolia, it is obliged to be implemented by the project implementation agency. Roles and responsibilities of various organizations for EMP implementation are included in table 55.

Table 55 Involvement and Responsibilities of Organizations for Implementation of EMP

No.	Organizations	Relationship with project and EMP	Responsibilities for implementation of EMP
1	Ministry of Environment and Green Development of Mongolia (MEGD)	State Central Body for environmental policy setting and policy implementation	• Screening of project for general impact assessment • Review of DEIA report and EMP content • Approval of DEIA and EMP or rejection • Review of yearly report of EMP implementation • Approval of EMP for next year
2	Ministry of Road and Transportation of Mongolia (MRT)	Executing agency in charge of Flyover project execution	• Coordinate agencies responsible for projects, activity of project management committee, • provide guidance for implementation of EMP • M&E for EMP implementation
3	State Professional Inspection Agency (SFIA)	State Central organization for environmental policy enforcement and monitoring	Environmental law enforcement agency • Annual and quarterly monitoring of EMP implementation through its UB department and District division • Reporting to MEGD on EMP implementation
4	Road Department of Ulaanbaatar city	Project implementing agency	• Coordinate activities of project implementation unit for EMP

No.	Organizations	Relationship with project and EMP	Responsibilities for implementation of EMP
	(UBRD)		implementation • Coordinate consultant and contractor activities focused on EMP • Review of monthly, quarterly and annual EMP implementation report and approval of EMP for next year • Submission of EMP to MEGD
5	Project implementation unit	Day to day activity of EMP	• Oversee of contractor's activity on EMP implementation • Coordination of Consultant and contractor for bridge and road construction and subcontractors activities for EMP • Facilitation for implementation of EMP • Organization of daily monitoring according to EMP • Submission of annual performance report for EMP • Development of EMP for next year

Once the loan agreement is made between the Government of Japan and Government of Mongolia, the implementation agency under supervision of executing agency, should organize bidding among construction companies and select the best suitable and experienced contractor for bridge construction. The Project implementation unit (PIU), which created by the UB Road Department, a project implementing agency, will be responsible for implementation of approved EMP. PIU will be responsible for oversee the EMP is being implemented by the contractor.

Monitoring of EMP implementation will be done periodically by the environmental inspectors of local government, which is professional inspection division of Bayangol District under the Ulaanbaatar city Professional Inspection Department.

Project Contractor can cooperate with environmental agencies or consulting organizations for implementing or monitoring of activities reflected in EMP, but it does not free from its obligation.

7.1.2 Environmental parameters for monitoring

(1) Prevention from air and environmental pollutions

Impact code – Air

During the project implementation period polluting substances in the atmosphere will be increased due to increased dust during the road-bridge construction process, emissions

from machines, mechanism and equipment; exhalation of materials, which are used for paved road. Thus, we need to take preventive measures. For that, must comply with air quality standards, shown at table 56.

Table 56 Air quality standard

Parameters	Average measurement temperature	Measurement unit	Acceptable content level
Chemical impact			
Sulfuric gas (SO)	Average in 10 minutes Average in 20 minutes 24-hours average Annual average	$Mkg/_m^3$	500 450 20 10
Carbon monoxide (CO)	Average in 30 minutes 1 –hour average 8 –hours average	$Mkg/_m^3$	80 000 30 000 10 000
Nitrogen dioxide (NO)	Average in 20 minutes 24-hours average Annual average	$Mkg/_m^3$	85 40 30
Ozone /O/	8 –hours average	$Mkg/_m^3$	100
Dust /total weighing substance/	Average in 30 minutes 24-hours average Annual average	$Mkg/_m^3$	500 150 100
Coarse dust /PM10/	24-hours average Annual average	$Mkg/_m^3$	100 50
Ground dust /PM2.5/	24-hours average Annual average	$Mkg/_m^3$	50 25
Lead /Pb/	24-hours average Annual average	$Mkg/_m^3$	1 0.5
Benzene /CH/	24-hours average	$Mkg/_m^3$	0.001
Physical Impact			
Noise Daytime /7-23/ Night time 23-07	 16-hours average 8-hours average	dB	 60 45

Table 57 shows acceptable levels under the standard and norms and permitted level of pollution under the environmental license.

Table 57. Acceptable maximum concentration of dust and toxic gases in ambient air

parameters	Maximum concentration	Daily average concentration
Dust, mkg/m^3	500	150
Carbon monoxide, mkg/m^3	80,000	30,000
Nitrogen dioxide, mkg/m^3	85	40
Sulphuric gas, mkg/m^3	500	30

Justification for observations

It is necessary to be done detailed controls and examinations to avoid polluting air during the flyover construction works. These include:

- To regularly control dust, noise levels

- During the project implementation period, air sample will be taken by professional institution and it should be analyzed
- To be examines employees' health by professional physicians and to be make medical controls for symptoms of occupational diseases.

Financing sources

Project implementer must reflect cost for implementation measures about reducing negative impacts to the environment into annual financial plan and conduct activities according to the plan.

Table 58 shows cost estimations for preventive measures from air pollution.

Table 58.Cost estimations for preventive measures from air pollution. X 1000 MNT

Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities					Total cost
To determine air pollution status by professional organization	Since beginning of project activity	General project manager and environmental manager	Authorized professional organization for air quality assessment	2 Twice a year, in June and November	Salary of staff	Per diem for 2 people /2 days/	Transportation cost	Measurement & sample cost	Cost for laboratorial examination	350 700
					100	100	60	40	50	
during the construction period, to organize preventive measures from dusting in the air	Since beginning of project activity	Environmental manager appointed by contractor	Contractor executes it own techniques, technologies and work force	Once a month in draught season and 6 times a year	Managing officer /1day/	Employees' 4 salary people	Transportation cost /20km/	Water norm /200t/		650 3,900
					50	200	300	100		
Avoid polluting the environment by solid waste	Since beginning of project activity	Contractor's supervisor	Contractor executes it own techniques, technologies and work force	To collect and remove solid waste to the refuse dump, once a month	Transportation cost for removing solid waste from construction			Work cost		2,850
					2,400			450		
Avoid making exhalation of lubricants and oil in the air	Since beginning of project activity	Contractor's manager in charge of technical completeness	Contractor's mechanic and drivers	To make permanent control on quality of technical maintenance services	Environmental manager makes control			Work cost / monthly basis/		600
					Annual			50		
Total cost										7,920
Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities					Total cost
To be determined air pollution by professional organization	Since beginning of project activity	General project manager and environmental manager	Authorized professional organization for air examination	2 Twice a year, in June and November	Specialist's salary	Per diem for 2 people /2 days/	Transportation cost	Measurement & sample cost	Cost for laboratorial examination	350 700
					100.0	100.0	60.0	40.0	50.0	
during the construction period, to organize preventive measures for dust reduction in the air	Since beginning of project activity	Environmental manager appointed by contractor	Contractor executes it own techniques, technologies and work force	Once a month in draught season and 6 times a year	Salary for Managing officer /1day/	Employees' 4 salary people	Transportation cost /20km/	Water norm /200t/		650 3,900
					50	200	300	100		

Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities		Total cost
Avoid polluting the environment by solid waste	Since beginning of project activity	Contractor's supervisor	Contractor executes it own techniques, technologies and work force	To collect and remove solid waste to the refuse dump, once a month	Transportation cost for removing solid waste from construction	Work cost	2,850
					2400.0	450.0	34,200
Avoid making exhalation of lubricants and oil in the air	Since beginning of project activity	Contractor's manager in charge of technical completeness	Contractor's mechanic and drivers	To make permanent control on quality of technical maintenance services	Environmental manager oversee s	Work salary/ monthly basis/	600
					Annual	50.0	
Total cost							39,400

Project implementer will pay attentions to following preventive measures to avoid air pollution. That includes:

- To select sampling locations for air pollution measure in the center of the flyover project and in areas, where heavy machineries and/or truck work;
- In order to prevent from dust in the air, periodically use water for spraying for unpaved roads for construction vehicles, areas, where concentration of dust 6 times a year during dry seasons (spring, summer and autumn time).
- In order to avoid smell from solid waste to the environment and air, should build protective fence and bunkers and remove waste to the accepted disposal sites in Ulaanbaatar city on monthly basis.
- In order to avoid making exhalation from lubricants and oils to the air, should make permanent control on completeness of employees of road-bridge construction work and automobiles of flyover engineering works. In case if lubricant and oil spelled into ground, one should immediately remove the spelling and clean soil and to comply with waste removal procedure.

(2) Preventing from soil pollution and erosion

Impact code – soil

Environmental soil and land can be polluted due to failure to collect and remove solid waste which was caused by earthworks, soil erosion in the project site by machines' and techniques' impacts or caused by mechanic erosion, within scheduled time according to appropriate regulations. Also, spillage and flows of lubricants and oil may pollute land surface due to failure to execute maintenance, caring, oiling and repairing services of machines and mechanisms in the construction sites.

Object to be affected by impact

Soil around flyover

Soil along vehicle trace

Acceptable standard and norms

Table 59. Acceptable maximum concentration of toxic substances in the soil /AMR/

[1]No.	Substance name	AMR /mg.kg/
1	Benzene	0.3
2	Sulfuric hydrogen	0.4
3	Pb^{+2}	6.0

Justification for observation and control

It is necessary to make control on roads and routes where machines and techniques pass over. Should control changes to land quality and soil quality and occurrence of pollution, to report its outcome to the related authorities within scheduled time and to record registration and data.

Financing sources:

Project implementer must reflect cost for implementation measures about reducing negative impacts to the environment at annual financial plan and conduct activities according to the plan.

Table 60 shows cost estimations for preventive measures to avoid soil pollution.

Table 60. Cost estimations for preventive measures from soil pollution. X 1000 MNT

Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities					Total cost
To be determined soil pollution by professional organization	Since beginning of project activity	General project manager and environmental manager	Authorized professional organization for soil inspection and examination	Twice a year, in April and October	Specialist's salary	Per diem for 2 people /2 days/	Transportation cost	Measurement & sample cost	Cost for laboratorial examination	400 800
					100	100	60	40	100	
To peel off humus layer of 0.34 hectare soil in the garden along the Narnii zam; to pile and store for rehabilitation of lawn strips along both side of access road after construction	Soil digging	General project manager and environmental manager	Organization that executes technical and biological rehabilitation	Twice at the beginning of the project and before commission of construction work	Salary for managing officer	Employees' salary /10 people 10 days/	Transportation cost	Fuel cost	Fertilizer	7500 15,000
					500	5,000	1,000	500	500	
To clean, repair, fill and recover deteriorated road and field during the earthwork process	Since beginning of project activity	Contractor's supervisor	Professional organization	Annual	Salary for managing officer	Employees' salary /20 people 5days/	Transportation cost	Fuel cost	Additional cost	9,500
					500	5,000	1,000	2,000	1,000	
To build water removal pipelines n the roads, and areas, where high risk of flash flood and to reinforce dykes along Dundgol River	Since beginning of project activity	Contractor's supervisor	Professional organization	Annual	Salary for managing officer	Employees' salary /2 5days/	Transportation cost	Materials	Additional cost	75,500 (as the cost included into Flyover total construction cost, it will not be counted for the sum)
					500	10,000	10,000	50,000	5,000	

Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities					Total cost
To provide temporary routes for traffic movements with signs and avoid creating additional unpaved temporary routes	Since beginning of project activity	Contractor's supervisor	Contractor executes it own techniques, technologies and work force	Annual	Salary for specialist	Employees' salary / 5days/	Transportation cost	Materials	Additional cost	1,150
					200	250	100	500	100	
To build appropriate temporary parking area for automobiles and mechanisms during the flyover construction work	Since beginning of project activity	Contractor's supervisor	Contractor executes it own techniques, technologies and work force	Annual	Salary for specialist	Employees' salary / 5days/	Transportation cost	Materials	Additional cost	7,000
					300	1,000	2,000	3,000	700	
To place board and sign to prevent soil pollution in the territory of flyover construction zone	Since beginning of project activity	Contractor's supervisor	Contractor executes it own techniques, technologies and work force	Annual	Salary for specialist			Material		750
					50			700		
Total cost										34,200

(3) Preventing from water pollution

Impact code-surface and underground water

- Solid waste, which are disposed in open area may be absorbed to soil through water during the rain and flood and causes pollution by flowing into the surface water and underground water.
- Working conditions can be difficult and affected by flood due to that failed to build water removal channels and dikes.
- Spillage and flows of lubricants and oil from automobiles and mechanisms may pollute surface water.

Impact object

- Underground water
- Surface water
- Employees

Acceptable level by standard norm

Environmental Conservation. Hydrosphere. General requirement for protection of underground water from pollution MNS 3342-82

Status of protecting water resources from pollution (1st attachment to joint resolution No. 143/A/352 from 1997 by Ministries of Environment and Health and Social welfare)

Drinking water. Hygienic standard and its control, MNS 900-2005

Acceptable maximum level of poisonous substances in the water point for household and water utilizations(5th attachment to joint resolution No. 143/A/352 from 1997 by Ministries of Environment and Health and Social welfare)

Hydrosphere quality index. MNS 4586-98

Order for protection of population's drinking water sources and hygienic zone (1st attachment to joint resolution No. 167/335/a/171 from 1995 by Ministries of Environment, DPP and Health)

Recording procedure for pollution, dearth and rehabilitation of water resources (2nd attachment to joint resolution No. 167/335/a/171 from 1995 by Ministries of Environment and Health)

Water consumption norm "Identifying payment percent and rate" Government resolution No. 7, 2005

Financial sources:

Project implementer must reflect cost for implementation measures about reducing negative impacts to the environment at annual financial plan and conduct activities according to the plan.

Table 61 shows cost estimations for preventive measures from water pollution.

Table 61. Cost estimations for preventive measures from water pollution. X 1000, MNT

Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities					Total cost
To determine water quality by professional organization	Since beginning of project activity	Contractor's supervisor and environmental manager	Professional organization which in entitled to do water inspection and examination	Every spring of the year	Specialist's salary	Per diem for 2 people /2 days/	Transportation cost	Measurement & sample cost	Cost for laboratorial examination	960
					100	100	60	500	200	
To execute connection design according to plan for sewerage and pure water lines and collector for rain water removal	Since beginning of project activity	Contractor's supervisor	. To execute under the agreement made to related organizations	Annual	Material			Salary		600,000 (as it was included into project budget, cost is not included in sum)
					500,000			100,000		
To choose more than 3 points in surface water and underground water points parallel to inspection points of surface water		Environmental manager		Annual	Specialist's salary	Per diem for 2 people /3 days/	Transportation cost	Measurement & sample cost	Cost for laboratorial examination	1,350
					100	150	100	500	500	
To place boards and signs which protect water from pollution in the flyover zone	Since beginning of project activity	Environmental manager	Contractor executes it own techniques, technologies and work force	Annual	Work salary for specialist /5 people/			Material cost		900
					500			400		

Implementation activity	Duration	Contractor	Contracting organization	Frequency	Detailed cost for activities					Total cost
Based on monitoring results, to implement measures to reduce surface and underground water pollution	Since beginning of project activity	Environmental manager	Contractor executes it own techniques, technologies and work force	Quarterly	Work salary for specialist	Salary for workers	Cost for machines and	Fuel cost	Other	20,200
					200	10,000	5,000	3,000	2,000	
Total cost										23,410

Total annual cost for environmental protection measures is **97,010,000 MNT. For four years, total cost for environmental protection measures will be 425,480,000 MNT.**

It is necessary to implement following management and organizational activities for Environmental conservation.

Project implementer needs to operate practiced and trained officer who was included to the professional training for environmental conservation and conservation methodologies as an officer who provided implementation of environmental plan and must identify its performance within scheduled time and report to related organizations.

Also project implementer must make special scheduled plan for implementing measures at the environmental plan, simultaneously receive performance of the plan at management level, make permanent control on performances and cooperate to environmental inspection institutions and administrations of Khan-Uul and Bayangol districts.

Must regularly introduce laws and regulations about Environmental conservations for all employees and officers, conduct short-term training and conduct activities to implement them.

It is appropriate to remove waste from construction works to the refuse dump which was indicated by Inspection authority of environment, hygiene and infectious inspections and to cooperate to inspection authorities.

Must provide permanent attentions for employees' labor safety operations, regularly introduce safety rules and regulations and make control on their activities.

To define transportation road and route, place signs and to make control on its operation.

In case that it's operational trend is changed, assess to state administration organization in charge of environmental issues and be done and implemented required additional clarification to evaluation report of Environmental Impact Assessment.

7.2 Monitoring Mechanism

Monitoring mechanism aims to draft environmental monitoring program including pollution monitoring for water, air and soil during the project implementation period,

examination methodology to control any changes in each environmental component, monitoring period, location of the sampling and measuring points, parameters to be identified by the examination, concluding and reporting examination result, prevent from negative impacts to the environment, or in case negative impacts occur propose required measures to eliminate or reduce.

7.2.1 Air Pollution Monitoring

Demands for monitoring and monitoring parameters

Causing air pollution by dusting and fuel exhalation during the construction building works and causing unsuitable smell to the environment due to failure to remove solid waste within scheduled time required to execute monitoring.

Monitor monitoring parameters such as dust, carbon monoxide /CO/, carbon dioxide / CO_2/, nitrogen dioxide /NO_2/, sulphuric gas /SO_2/, and noise content.

Air test type and form

Air sampling and testing

Monitoring duration

Get air sample and be tested it in June and November of every year

Cost for air test

(Reflected it to detailed cost for environmental conservation)

Monitoring methodology

Controlling procedure for air quality in urban area MNS 17.2.3.16-88

Atmosphere. Basic requirement for sampling MNS 3384-82

Methodology for identification and classification for labor conditions and identification for evaluation criteria MNS 12.100-91

Air and hygienic standards in the work zone MNS 12.013-91

Measurement method for weather at work places MNS 12.054-91

Identification of dust level in the air of work places MNS 12.055-91

Air quality index

General standard MNS 4585-98

Equipment

By equipment of professional organization

Table for outcome records and reports

To be executed examinations by professional organization and report according to form approved by the organization

Examination laboratory

Botanical laboratory: Tel-451014, Address: Building of Jukov's Academy of Sciences, 13th khoroo, Bayanzurkh district

Central laboratory of Environment: Tel-341816, Address: Chinggis avenue, Khan-Uul district

Data collection, processing and reporting

Monitoring record and report will be prepared by the form approved by authorized organization and submit it to Environmental Agency by July 15 and Dec 15 of every year.

7.2.2 Soil pollution and erosion monitoring

Demands for monitoring and parameters

It is necessary to monitor situations which may cause soil pollution and erosion due to inadequate activities during bridge construction.

Sample mechanic structure of nutrient soil layer, salt accumulation and soil agrochemical parameters Sample parameters for pollution: petroleum and lead contents

Monitoring types and forms

Must get sample from project site, test agrochemical parameters of soil and compare results.

Location

To get samples near sewerage, garbage disposal and parking area.

Monitoring duration

April in spring and October in autumn

Monitoring methodology

Environmental Conservation. Soil assessment index and norms in urban area MNS 3297-91

General sampling standards for tests MNS 3298-91

Soil. Procedure for sampling, package, shipment and storage MNS 2305-94

Soil. Identification for soil agrochemical parameters MNS 3310-91

Environmental Conservation. Soil. Description of Hygienic 3parametersMNS 3985-87

Equipment

By equipment of professional organization

Table for outcome records and reports

To be executed examinations by professional organization and report according to form approved by the organization

Data collection, processing and reporting

Monitoring record and report will be prepared by the form approved by authorized organization and submit it to Environmental Agency by July 15 and Dec 15 of every year.

7.2.3 Water pollution and consumption monitoring

Demands for monitoring and parameters

Underground water and surface water can be polluted by construction building works of flyover and monitor it according to following indexes.

- Non sensation features and physical characters (color, odor, taste, brightness, turbid, absorption substance and temperature)
- Oxygen parameters /dissolved oxygen, chemical oxygen demandand biochemical oxygen demand/
- Minerals /calcium, magnum, total hardness, vanishing hardness, static hardness, chloride, sulfate, carbonate, hydro carbonate and total minerals/
- Water level

Sampling point

	latitude	longitude	Remarks
SW1	$47^0$54'20,58 N	$106^0$52'11,44 E	surface water sampling
SW2	$47^0$54'16,13"N	$106^0$51'42,26"E	surface water sampling
SW3	$47^0$54'17,66"N	$106^0$52'27,54"E	surface water sampling
UW1	$47^0$54'17,65"N	106^0 52'5,81"E	Underground water sampling
UW2	47^0 54'17,65"N	106^0 51'41,54"E	Underground water sampling
UW3	47°54'18.09"N	106°52'13.25"E	Underground water sampling
E coli	47°54'16.06"N	106°51'43.76"E	bacterial sampling

Monitoring duration

Every Spring

Monitoring methodology

Procedure for controlling surface water quality MNS 4047-88

Sampling method for water test and standardized and coordinated methods for chemical tests MNS 3534-83

Sampling for water tests MNS 3534-83

Quality indexes of hydrosphere MNS 4586-98

Controlling procedure for surface water quality MNS 4047-88

Procedure for estimation of basic water consumption

Procedure for report preparation on water consumption

Water utilization contract

Equipment

By equipment of professional organization

Table for outcome records and reports

To be executed examinations by professional organization and report according to form approved by the organization

Data collection, processing and reporting

Monitoring record and report will be prepared by the form approved by authorized organization and submit it to Environmental Agency in May.

7.2.4 Noise monitoring

Monitoring demand and parameters

It is likely that noise level caused by construction works of the flyover may exceed acceptable norms and make impacts to employees' health. With this, monitoring of noise should be conducted. Details of monitoring:

To make regular control for noise level

Monitoring duration

Every half year

Monitoring methodology

Labor safety and sanitation. Work place environment. Sanitation standard MNS 4990:2000,

Labor safety and sanitation. General standard to measure light norms at work places MNS 4996:2000,

Labor safety and sanitation. General standards to measure noise MNS 5003:2000,

Labor safety and sanitation. General standards to measure dust content in the air of work place MNS 5010:2000

Table for outcome records and reports

To be executed examinations by professional organization and report according to form approved by the organization

Data collection, processing and reporting

Monitoring record and report will be prepared by the form approved by authorized organization and submit it to Environmental Agency by July 15 and Dec 15 of every year.

7.2.5 Medical monitoring

Monitoring demand and parameters

Noise and dust levels caused by construction works of the flyover may exceed stated norms at work places, which in turn impact health of construction workers. Therefore, monitoring for health of workers should be done constantly. These include:

Monitoring duration

Employees must go for medical examinations once a year.

Monitoring methodology

To conduct joint examinations and diagnosing

Monitoring institution

Medical contracted institution with project implementer

Table for outcome records and reports

To be executed examinations by professional organization and report according to form approved by the organization

Data collection, processing and reporting

Monitoring record and report will be prepared by the form approved by authorized organization and submit it to Environmental Agency in October.

7.2.6 Other issues

- Must provide additional claims by state administrative institutions of the districts in relation to activities every time
- To usually cooperate to environmental and professional inspection organizations about performances of laws and regulations in relation to environmental conservations;
- In case that project activities are changed, assess to Ministry of Environment and make and be approved appropriate and additional clarifications to environmental plan and environmental monitoring program

Analysis and report:

An officer in charge of environmental issues must write down monitoring report on the special notebook and give evaluation and conclusion. As a result of monitoring report, there is a negative impact to the environment, must immediately inform to detailed assessment “Environ” LLC and related professional institution and implement research measures.

7.3 Grievance Redress Mechanism

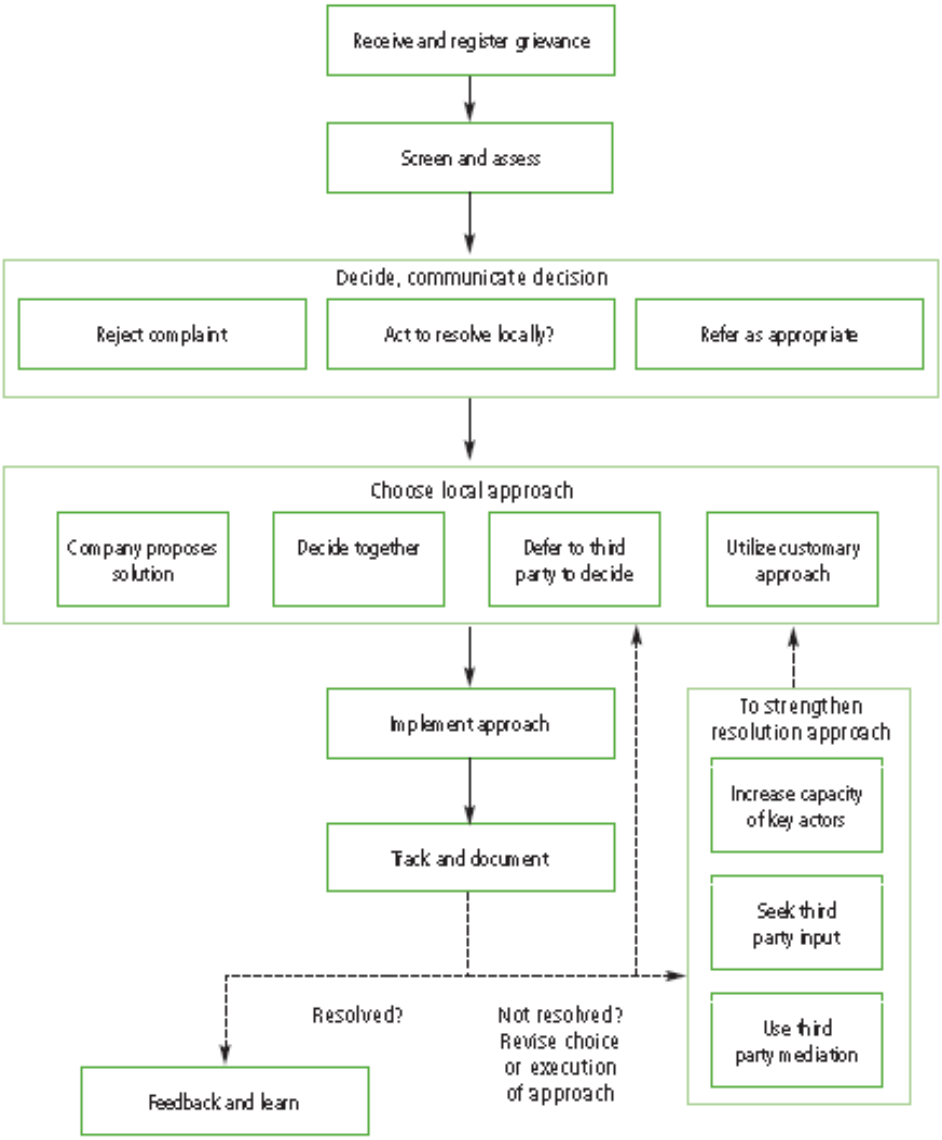
Project implementation unit will provide easy and effective Grievance Redress Mechanism which is sufficient for individuals and organizations which are affected by impacts.

Project implementation unit will provide and implement easy and effective Grievance Redress Mechanism which is sufficient for individuals and organizations which are affected by impacts at the first stage of the project.

To indicate structure and organization of Grievance Redress Mechanism must comply with following principles. Here includes:

- Must register and receive each complaint and request submitted by industrial workers and residents in the territory of project implementation, inform back that request or claim was accepted and provide public registration system.
- To ensure that each claim or request is included to project background or to define basis for the claim or request.
- To learn issues at the claim, to collect information about how same claim was solved or it is available to solve claim at the project scope; if it is available to be solved, must discuss to other which solutions are appropriate to remove it
- Methods to solve claims with or without involvement of lateral consult or any third party:
  - To give response to the claim according to internal decision making procedure or by using approved ethics and criteria within the project management, also in case that claim was not solved, must provide an opportunity to submit such claim to supreme managing organization of the project
  - To find out solution based on mutual discussion between plaintiff and project implementer
  - In case that parties can't make decision based on mutual agreement, must solve claims based on solution, offered by lateral body
- Must control solution and response to claims and provide control team that ensures response function
- Project implementation unit must provide information about taken measures against claims to population, citizens, industrial workers and employees in the territory of project site and to get citizen's views about improvement on Redress mechanism, structure and organization to solve it
- For citizens who are being affected by impacts, will pay attentions to demands of elders, women, children, native citizens and residents who are living in the territory without land license and have lowest living levels and be involved to discussion meetings
- In case that citizen or organization who is affected by impact don't have good satisfaction for decision, he/she is entitled be solved it by Mongolian court.

Working algorithm for Grievance Redress Mechanism that will be offered to project implementation unit



7.4 Implementation schedule of EMP

Duration of EMP corresponds with total project implementation period. According to preliminary schedule of the project, the construction activities will start when the contractor for construction is selected and a work contract for Ajilchin Flyover Bridge construction between the implementing agency and the contractor is signed. The construction duration will be four years.

Before bidding process for selection of contractor starts, preparation activity for bidding document should include revision of Environmental management plan in accordance with the detailed construction plan. It is important point that all EMP proposed activities (baseline setting, monitoring and correctional measures and M&E) are planned in line with construction elements and stages at the proposal level by bidders and the details are reviewed during the contractor's selection process. This way, EMP implementation process will be ensured at the start of proposal.

When the contractor selected and made agreement with implementing agency, a copy of approved EMP should be handed in to the contractor for enforcement purposes.

That way, the contractor is legally bind to implement EMP, while on the duty for project execution.

The contractor is obliged to renew EMP annually based on the monitoring results as well as on the results of corrective actions to reduce the negative impacts and submit the renewed EMP to implementing agency so that it in turn to submit to MEGD for review and approval. Environmental inspectors of Bayangol district will periodically examine the project activities in accordance with EMP and provide guidance in its implementation and recommendation to maintain the annual EMP. Unless there is a serious impacts to environment and society due to unexpected circumstances or emergency, the contractor should maintain the procedure of annual renew of EMP based on monitoring results. When serious impacts to environment and society are discovered because of monitoring outputs or observations, the contractor should take measures to stop or correct the activities that cause the harm to environment and society until the causes are eliminated. The project contractor and implementing agency should make sure that constant cooperation is maintained with all relevant agencies in charge of environment, which can be district professional inspection division, water, air and soil quality monitoring agencies and organizations at national and local levels.

According to the project construction schedule for four years, the contractor should renew EMP each year and four times in project duration and implement the renewed plan of monitoring.

8. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

8.1 Overview of consultation process

The study team has organized the first Public Consultation at the meeting hall of "Suuri" LLC, locates at the Baruun Teeverchid street on July 27 including representatives from Implementing agency – UB city Road Department and Land Administration Department.

Social study team member of the project study team delivered and has got signature for distribute invitation citizens and enterprises which are affected by Flyover bridge construction works in the territory of the 4th khoroo of Bayangol district of Ulaanbaatar city, where the project will be implemented 9 days ago prior to Public Consultation and also delivered brief information of the project in advance.

Figure 100. Public consultation process about environmental impact researches of the flyover

Citizens and workers who participated to the meeting, have known about preliminary project researches, basically environmental and social researches, also project activities and expected outcome and they are glad for submitting certain information about the project.

8.2 Details of Consultation Meetings and Discussions

At the range of preliminary research works, research team jointly organized the first Public Consultation with Auto Road Authority-Implementing agency of Metropolitan Governor's Office and Metropolitan Land Agency including delegations of citizens, industries, enterprises and workers. Table 61 shows discussion result.

Table 62.Public Consultation result

	The first public consultation
Date	At 14:00-16:00, July 27, 2012
Location	Meeting hall of the "Suuri" LLC
Participants	Total 26 people 「UB」MARA 1 delegation 「UB」MLA 1 delegation 4 people from Research Team 2 people from Mongolian Railway 1 person from Environmental NGO Delegations from 4 families who live in gers at the open site of Goviin 88

	12 delegations from industries and enterprises which can be affected by impacts
Consultation meaning	(Introduced by presentation) Environmental Impact Assessment Company (“Environ” LLC) which has entered into the contract by Research Team, conducted Public Consultation and briefly explained about environmental impacts and land surveys, 「Specialist from the Road department made a short intro on project. (Answers and questions) Questions and answers were existed at below. We aimed to hear public impression in relation to land exemption. Specialist of the Metropolitan Auto Road Agency answered to the questions. I want to know land size which will be affected by impacts from red lines (ROW) of the road, reflected to the presentation. When will you provide information about it? (Answer: In the future we will meet and discuss to industries which will be affected by impacts based on detailed ROW sizes.) It is available to explain it that time. Especially, bridge above the railway is widest; does the bridge have such width? (Answer: Did you say about the widening section to the flyover? There are several alternatives among all views and learn them in details until it selects the final alternative which can be main view to provide flyover outcome) Mongolian Railway is the Mongolian-Russian Joint Stock Company and for ownership land of Mongolian Railway we need to explain it to Managing directors. We ask state and administrative authority to organize meeting and explanation about it. (Answer: We are planning to organize consultation in relation to displacement next time. Also I think that we can invite authorized officials from Mongolian Railway or we can visit your organization and meet supreme officials and discuss about it). We understand that land exemption issues are difficult but it is important to make long term surveys for such project. It is necessary to build qualified and appropriate flyover that can freely convey heavy-duty trucks and avoid causing traffic jam. (Answer: A Specialist of UB Land Agency explained land exemption issues required to implement the project, combined understanding, simultaneously explained that this project is long term project that considered future sight)

8.3 Information disclosure

At the detailed research work of the Environmental Impacts, project team distributed brochures about Project brief introduction, Environmental research works and expected outcome of the project to 33 families and director of over 10 enterprises in the territory of the research and also delivered contacting telephone numbers and addresses of research team. Research team met with directors of over 10 branches of the Railway Joint Stock Association on Oct 09, 2012 and introduced about our surveys and ownership lands, construction buildings of Railway institutions which can be affected by flyover project plan and impact rate. Also research team is going to publicly introduce air quality, sound and noise rate, vibration level, water quality of Dundgol and depth wells, research result about soil and plants and Grievance Redress Mechanism for citizen’s claims and requests.

8.4 Second Public Consultation and Information Disclosure

The second public consultation meeting was held to introduce study results to public after the studies on DEIA and Resettlement plan completed. The meeting took place in the same conference room of “Suuri” LLC, where the first meeting was organized. As the venue is located right in the center of project site, it is very convenient for all entities and citizens to

participate for getting information and exchanging their views on this proposed project. The meeting took place on 17th of November 2012. Meeting agenda, List of participants, minutes of meeting and pictures from the 2nd PCM are included in appendices 16-19. In order to ensure participation of affected entities and citizens as well as to get their comments and complains, study team assistant gave a call to each of citizens and entity directors 7 days before the meeting date and invitation following calls has been handed in to each of potential participants 5 days in advance.

Figure 101. View on second public consultation meeting process on the study results

8.5 Details of Consultation Meeting

The study team has introduced the results of studies on environmental impact assessment and resettlement actions. Current status of soil, vegetation, air and water quality, noise and vibration levels; current and projected negative and positive impacts due to construction and operation of Flyover project were the topics of DEIA. Affected entities and citizens, affected properties and their portions, entitlements addressed to affected entities and citizens, current gaps of Mongolian legislation and JICA guidelines for settling the gaps within the land acquisition and resettlements process were topics for discussion and question answer session during the meeting.

Cut of date for restriction population influx was also announced to all participants. It is arranged that Land Administration Department will announce the cut of date through its website to public within a next week and instruct its Bayangol district's Land administration division on Cut-of- date, based on the official request from UB Road department.

Table 63 shows discussion result.

Table 63.Public Consultation info

	The Second public consultation
Date	15:00-17:00, Nov 17, 2012
Location	Conference room of the "Suuri" LLC
Participants	Total 26 people Representative from UB Road dept Representative from UB Land dept 4 people from Study team 2 persons from Environmental NGO 5 citizens from nearby living households

	13 persons represented 8 affected entities
Consultation process	Meeting started at 15.00 and finished 17.20. Two presentations are made: results of environmental studies on air, water and soil qualities and pollution levels against the national standards and projected negative and positive impacts from the Flyover bridge construction and operation; study results of land acquisition and resettlement study. Participants were interested in about the environmental study results as to know in whether air pollutants are exceed the acceptable level or not. if the water quality they consume is ok or bad. How much proposed bridge construction will impact in reducing current traffic jams and if there would be an increase or decrease of air pollution due to flyover bridge. Land acquisition and resettlement issues were hot and fragile among participants especially for some affected entities. Mr. Altanochir of Badral Gas Station, questioned justification of east –west ROW, offering ROW along and over Dundgol river, stating that since this river is polluted and no one is needed. Even tough, proposed entitlements for each affected entity or citizen are introduced to public, some persons (especially those who have no right/license for land possession) were anxious: since Mongolian legislation has a lot of gaps in entitlement, can JICA's and other international experiences can really influence enforcement of these entitlements. Dominant participants were happy to know about how the process of land acquisition and resettlement would take place, who will be responsible, how compliance redress mechanism will be working and if the proposed entitlements will really be workable. Details are included in the minutes of meeting. Cut of Day was also announced at this meeting to restrict influx of population. Some people reacted with question: how would people move to this location, when those living will be moved? It is understandable that not many aware and sure about the entitlements offered. From the Mongolian past practices, no one were happy because of resettlements. Details are included in the minutes of meeting.

9. CONCLUSION

Experts of consulting company ENVIRON on air quality, soil, vegetation, noise, vibration, wildlife, water resources, resettlement and emergency management have studied the proposal “Ajilchin Flyover Project” based on the existing materials, field data collection, sampling and data analysis.

As the results discover that the proposed project on Ajilchin Flyover Bridge will minimally impact the air quality, soil, water quality and negligible impacts to surrounding society during its implementation and expected to bring positive impacts through its construction of Flyover Bridge and access roads, to society, districts of Ulaanbaatar city in terms of economic development, reduction of traffic jams, improvement of air quality, and creation of work places.

Provided that the project properly implements all the actions set in the environmental management plan and monitoring programs, there will not be serious impacts to environment and society. Taking into consideration of all above factors, it concludes that the proposal “Ajilchin Flyover Project” should be approved for implementation consideration.

STUDY TEAM COMPOSITION FOR DEIA REPORT

1. Mr. Erdenesaikhan, team leader, Director of Environmental Consulting Company ENVIRON LLC
2. Ms. Undrakhtsetseg, EIA manager
3. Prof Urjin O., Science advisor
4. Enkhmaa S., Chief Researcher for air quality
5. Prof Tugjsuren N., Noise measurement and analysis
6. Prof Saijaa N., Vibration measurement and analysis
7. Dr. Baatar R., Soil and sedimentation sampling and analysis
8. Dr. Janchivdorj L., Surface and underground water sampling and analysis
9. Mrs. Battuya, surface water expert
10. Mr. Badarch, ground water expert
11. Dr. Suran, Flora study (vegetation and forest) expert
12. Dr. Tseveenmyadag, Fauna expert
13. Ms. Baasanjav, Aquatic biologist
14. Dr. Jambaljav, Permafrost and geographical expert
15. Mr. Tuvdendroj, social expert and lawyer
16. Ms. Munkhtsetseg, GIS expert
17. Ms. Adilbish, Remote Sensing expert

18. Mr. Erdenetsogt, Graphic designer
19. Ms. Khishigsuren, Hygienic expert

Contact address for study team:

Mr. Erdenesaikhan, team leader- phone 976-9191-0331, email: erdene@environ.mn

Ms. Undrakhtsetseg, EIA manager - phone 976-9963-7363, email: info@environ.mn
Phone and fax: 976-11-311938
Office address: R#314 Mongolian Youth Federation Building, Baga toiruu-42
Sukhbaatar District, Ulaanbaatar Mongolia

10. APPENDIXES

1. A copy of EIA General Conclusion of the Ministry of Environment and Green Development
2. Terms of Reference for DEIA
3. List of bird species in the project implementation territory
4. Central Geological Lab: results of heavy metal contents of soil and sediment samples 1
5. Central Geological Lab: results of heavy metal contents of soil and sediment samples 2
6. Central Geological Lab: results of heavy metal contents of surface and underground water samples
7. Soil and Biochemical Lab: results of Chemical analysis of soil samplings
8. Public Health Bacteriological Lab: results of bacterial content of surface water
9. Geo-Ecological Institute Water Lab: results of Chemical analysis of water samplings
10. Copies of Minutes of Meeting of First Public Meeting
11. Agenda of First Public Meeting
12. Pictures of First Public Meeting
13. List of participants of 1st PCM
14. List of participants of a Meeting organized for management staffs in the Conference Room of the Mongolian –Russian Railway Joint Venture
15. A copy of translation of Letter from Railway Authority on Flyover project.
16. Agenda of Second Public Consultation Meeting
17. A copy of Minutes of Meeting of 2nd PCM
18. List of Participants of 2nd PCM
19. Picture taken at 2nd PCM

APPENDIX 1. A COPY OF EIA GENERAL CONCLUSION OF THE MINISTRY OF ENVIRONMENT AND GREEN DEVELOPMENT

МОНГОЛ УЛСЫН
БАЙГАЛЬ ОРЧИН,
АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ

15160 Улаанбаатар хот, Чингэлтэй дүүрэг,
Нэгдсэн Үндэстний гудамж 5/2, Засгийн газрын II байр,
Утас: 26-61-71, Факс: (976-51) 26-62-86,
E-mail: monenv@mail.mn, http://www.mne.mn

2019.04.26 № 6/1662

танай _____-ны №_____-т

АВТО ЗАМЫН ГАЗАРТ

Улаанбаатар хотын Баянгол дүүргийн нутаг дэвсгэрт төмөр зам дээгүүр гүүрэн гарц барих төсөлд "Байгаль орчинд нөлөөлөх байдлын үнэлгээний тухай хуулийн дагуу ерөнхий үнэлгээ хийв.

Ерөнхий үнэлгээний дүгнэлтээр уг төсөлд байгаль орчинд нөлөөлөх байдлын нарийвчилсан үнэлгээ хийлгэх шаардлагатай гэж үзлээ.

Ерөнхий үнэлгээний дүгнэлтийг хавсаргав.

ЕРӨНХИЙ ШИНЖЭЭЧ Д.ЭНХБАТ

УХА0017

001715

APPENDIX 2. TERMS OF REFERENCE FOR DEIA CONSULTANCY

TERMS OF REFERENCE

FOR

ENVIRONMENTAL IMPACT STUDY

UNDER

THE PREPARATORY SURVEY FOR AJILCHIN FLYOVER PROJECT IN ULAANBAATAR CITY

1. Background

Currently, the population in Ulaanbaatar city (UB) accounts for more than 40 % population of Mongolia, and the southern part of UB has developed quickly with economic and population growth.

As its economy and population grow, the traffic volume has increased rapidly, and it is expected to increase further continuously. Moreover, the railway and Dund River flowing from east to west divide the city into two parts, the north and south, which aggravate traffic congestion is a major hindrance for economic activity and livelihood in the city. Therefore, in order to mitigate the traffic congestion and promote economic activity, it is vital to construct a new bridge over the railway and Dund River to link the north and the south.

According to "MDG based National Development Strategy (2007-2021)", it is highly prioritized to improve the road network in UB. Also, in "the Mid-Term Program of new construction of Mongolia" construction of railway flyover (at least seven flyovers) in UB including Ajilchin railway flyover is stated as one of the priority actions.

2. Project Location

"Ajilcin Flyover" is planned to be located in the western part of Ulaanbaatar City to fly over railway and connect Narny Zam to road along the Dound River and road to Thermal Power Station No.3.

Two routes, i.e. East-West route and North-South route, shall be compared as a part of alternatives analysis. Cartographic information on the two routes is to be provided as an annex.

3. Project Components

The Project consists of the following components:

- Construction of main flyover
- Building of access roads to the flyover

PART A: DEIA REPORT

4. Objective

The main objective of the Detailed Environmental Impact Assessment (DEIA) study is to assess both positive and negative environmental impacts due to each project activities. Assess the impacts and recommend appropriate mitigation measures during construction, and operation phases to minimize negative impacts of the Project to acceptable levels. Prepare DEIA and Environmental Management Plan (EMP) including Monitoring Program in both Mongolian and English in compliance with Mongolian Law on Environmental Impact Assessment (1998, amended 2002) and JICA's Guidelines for Environmental and Social Considerations. The contracted company shall meet the requirement of this TOR as well as the requirement of GEIA issued by MNET, as per attached as an annex.

5. Scope of Work

5.1 Baseline Studies

5.1.1 Review on Legal and Administrative Procedures

- Review prevailing government regulations and JICA's policies governing the assessment and management of environmental impacts of the Project, including norms and standards on air, noise, vibration, water and waste, etc.
- Conduct a series of meetings with officers of Ministry of Nature, Environment and Tourism (MNET) and other relevant organizations, if necessary.

5.1.2 Baseline Assessment and Scoping

- Review reports and secondary data collected from the Project.
- Collect general baseline information on existing environmental condition in the project influenced area i.e. monitoring data around the project area, and identification of the environmental components that need detailed further study.
- Note that the baseline assessment will be carried out basically based on the available secondary information and field visits on the following items.
    i. Physical Resources: topography, climate, soils, geology, land use, aquatic resources, and surface and groundwater resources. (The JICA Survey Team is going to organize other surveys on some physical resources. Necessary data will be provided to the awarded company if deemed relevant.)
    ii. Environmental Risks: floods, earthquakes, road accidents, etc.
    iii. Ecological Resources: landscape and natural ecosystem, flora and fauna, wildlife and wetland habitats, and protected areas.
    iv. Environmental Quality:
- Air quality: Ascertain air quality on major variables identified in the national standard.
- Noise and vibration level: Ascertain noise and vibration level compared with the national standard.
- Water Quality: Ascertain water quality on major variables identified in the national standard

- Soil/sediment quality: Ascertain the current conditions compared with the national standard on soil and sediment.
- Other important variables, if any.
    v. Cultural Resource Site: Identify structures and sites which are historical, religious, architectural, etc.
- Identify the possible project impacts and prepare the scoping for DEIA based on the baseline assessment clarified 5.1.2.

5.1.3 First Public Consultation Meeting

- Conduct the first public consultation meeting to ensure relevance of the project to the interests of the people in the project area; and to seek views and suggestions toward the result of baseline assessment and scoping.

5.2 Detailed Studies

5.2.1 Field Investigation

- Conduct necessary investigations and fieldwork for gathering of additional information on ecological and environmental parameters selected during the Baseline Studies mentioned in 5.1.

Those may include, but not limited to, the followings.

I. Physical Environment
- Regional Hydrology and Flood Pattern,
- River Sediment and Siltation, and
- Land use

II. Ecological Environment Tree Plantation/Felling, Water bodies and Fisheries, and
- Wildlife

III. Environmental Pollution
- Air Pollution,
- Noise and Vibration,
- Soil Contamination including dredged soil
- Surface and Ground Water Quality, and
- Pollution due to Waste

IV. Social Environment
- Land Acquisition,
- Cultural and Common Resources Loss,
- Livelihood and Local Economy
- Employment Opportunities,
- Infrastructure and Industry,

- Road Transport,
- Women Empowerment,
- Split of Communities,
- Health and Safety, and
- Road Accident

5.2.2 Focus during Field Investigation

The current study will especially focus on but not limited to the following. Detailed studies will be done based on the primary information obtained through actual measurement and investigation, unless otherwise mentioned. For some investigation items, please refer the attached map of sampling points.

1. Landscape, Geohazards and Slope Stability

- Identification of natural landscape of the project area. Assessment of geological, hydrological and morphological features of the project area, as well as any violent interference in the natural processes. Investigation and evaluation of results to predict erosion, siltation, ground subsidence, floods, and banks washing-off (lateral erosion) in the project area.

2. Regional Hydrology and Flood Pattern

- Assessment of the situation pertaining to regional hydrology and flood pattern in the project area.

3. Climate Change Impact, if relevant for the Project

4. River Morphology

- Study possible impacts on river morphology, various environmental parameters and flooding.

5. Soil Erosion and Bank Stability

- Analysis of soil characteristics, moisture contents to predict possible soil and bank erosion to project activities.

6. Terrestrial Flora and Fauna

- Investigation of the composition of plant species, migratory and local birds, aquatic habitats, terrestrial fauna including wildlife in the Project area.

7. Sensitive Areas/ Receptors

- Identification of locations of sensitive areas and receptors to ensure that they are sufficiently distant enough to maintain harmonization and avoid any potential social disturbances.

8. Traffic Flow

- Predict future traffic growth and load on the bridge and access road by examining changes in traffic counts and flow. (Please note that the result of traffic survey will be provided by the JICA Survey Team.)

9. Air Quality1

- Conduct air quality analysis by measuring temperature, wind direction, wind velocity, suspended particulate matter (SPM), CO, NO2, SO2 and Pb throughout the project area. Numbers and locations of sampling points shall be decided by considering traffic/road conditions and location of sensitive receptors. Minimum numbers are five points; one in the northern-side intersection (A1), one under the planned flyover (A2), one in the southern-side intersection in case of the South-North route (A3), one in the western-side intersection in case of the East-West route (A4) and the one near the current Dound River Bridge (A5). More points could be proposed if deemed appropriate.

10. Noise and Vibration Level

- Conduct noise and vibration survey and measure average equivalent sound level (Laeq), frequency, velocity and sound acceleration during both day and night times, as defined by the national standard. Minimum numbers are five points; one in front of School 38 on the Narny Zam Stree (NV1), one near the railway track in the project area (NV2), one near the current Dound River Bridge (NV3), one in the ger families' area along the railway branch line (NV4) and one in Dound Gol street (NV5). More points could be proposed if deemed necessary.

11. Water Quality

- Conduct water quality analysis for major water sources in and around the project site by measuring water temperature, DO, BOD, COD, turbidity, pH, TOC, TDS, TSS, EC, As, Coli form, hardness, oil and grease. For water quality of groundwater, if a well in residential areas is used for drinking purpose, water quality has to be compared with the standard of drinking water quality. Minimum numbers of sampling points are five; three 1 The parameters for air quality, noise and vibration, water quality, soil and sediment contamination should be in line with the relevant national standards. In addition, it is advisable to include parameters that are surveyed by DEIAs of other similar projects funded by ADB and World Bank.

  for groundwater quality (a well in the ger families' area along the railway branch line (GW1) and two deep wells which will be dug by the JICA Survey Team (GW2 and GW3)) and two for surface water (one in the upper side of the Dound River (W1) and the other in the lower side of the Dound River (W2)). More points could be proposed if deemed necessary.

12. Soil

- Conduct analysis on the chemical properties of soil and assess the presence of toxic substances and heavy metals like Cu, Pb, Zn, Mn, Hg, Cd, As. Evaluate the environmental impact of such contaminants on the end-use and environmental impacts of soil. Minimum numbers of sampling points are five; one in the central reservation on the Narny Zam Street (SO1), one in the railway premises (SO2), two along the northern embankment of the Dound River (SO3 and SO4), the other in the ger families' area along the railway branch line (SO5). More points could be proposed if deemed necessary.

13. Sediment

- Conduct analysis on the chemical properties of sediment and assess the presence of toxic substances and heavy metals like Cu, Pb, Zn, Mn, Hg, Cd, As. Evaluate the environmental impact of such contaminants on the end-use and environmental impacts of sediment.

  Minimum numbers of sampling points are two; one in the upper side of the Dound River (SE1) and the other in the lower side of the same river (SE2). More points could be proposed if deemed necessary.

14. Sand Mine, Quarry and Borrow Sites

- Estimate impact of sand mining, quarry and barrow pit operations toward the environment in the project area.
- Carry out a study on the potential impacts due to various construction methods.

  The below table summarizes the minimum requirement of measurement for selected investigation items. Please note that once DEIA starts, numbers and locations of sampling points have to be agreed by the JICA Survey Team prior to any actual measurements.

  Table 1. The ***minimum requirement*** of selected investigation items **Investigation items Parameters to be analyzed No. of sampling points**

  Air Quality Temperature, wind direction, wind velocity, SPM, CO, NO2, SO2 and Pb5 Noise and Vibration Equivalent sound level (Laeq), frequency, velocity and sound acceleration (during both day and night times) 5 Water Quality (surface water) 2 (surface water) 7 water temperature, DO, BOD, COD, turbidity, pH, TOC, TDS, TSS, EC, As, Coli form, Hardness, oil and grease (groundwater) TS, NO3-, Pts, heavy metals (Cu, Pb, Zn, Mn, Hg, Cd, As), coliform, fecal coliform 3 (groundwater) Soil Cu, Pb, Zn, Mn, Hg, Cd, As 5 Sediment Cu, Pb, Zn, Mn, Hg, Cd, As. 2

5.3 Analysis of Alternatives and Economic Assessment

5.3.1 Analysis of Alternative Options

- In the Project, there are two *alternative routes*, namely the East-West route and the South-North route as per attached as an annex. Obtain the information on all the alternative

route and conduct comparative environmental analysis of these routes, including "No Project" scenario.

5.3.2 Economic Assessment

- Conduct economic analysis of all alternatives for (i) costs and benefits of environmental impacts; (ii) costs, benefits, and cost-effectiveness of mitigation measures; and (iii) discussion of impacts that have not been expressed in monetary values, in quantitative terms where possible.

5.4 Anticipated Environmental Impacts and Mitigation Measures

5.4.1 Estimation of Impacts

- ***Estimate*** air and noise quality based on predicted traffic estimates and recommendation of mitigation measures.
- Evaluate the project impact on all physical and ecological resources described above and recommendation of mitigation measures.
- Evaluate socio-economic and cultural impacts, such as:
  - Assessment of the status of livelihoods.
  - Assessment of impacts on culturally and religiously sensitive locations and other sensitive receptors
  - Assessment of impacts on industrial development
  - Assessment of traffic safety.
  - Assessment of impact on health and safety and estimation of possible health and safety impacts (such as occupational safety, HIV/AIDS, STDs) on construction workers.

5.5 Environmental Management Plan

5.5.1 Environmental Mitigation Measures

- Prepare Environmental Management Plan (EMP) together with the executing agency for ***all phases of the Project*** for effective implementation of environmental protection and mitigation measures of significant environmental impacts.
- Preparation of environmental protection measures together with the executing agency to (i) mitigate environmental impacts, (ii) compensate for adverse environmental impacts or (iii) enhance environmental resources. Prepare cost estimates for each mitigation measure proposed in the EMP and to make sure that all the mitigation measures are adopted in the engineering design of the Project.

5.5.2 Institutional Assessment

- Assess institutional capacity of the implementing agencies for effective implementation of environmental management and monitoring plan and recommend possible institutional arrangement for implementation and supervision of the EMP.

5.5.3 Monitoring Mechanism

- Elaborate monitoring mechanism and develop a monitoring form, a tool to be used by implementing authorities together with the executing agency in order to be able to interfere and respond quickly to activities, which during the construction and operation turn out to have a negative effect to the environment. The tool will specify the parameters, location, frequency and means of monitoring.

5.6 Public Consultations and Disclosure Plan

5.6.1 Public Consultations

- Assist the executing agency to conduct two public consultations (the first one after the scoping stage and the second one after preparation of draft DEIA report). This will ensure that the consultation process will involve affected people, key agencies, NGOs, public representatives, and other stakeholders and they are provided with opportunities to participate in the decision-making process. Please note that assistance shall include all logistical supports such as arrangement of conference room, handouts, etc; thus such cost shall be included in the total quoted cost.
- Consult with the governors of relevant districts on the contents of DEIA report.
- Record and document the minutes of meetings of all the public consultation meetings.

5.6.2 Disclosure Plan

- In consultation with the stakeholders, prepare information disclosure plan for dissemination of DEIA to the affected community and general public.

5.7 Grievance Redress Mechanism

5.7.1 Establishment of Grievance Redress Mechanism

- Recommend appropriate Grievance Redress Mechanism based on the review of current practices in Mongolia and other similar projects by other donor agencies.

6. Team Composition

- Formulate a team with necessary experts in order to carry out DEIA in line with a work program mentioned in the next section. Currently, the followings experts are considered to be indispensable. Please propose any other experts or assistants if deemed necessary.

 # Position Person Months

1 Team Leader (EIA Specialist) 5
2 EIA Assistant 5
3 Environmental Specialists (subject-wise) 7
4 Environmental Assistants (subject-wise) 10
5 Social Expert (Resettlement) 1
6 Economist/ Valuator 1
7 Other Experts (i.e. GIS experts) 1

7. Work Program

- The duration of the preparation of the DEIA including EMP will be about 4 months. The work program and personnel schedule is provided in Figure 1

Figure 1: Implementation Schedule June July Aug. Sept.
1 Project Mobilization
2 Review Previous Studies
3 Identification of Possible Project Impacts (Scoping)
4 First Public Consultation
5 Detailed Field Investigation
6 Preparation of Draft EIA Report
7 Second Public Consultation
8 Finalization of Deliverables, inc. EIA Report
9 Submission them to JICA and MONET

8. Reporting

The following is a list of deliverables and those shall be written in both Mongolian and English.

- Draft Scoping (Identification of Possible Project Impacts)
- Draft DEIA Report
- Final DEIA Report

The report should include necessary annexure, i.e. official letters from MNET on GEIA and DEIA and minutes of meetings of public consultation meetings, and shall be submitted to the JICA Survey Team in time.

APPENDIX 3 A LIST OF BIRD SPECIES AND THEIR HABITAT AREA SPECIFICS WITHIN THE AJILCHIN FLYOVER PROJECT STUDY AREAS

[1]	SPECIES NAME	Habit areas in Mongolia	U	M	N	W	O	Occurrence	Distribution
1.	Milvus migrans Black Kite	TB. Mountain steppe, urban areas	-	1	1	-	-	C	E.Sib
2.	Circus aeruginosus Westren Marsh Harrier	W. meadow, wetland, lake with reeds	-	-	-	1	-	R	PA
3.	Accipiter nisus Eurasian or Northern Sparrow Hawk	TB. Coniferous and mixed forest	1	-	-	1	-	E	PA
4.	Buteo hemilasius Upland Buzzard or Hawk	S. Mongolian steppe, mountain steppe	1	-	1	-	-	C	Mon.T
5.	Falco tinnunculus Common or Eurasian Kestrel	S. Steppe, mountain steppe, desert, rocky place	1	-	1	-	-	C	PA
6.	Falco amurensis Amur (Red-footed) Falcon	TB. Coniferous and mixed forest	-	1	-	-	1	C	CH
7.	Falco cherrug Saker Falcon	S. rocky mountain, steppe	1	-	1	-	-	C	Mon.T
8.	Perdix dauuricae Daurian Partridge	S. steppe of mountain, steppe, desert, sandy	1	-	-	-	-	C	Mon.T
9.	Vanellus vanellus Northern Lapwing	W. river basin, meadow, wet meadow	-	1	-	-	1	C	PA
10.	Charadrius dubius Little Ringed Plover	W. river, lake, small lake, some green water	-	1		-	-	C	PA
11.	Tringa glareola Wood Sandpiper	W. green water, lake, small lake	-	1	-	-	1	C	PA
12.	Tringga hypoleucos Common Sandpiper	W. river, lake, small lake	-	1	1	-	-	C	E.Sib
13.	Columba livia Domestic or Rock Dove	RP. Western in Mongolia	1	-	1	-	-	A	M-MT
14.	Columba rupestris Blue Hill Pigeon	RP. Rocky place, mountain,	1	-	1	-	-	A	Mgl
15.	Streptopelia orientalis Rufous or oriental turtle Dove	TB. Forest of river	-	1	1	-	-	R	PA

[1]	SPECIES NAME	Habit areas in Mongolia	U	M	N	W	O	Occurrence	Distribution
16.	Cuculus canorus Eurasian or Common Cuckoo	TB. forest, place with bush	-	1	1*	-	-	E	PA
17.	Athene nocuta Little Owl	RP. Rocky place, steppe, mountain	1	-	1	-	-	E	M-MT
18.	Apus apus Nortern or Common Swift	RP. Rocky place, mountain, forest	-	1	1	-	-	C	Eu
19.	Apus pacificus Pacific or White-rumped Swift	RP. Rocky mountain roof of house	-	1	1	-	-	C	CH
20.	Upupa epops Hoopoe	RP. Rocky mountain, mountain side, Gobi, steppe	-	1	1	-	-	C	Eu.Ch
21.	Eremophila alpestris Shore or Horned Lark	S. desert, steppe, Altai mountain	1	-	1	-	-	A	Mgl
22.	Riparia riparia Bank Swallow or Sand Martin	W. river and lake, in the water	-	1	-	-	-	C	M-MT
23.	Hirundo rustica Barn or Common Swallow	W. wetland, lake, river	-	1	1	-	-	C	Sib
24.	Delichon urbica Northern House Martin	RP. Rocky mountain, mountain side, Gobi, steppe	-	1	1	-	-	C	PA
25.	Motacilla alba White or Pied Wagtail	W. river and lake, in the water	-	1	1	-	-	C	PA
26.	Motacilla flava Yellow Wagtail	TB. Wetland	-	1	-	-	1	R	PA
27.	Anthus hodgsoni Olive-backed or Indian Tree Pipit	TB. Coniferous and mixed forest, mountain	-	1		-	-	R	CH
28.	Anthus spinoletta Water or Rock Pipit	RP. Mountain, forest	-	1		-	-	R	T
29.	Lanius cristatus Brown Shrike	TB. Wetland, place with plant	-	1	1	-	-	C	CH
30.	Lanius isabellinus Isabelline or Central Asian Shrike	TB. wetland, plants, Gobi, place with plant	-	1	1	-	-	R	CH
31.	Bombycilla garrulus Bohemian Waxwing	TB. Coniferous and forest	-	1		1	-	C	Sib
32.	Prunella montanella Siberian Accentor	RP. Coniferous, forest, mountain	-	1	-	1	-	R	Sib

[1]	SPECIES NAME	Habit areas in Mongolia	U	M	N	W	O	Occurrence	Distribution
33.	Prunella fulvescens Brown Accentor	RP. Mountain, rocky place, Coniferous	1	-	1	-	-	R	Mgl
34.	Oenanthe oenanthe Northern Wheatear	S. steppe, mountain, Gobi, forest	-	1	1	-	-	R	PA
35.	Phoenicurus phoenicurus Eurasian Redstart	TB. Coniferous, forest, mountain, rocky place	-	1	1	-	-	R	Eu
36.	Phoenicurus ochruros Black Redstart	ÕÀ. Forest and rocky place	-	1	1	-	-	E	Eu
37.	Phoenicurus auroreus Daurian Redatart	TB. forest, in the river	-	1	1	-	-	E	CH
38.	Turdus ruficollis Dark-or Red-throated Thrush	TB. Coniferous forest	-	1	-	-	1	E	Sib
39.	Locustella certhiola Pallas' Grasshopper	TB. High and wet place	-	1	-	-	1	E	Sib
40.	Phylloscopus trochiloides Greenish Leaf-warbler	TB. Mixed forest, plants	-	1	1	-	-	E	CH
41.	Phylloscopus inornatus Yellow-browed Leaf-warbler	TB. Coniferous and mixed forest	-	1	-	-	1	E	Sib
42.	Phylloscopus proregulus Pallas' Leaf-warbler	TB. Shore of river, coniferous forest	-	1	-	-	1	E	Sib
43.	Muscicapa parva Red-breasted or Red-throated	TB. Coniferous and mixed forest	-	1	1	-	-	E	Sib
44.	Aegithalos caudatus Long-tailed Tit	TB. Coniferous and mixed forest, bush	1	-	1	-	-	E	PA
45.	Parus major Great Tit	TB. Coniferous and mixed forest, elm,	1	-	1	-	-	E	Eu.Ch
46.	Em.eriza leucocephala Pine Bunting	TB. forest, tree, coniferous forest	1	-	1	-	-	R	Sib
47.	Emberiza spodocephala Black-faced Bunting	TB. Wet place, tree, bush and elm	-	1	1	-	-	E	CH
48.	Acanthis flavirostris Twite	RP. Rocky mountain, steppe, mountain	1	-	-	1	-	C	Mon.T
49.	Uragus sibiricus Long-tailed Rosefinch	TB. forest, brushwood	1	-	1	-	-	C	CH

[1]	SPECIES NAME	Habit areas in Mongolia	U	M	N	W	O	Occurrence	Distribution
50.	Carpodacus erythrinus Scarlet Rosefinch or Grosbeak	TB. forest, brush, mountain	-	1	1	-	-	C	CH
51.	Passer domesticus House Sparrow	TB. In the city	1	-	1	-	-	C	PA
52.	Passer montanus (Eurasian) Tree Sparrow	TB. tree, mountain, in the river, Gobi	1	-	1	-	-	A	PA
53.	Pica pica Black-billed Magpie	TB. tree, mountain, forest	1	-	1	-	-	C	Eu.Ch
54.	Pyrrhocorax pyrrhocorax Red-billed Chough	RP. Rocky place, mountain and rocky mountain	1	-	1	-	-	A	Mon.T
55.	Corvus dauricus Daurian Jackdaw	TB. River basin	-	1	1	-	-	E	Eu.Sib
56.	Corvus corone Eurasian Carrion or Hooded Crow	TB. forest, brush, coniferous	1	-	1	-	-	A	PA
57.	Corvus corax Northern Raven	TB. steppe, Gobi, forest, reedy lake, rocky place	1	-	1	-	-	A	PA

First remark of chart:

- TB – Tree and bush, W– Wetland, S – Steppe, M - Mountain, RP – Rocky place.
- U – Urban, M – Migratory, N - Nest, W - Wintering, O – Occasional, E – endangered, R – Rare, C – Common, A – abundant.
- PA – Paleo-Arctic, Sib - Siberian, Ch - China, Mon.T – Mongolian- Tibetan, M-MT – Mongolian-Mid-Terrainian, EC – Europe-China, Eu - Europe, E.Sib-Europe-Siberian, T- Tibetan. Mgl-Mongolia

APPENDIX 4. CENTRAL GEOLOGICAL LAB: RESULTS OF HEAVY METAL CONTENTS OF SOIL AND SEDIMENT SAMPLES 1

Маягт ХФ-01

ГТЛ-ийн Захирлын 2011 оны
155 тоот тушаалын 1-р хавсралт

ГЕОЛОГИЙН ТӨВ ЛАБОРАТОРИ

18080 ш/х-437, Улаанбаатар хот, [illegible] дүүрэг,
[illegible], ГТЛ-ийн байр.
Утас: 976-11-632904, 632914; Факс: 976-11-632944
[illegible]

CENTRAL GEOLOGICAL LABORATORY

C 002
MNS ISO/IEC 17025

ИТГЭМЖЛЭГДСЭН ЛАБОРАТОРИЙН ШИНЖИЛГЭЭНИЙ ДҮН

Захиалгын дугаар : ХФ 2012/1134
Захиалагчийн нэр : Энвайрон ХХК
Хаяг :
Утас : 99165110
Факс : 311938
Шинжилсэн огноо : 2012.09.07
Хуудасны тоо : 1

Нэгжийн нэр : Хими физик аргын лаборатори
Дээжийн боловсруулалт : -
Шинжилгээний арга : Хими
Дээжийн тоо, төрөл : 7, шунтаг дээж
Хүлээн авсан огноо : 2012.08.31

* - Олон улсын хэмжээнд итгэмжлэгдсэн арга

№	Лаб №	Дээж №	Дээжийн тодорхойлолт	Элемент, мг/кг	
				Hg	Cd, %
1	15681	X-1 Гүүр	-	0.15	<0.005
2	15682	X-2 0-5	-	0.19	<0.005
3	15683	Sed-2	-	0.11	<0.005
4	15684	X-3 0-5	-	0.13	<0.005
5	15685	X-5 0-5	-	0.19	<0.005
6	15686	Сед-1	-	<0.05	<0.005
7	15687	X-4 0-5	-	<0.05	<0.005

Чанарын хяналт

1	АСЗ	Шифр-2539	аттестатчилсан утга	1.52	0.001
			шинжилсэн утга	1.69	<0.005
Шинжилгээний аргын код				EPA-7473	AAC-10*

Энэхүү шинжилгээний дүн нь захиалагчаас ирүүлсэн тухайн дээжинд хамаарах бөгөөд зөвхөн эх хувь нь хүчинтэй.

Тайлбар: АСЗ - Аттестатчилсан стандартчилсан загвар

Лабораторийн эрхлэгч (тамга) (гарын үсэг) /Д.Пүрэвжаргал/ (нэр) Хяналтын инженер (гарын үсэг) /Б.Буянхишиг/ (нэр)

Гүйцэтгэсэн инженер: М.Амгалантуяа, Ч.Цэрэнхүү (нэр)

Манай байгууллагаар үйлчлүүлсэнд баярлалаа.

APPENDIX 5. CENTRAL GELOGICAL LAB: RESULTS OF HEAVY METAL CONTENTS OF SOIL AND SEDIMENT SAMPLES 2

Маягт ХФ-01

ГТЛ-ийн Захирлын 2011 оны
155 тоот тушаалын 1-р хавсралт

ГЕОЛОГИЙН ТӨВ ЛАБОРАТОРИ
18080 ш/х-437, Улаанбаатар хот, Сонгинохайрхан дүүрэг,
Үйлдвэрчний эвслийн гудамж, ГТЛ-ийн байр,
Утас: 976-11-632904, 632914; Факс: 976-11-632944
Цахим хаяг: info@cengeolab.com; http://www.cengeolab.com

DAP-PL-0781.00

C 002
МНБ ISO/IEC 17025

ИТГЭМЖЛЭГДСЭН ЛАБОРАТОРИЙН ШИНЖИЛГЭЭНИЙ ДҮН

Захиалгын дугаар : ЦЛ 2012/0212
Захиалагчийн нэр : Энвайрон ХХК
Хаяг :
Утас : 99165110
Факс : 311938
Шинжилсэн огноо : 2012.09.13
Хуудасны тоо : 1

Нэгжийн нэр : Цацраг идэвхт материалын лаборатори
Дээжийн боловсруулалт : СБСЛ-д боловсруулсан.
Шинжилгээний арга : Рентгенфлуоресценцийн шинжилгээ
Дээжийн тоо, төрөл : 7, нунтаг дээж
Хүлээн авсан огноо : 2012.08.29

* - Олон улсын хэмжээнд итгэмжлэгдсэн арга

№	Лаб №	Дээж №	Дээжийн тодорхойлолт	Элемент, мг/кг		
				As	Pb	Cr
1	3028	X-1 гүүр	-	18	45	49
2	3029	X-2 0-5	-	11	27	68
3	3030	Sed-2	-	13	57	91
4	3031	X-3 0-5	-	7	62	40
5	3032	X-5 0-5	-	9	97	51
6	3033	Сед-1	-	11	481	23
7	3034	X-4 0-5	-	6	25	44
Чанарын хяналт						
1	АСЗ	Шифр-2531	аттестатчилсан утга	2.28	24.81	182
			шинжилсэн утга	<5	23	185
Шинжилгээний аргын код				РФА-49*		

Тайлбар : АСЗ - аттестатчилсан стандартчилсан загвар
Энэхүү шинжилгээний дүн нь захиалагчаас ирүүлсэн тухайн дээжинд хамаарах боговод зөвхөн эх хувь нь хүчинтэй.

Лабораторийн эрхлэгч (Б.Долгодмаа / (нэр) Хяналтын инженер /Г.Цэвээлмаа/ (нэр)
(гарын үсэг) (гарын үсэг)

Гүйцэтгэсэн инженер: Ц.Надмид
(нэр)

Манай байгууллагаар үйлчлүүлсэнд баярлалаа.

APPENDIX 6. CENTRAL GELOGICAL LAB: RESULTS OF HEAVY METAL CONTENTS OF SURFACE AND UNDERGROUND WATER SAMPLES

Маягт ХФ-01

ГТЛ-ийн Захирлын 2011 оны
155 тоот тушаалын 1-р хавсралт

ГЕОЛОГИЙН ТӨВ ЛАБОРАТОРИ
18080 ш/х-437, Улаанбаатар хот, Сонгинохайрхан дүүрэг,
Үйлдвэрчний эвлэлийн гудамж, ГТЛ-ийн байр,
Утас: 976-11-632904, 632914; Факс: 976-11-632944
Цахим хаяг: info@cengeolab.com; http://www.cengeolab.com

DAP-PL-5721.00

C 002
MNS ISO/IEC 17025

ИТГЭМЖЛЭГДСЭН ЛАБОРАТОРИЙН ШИНЖИЛГЭЭНИЙ ДҮН

Захиалгын дугаар : ХФ 2012/0912
Захиалагчийн нэр : Энвайрон ХХК
Хаяг : 3Г-н III байр 123 тоот
Утас : 99884609
Факс : 311938
Шинжилсэн огноо : 2012.07.20
Хуудасны тоо : 1

Нэгжийн нэр : Хими физик аргын лаборатори
Дээжийн боловсруулалт : СБСЛ-д боловсруулсан.
Шинжилгээний арга : Хими
Дээжийн тоо, төрөл : 5, ус
Хүлээн авсан огноо : 2012.07.18

* - Олон улсын хэмжээнд итгэмжлэгдсэн арга

№	Лаб №	Дээж №	Дээжийн тодорхойлолт	Элемент, мг/л
				As
1	12279	1(1)	-	<0.01
2	12280	2(2)	-	<0.01
3	12281	3(3)	-	<0.01
4	12282	4(4)	-	<0.01
5	12283	5(5)	-	<0.01

Чанарын хяналт

1	СУ	Шифр-1818	стандарт үүсмэлын агуулга	0.75
			шинжилсэн утга	0.77
Шинжилгээний аргын код				ICP-25*

Энэхүү шинжилгээний дүн нь захиалагчаас ирүүлсэн түүхийн дээжинд хамаарах бөгөөд зөвхөн тэх хувь нь хүчинтэй.

Тайлбар: СУ- Стандарт үүсмэл

Лабораторийн эрхлэгч /Д.Пүрэвжаргал/ Хяналтын инженер /Б.Буянхишиг/
(гарын үсэг) (нэр) (гарын үсэг) (нэр)

Гүйцэтгэсэн инженер: Ч.Цэрэнхүү
(нэр)

Манай байгууллагаар үйлчлүүлсэн байрлалаа.

(гэмээн хүний үсэг)

APPENDIX 7. SOIL AND BIOCHEMICAL LAB: RESULTS OF CHEMICAL ANALYSIS OF SOIL SAMPLINGS

ХӨДӨӨ АЖ АХУЙН ИХ СУРГУУЛЬ,
ЭРДЭМ ШИНЖИЛГЭЭ СУРГАЛТ ҮЙЛДВЭРЛЭЛИЙН "НАРТ" ТӨВ,
ХӨРС-БИОХИМИЙН ЛАБОРАТОРИ

Монгол улс, Улаанбаатар – 210153, Хан-Уул дүүрэг, 11-р хороо, Зайсан, Мал аж ахуйн эрдэм шинжилгээний хүрээлэнгийн байр, 406, 415, 419 тоот
Ш/х 53/10 ХААИС
Утас: (976)-98006123, 98001838Факс: (976-11)-341377
E-mail: nartcenter@msua.edu.mn

20 [illegible] оны [illegible] сарын 31 өдөр

Зинийрин

Хөрсний химийн задлан шинжилгээний дүн

№	Дээж	pH	Давс, %	ЦДЧ, дс/м	CO_2, %	Солилцох суурь, мг-экв/100гр		Ялзмаг, %	NO_3, мг/кг	Шим тэжээлийн элементүүд, мг/100гр	
						Ca	Mg			P_2O_5	K_2O
1	P-1 0-20	8.3	0.05	0.130	0.16	12.4	4.2	1.56	1.10	[illegible]	[illegible]
2	25-35	8.5	0.04	0.141	0.16	16.8	2.4	1.17	0.01	[illegible]	8

Механик бүрэлдэхүүний задлан шинжилгээний дүн

№	Дээж	Механик ширхэгүүд, % ширхэгийн хэмжээ, мм						
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.005	0.005-0.001	<0.001	<0.01
1	P-1 0-20	1.6	56.0	20.6	6.0	9.1	6.7	21.8
2	25-35	13.0	40.5	17.5	25.2	1.9	1.8	28.9

Хөрсний шинжилгээний шинж чанарын үзүүлэлтүүдийг:

1. Хөрсний урвалын орчин- Усан бэлдэц дахин хандлагад ионометрийн арга
2. Хөрсний ялзмаг- Тюрины арга, %
3. Хөрсний нитратын азот- усан хандлагад потенциометрийн арга мг/100гр
4. Хөрсний хөдөлгөөнт фосфор (P_2O_5) – 1% нүүрс хүчлийн аммони уусмалд Мачигины арга, мг/100гр хөрсөнд
5. Хөрсний хөдөлгөөнт кали- 1% нүүрс хүчлийн аммони уусмалд, дөлийн фотометрийн арга, мг/100гр хөрсөнд
6. Хөрсний давсжилт- ионометрийн арга, %
7. Хөрсний механик бүрэлдэхүүн- Качинскийн аргаар, %
8. Хөрсний цахилгаан дамжуулах чадвар- ионометрийн арга, дс/м
9. Солилцох суурьууд- комплексметрийн аргаар, мг-экв/100гр
10. Хөрсний карбонатын агууламж, кальциметрийн арга, % зэрэг стандарт аргуудаар тодорхойлов

МОНГОЛ УЛС ХААИС "НАРТ" ТӨВ

Лабораторийн эрхлэгч: Г. Солонго /Ph.D/
Задлан шинжээч: Ч. Уранхайч /McS/

APPENDIX 8. PUBLIC HEALTH BACTERIOLOGICAL LAB: RESULTS OF BACTERIAL CONTENT OF SURFACE WATER

ЭРҮҮЛ МЭНДИЙН ЯАМНЫ ХАРЪЯА
НИЙГМИЙН ЭРҮҮЛ МЭНДИЙН ХҮРЭЭЛЭН

2012 оны 10-р сарын - ны өдөр | № 774 | Улаанбаатар 211049 Утас: 452774

Шинжилгээний хариу

Шинжилгээ ирүүлсэн байгууллага:	"Environmental Consulting"
Шинжилгээ ирүүлсэн огноо:	2012-10-03
Сорьц, шинжилгээ авсан хүний нэр, албан тушаал:	Б.Доржханд ЭЗБАСЛ-ийн бактериологич
Лабораторид хүргэсэн хүний нэр, албан тушаал:	Хишигсүрэн
Шинжилгээ авсан эх үүсвэр:	Дунд голын ус
Сорьцийн нэр:	Цэвэр саванд 0.5л-ээр 1ш дээж

Шинжилгээний дүн :

Д/д	Дээж №	Нянгийн тоо	Гэдэсний бүлгийн бичил биетэн	Анаэроб бичил биетэн	Гэдэсний бүлгийн эмгэг төрөгч
	Стандарт үзүүлэлт	100 MNS 900-2005	0 MNS 4697-98	Илрэхгүй MNS 7939:2000	Илрэхгүй MNS 6340-2003
1	1	$5x10^4$	*E.coli* илрэв	*Cl.perfringens* илрэв	Эмгэгтөрөгч илрээгүй

НЭМТЛ-ийн захирал,
БШУ-ны доктор, проф, академич Ц.Энхжаргал

Шинжилгээ гүйцэтгэсэн: Бактериологич Б.Доржханд

APPENDIX 9. GEO-ECOLOGICAL INSTITUTE WATER LAB: RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLINGS

Geoeco

ШИНЖЛЭХ УХААН
ГЕОЭКОЛОГИЙН ХҮР
ШИНЖИЛГЭЭНИЙ Л

Усны химийн шинжилгээний тодорхойлолт

Сорьц авсан: 2012 оны 07 сарын 09 өдөр

Шинжилгээ хийсэн 2012 оны 07 сарын 09 өдөр

Сорьц авсан газрын нэр: Хан-Уул дүүрэг, Гадаргын усны
Дунд гол, "Илч Хангай"ХХК - ийн

Сорьц шинжлүүлсэн байгууллага, хувь хүн: "Энвайрон" ХХК

Солбицлол X= Гүн : м

Y= Үндарга: л/с

Уст цэгийн төрөл ба дугаар: гол

Анион	1 дм^3 -д байгаа мг	мг-экв	мг-экв%	Катион	1 дм мг	м
Cl^-	23.08	0.65	20.40	Na^++K^+	15.42	
SO_4^{--}	25.00	0.52	16.34	Ca^{++}	40.08	
NO_2^-	0.00	0.00	0.00	Mg^{++}	6.08	
NO_3^-	1.00	0.02	0.51	NH_4^+	0.30	
CO_3^{--}	0.00	0.00	0.00	Fe^{++}	0.00	
HCO_3^-	122.00	2.00	62.76	Fe^{+++}	0.00	
Дүн	171.08	3.19	100.00	Дүн	61.88	

HCO_3^- ийн хагасыг хасcан анион катионуудын Анион

нийлбэр: 171.95 мг/ дм^3 нийлбэр:

Хуурай үлдэгдэл: 176.00 мг/ дм^3

Ус агуулагч чулуулгий

Ерөнхий хатуулаг: 2.5 мг-экв/ дм^3 Онцлог то

pH: 7.90 EC:

Исэлдэх чанар: 3.93 мг/ дм^3 TDS:

Физик чанар: жинлэгдэх бодис: 29.54

Тунгалаг: 15 см Ерөнхий шүлтлэг 44

Өнгө: бор Чөлөөт CO_2 8.80

Үнэр: балл Идэмхий CO_2 2.90

Амт: - балл

Тунадас: шороотой

Усны найрлагын томьёо: $M_{0.2}\ \frac{HCO_3^-63\ Cl^-20\ SO_4^{2-}}{Ca^{2+}63\ Na^++K^+21}$

Дүгнэлт

Химийн бүрэлдэхүүнээрээ гидрокарбонатын анги бүлгийн, 2-р төрлийн, цэнгэг, зөөлөн ус ба Гадаргын усны цэврийн зэргийн ангиллын норматив "Бохирдолтгүй" гэсэн ангилалд хамаарч байна. Уг у үзүүлэлтүүд нь Монгол улсад мөрдөж байгаа барилгын зуурмагт хэрэглэх усны УСТ 3821-8 шаардлагад хангаж байна.

Шинжилгээ хийсэн:
Химич ________________ /Б.Баттуяа/

Шалгаж, дүгнэсэн:
Эрхлэгч: доктор, Ph.D ____________________ /М. Энхтуяа/

APPENDIX 10. FIRST PUBLIC CONSULTATION MEETING ON AJILCHIN FLYOVER PROJECT

Meeting place: Meeting room of Suuri LLC, Industrial Road, Bayangol District Ulaanbaatar city.
Meeting date: 2 PM, 27 July 2012.
Meeting started at 2 PM and ended 4 PM.
Meeting participants:

1. N. Erdenesaikhan, director of consulting company Environ LLC, team leader of Environmental and social survey.
2. G. Hasbaatar, specialist of UB Road department
3. O. Enkhtuya, specialist, Resettlement Division, UB Land department
4. D. Chinzorig, engineer, UB Railway Joint Venture
5. Ch. Erdenedalai, State inspector, Department of Railway
6. B. Munkhzul, representative, Mongolian Association for Conservation Nature NGO
7. B. Tumenjargal, representative, Environment and Security Center of Mongolia NGO
8. O. Chimeddorj, vice director, Khuvsgul Trade LLC
9. B. Davaadulam, manager, Global Shariin Gol LLC
10. B. Ulambayar, engineer, Tsuurden LLC
11. B. Otgonbayar, engineer, NRTS LLC
12. E. Chgnaasuren, manager, Suuri LLC
13. B. Solongo, lawyer, Gobi LLC
14. J. Khorloo, Advisor to Director, Suuri LLC
15. J. Demberel, manager, Wagner Asia LLC
16. Ts. Ganbaatar, manager, Mon Karotage LLC
17. D. Erdenebaatar, manager, Metal Trade LLC
18. Kh. Ariunzaya, spokesperson, Suuri LLC
19. P. Tuvdendorj, lawyer, Environ LLC
20. G. Undralbat, EIA manager, Environ LLC
21. D. Lhamsuren, manager, San Industrial LLC
22. D. Munkhbayar, resident, Gobi 88
23. D. Erdenebaatar, resident, Gobi 88
24. Kh. Munguntuya, resident, Gobi 88
25. T. Munkhbold, resident, Gobi 88
26. M. Ganbat, supervisor, CTI engineering LLC

Protocol was made by Tuvdendorj, lawyer of Environ LLC.

Mr. Erdenesaikhan opened meeting and thanked all participants for their coming and introduced purpose and agenda of the meeting. The purpose of the meeting was to introduce about the start of Flyover project's environmental and social studies, which would provide pros and cons of the project in terms of surrounding environment and residents and entities located within and nearby project. With this, all participants have an opportunity to express their views upon receiving all information related to this project. He explained that this project is implemented by the UB Road department and Environ was hired to conduct the EIA and resettlement studies. JICA supports the current studies.

Mr. Hasbaatar made a short presentation on policy and programs of UB road department to improve road network and reduce traffic jams. He briefed about UB plan on proposed flyover bridges in the 7 intersections, including Ajilchin Flyover project.

Mr. Erdenesaikhan made a short presentation on environmental and social studies to be take place in conjunction with Ajilchin Flyover project and introduced about EIA and Resettlement plans. He also explained the Right of Way of project, based on recently acquired blueprint and about the affected households and entities.

He emphasized all current studies focused to identify possible negative and positive changes in surrounding environment and social elements during construction and exploitation of Flyover project and elaborate ways to reduce the negative changes and to disseminate and share all findings with all stakeholders including residents and economic entities located in and around project site.

Ms. Enkhtuya briefly introduced about the UB Land department policies on resettlement issues related with ongoing and planned infrastructure projects.

Question and answer session:

Demberel Wagner Asia LLC: regarding the RoW picture, you would need to have a very clear delineation of affected objects and nearby objects in the picture. When this info will be available?

Erdenesaikhan: as soon as we get the detailed RoW, we will visit each affected entities and households and explain to relevant persons and identify the size and impacts.

Erdenedalai, Railway inspector: why road width while intersecting with the Railway?

Hasbaatar: there is in and out road traces to flyover bridge and therefore it is looks wide. We have reviewed several routes before reaching the consensus with all decision makers in our department and consultants.

Chinzoring, Railway Joint Venture: As current railway organization is joint venture of Russia and Mongolia, we cannot solve this issue (meaning that several infrastructures and buildings of this organization are affected by the project) without negotiation with our partner. Also, we kindly

request you to make presentation in our organization so that relevant people get more clear picture of Ajilchin Flyover project.

Erdenesaikhan: We plan to make the public meeting 2 times and one public meeting on resettlement plan. We will discuss about your request and let you known soon.

Khorloo, Suuri LLC: As this is very important project, those, who plan to do this project need to have a long term perspective so that all current and possible future problems are solved within this project. Meaning that make double passes, allow heavy trucks to use this flyover, use of land beneath Flyover Bridge etc.

Enkhtuya, Land department: Existing legal environment is not suitable to current situation on resettlement and compensation. For example, we use outdated rate of land resettlement compensation of government on 2005, which is MNT13,200 per square meter of land and which does not reflect current market price. Also, I recommend to review certificates/licenses of your immovable properties and land if these are legal and or meet legal requirements etc. if everything is legal, then, it is easier for affected person.

Munguntuya, resident: is government going to change current decree on land valuation?

Enkhtuya, Land dept: we are discussing about a draft law on resettlement. If this law passes via parliament, the government would be changing the valuation rate.

Demberel, Wagner Asia: I would like to thank organizers of this meeting. From my previous experience, those who implements project, worked forcefully without taking permission from affected people. I appreciate your approach to introduce first about the start of study to be taken place before the Flyover project. This gives opportunity for possible affected people to make changes on their plans or postpone the decision, if someone starts to invest on land.

Hasbaatar, UBRD: Can you provide Railway authority view on possible two routes of railway via UB?

Chinzorig, UB railway: yes, we have provided all relevant info to JICA study team. Our request is not to cross the future road with railway. Again remind, we will be very happy if your project makes a presentation about the Flyover project among our Railway decision makers. One would need to understand that railway is joint venture of two countries.

Hasbaatar, UBRD: yes, we understand this situation. Let’s agree on timing for making presentation via communication.

Erdenesaikhan thanked all participants for their visit and active participation and provided contact address in case of info request and comments.

APPENDIX 11. INVITATION AND AGENDA OF FIRST PUBLIC MEETING

INVITATION FOR PUBLIC MEETING

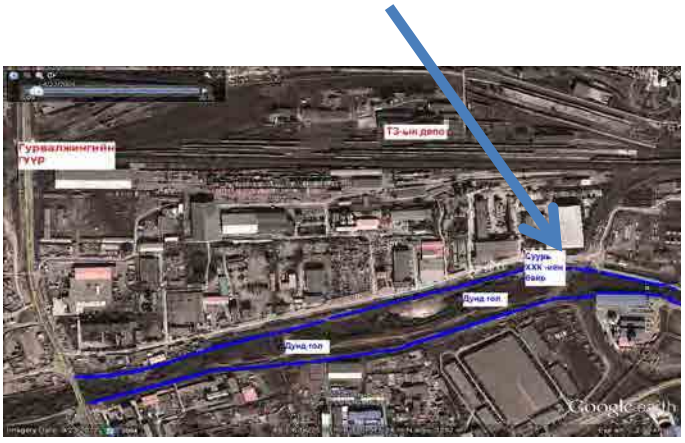
Dear invitee . . . . (name of person/director of entity)

Under auspices of the cooperation agreement between the Japanese International Cooperation Agency of the Government of Japan, the Ministry of Road, Transport, Construction and Urban Development of Mongolia and Ulaanbaatar Municipality, the feasibility study on Ajilchin Flyover project is ongoing to date. Within the framework of this feasibility study, an environmental and social impact study is being carried out by the Environ LLC, a government authorized research entity.

In connection with the study, the Public Consultation Meeting to disclose information on proposed study activities and disseminate to all population and entities located in and around the project territory is now being announced.

I kindly invite you to attend this event and receive most recent info and express your opinions regarding the proposed study.

The event will be take place at 2PM on 27th July of 2012 in the Conference room of SUURI Company, which is located in the north east of Dund River Road. Location of Suuri Company is shown on the map below:



EIA Team of ENVIRON LLC.

Meeting agenda

14.00	-	14.10	Registration/tea and coffee
14.10	-	14.20	A short intro on Ajilchin Flyover project, - Mr. Hasbaatar, specialist of UBRD
14.20	-	14.40	Question/clarifications
14.40	-	15.00	EIA and Resettlement study plans and current activities – Mr..Erdenesaikhan, study team leader and director of Environ LLC
15.00	-	15.15	Question/clarifications
15.15	-	15.30	Current land ownership and resettlement policy of UB municipality – Ms. Enkhtuya, specialist of UB Land department
15.30	-	15.45	Question/clarifications
15.45	-	15.55	current policy of UB Railway to support in development of UB road network – Mr. Chinzorig, representative of UBTZ, a Russian Mongolian Joint venture.
16. 10			Meeting closing

Meeting related questions and clarification can be obtained from Mr. Tuvdendorj, coordinator of social events and lawyer of Environ LLC through the following phones 9100-0331 (cell) and 311938 (office).

APPENDIX 12. PICTURES OF FIRST PUBLIC MEETING

APPENDIX 13. LIST OF PARTICIPANTS OF A MEETING ORGANIZED FOR MANAGEMENT STAFFS IN THE CONFERENCE ROOM OF THE MONGOLIAN –RUSSIAN RAILWAY JOINT VENTURE

"Ажилчны гудамжны гүүрэн гарц" төсөл

Олон нийтийн уулзалтанд ирсэн албан байгууллагуудын жагсаалт

Д.д	Байгууллагын нэр	Хүний нэр	Албан тушаал	Гарын үсэг	Холбоо барих утас, хаяг
1	"УБТЗ" ХНН	Д. Чинзориг	инженер	[illegible]	99095714
2	МВОХ Холбоо	Б. Мөнхзул	ня-бо ажилтан	[illegible]	99053262
3	Нийслэлийн хурлын алба	О. Тамира	[illegible]	[illegible]	96641021
4	[illegible] трейд ХХК	О. [illegible]	Зөв валбар	[illegible]	99900802.
5	НАЗГазар	Г. Хасбаатар	Тоспийн нормативны тэн	[illegible]	99990181
6	Глобал Шарын Гол	Б. Давааддулам	референт	[illegible]	99965082
7	Бүтээгдэхүүн	Б. Ууганбаяр	инженер	[illegible]	99110884
8	[illegible] ХХК	Б. Отгонбаяр	Инженер	[illegible]	91811691
9	Суурь "АК	Э.Чагнаасүрэн	менежер	[illegible]	99089099
10	[illegible] ХК	Б. Сэлэнгэ	худалдан	[illegible]	86646648.
11	Төмөр замын газар	Ч. [illegible]	хяналтын улсын байцаагч	[illegible]	99098684
12	Сүзэрбо ХХК	Ж. Хорлоо	зөвлөх	[illegible]	98181224
13	Вагнер Ази	Ж. [illegible]	менежер	[illegible]	99896142
14	Монголроботикс ХХК	И.Ганбаатар	Менежер	[illegible]	99023132.
15	Металл түлшний	Д. Эрдэнэбаатар	менежер	[illegible]	96682690
16	Сервис ХХК	Ж. [illegible]	менежер	[illegible]	85535059 88118189
17	[illegible] Инженерийн байгууламж ТӨХ ТББ	Б. Гантамирцал	захирал	[illegible]	91910212
18	Эвсайрон ХХК	А. [illegible]	[illegible]	[illegible]	91910327
19	Инвайрон ХХК	П. Түвшинбаяр	ажилтан	[illegible]	91000881
20	Энвайрон ХХК	Г. Эндрамбат	менежер	[illegible]	99884609.
21	САН ИНДУСТРИАЛ	Д. АХМАСҮРЭН	менежер	Д. АХМАСҮРЭН	96659956
22	СТ1 инженеринг	М. Ганбат	ажилтан		88177744

"Ажилчны гудамжны гүүрэн гарц" төсөл

Олон нийтийн уулзалтанд ирсэн айл өрхүүдийн жагсаалт

Д.д	Өрхийн тэргүүлэгчийн нэр	Гарын үсэг	Холбоо барих утас, хаяг
1	Д. Мөнхбаяр	[illegible]	99163149 үйлдвэр тосгон ХУД 3р хороо 88 тоот
2	Д. Эрдэнэбаатар	[illegible]	ХУД - 3-р хороо үйлдвэр товчоо 88 тоот 88447887
3	Д. Мөнхтуяа	[illegible]	ХУД - 3-р хороо Говийн 10 тоот
4	Т. Мөнхболд	[illegible]	ХУД - 3р хороо 99685574 Говийн 88.
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

APPENDIX 14. LIST OF PARTICIPANTS OF A MEETING ORGANIZED FOR MANAGEMENT STAFFS OF RAILWAY IN THE CONFERENCE ROOM OF THE MONGOLIAN –RUSSIAN RAILWAY JOINT VENTURE

The following representatives of subsidiary organizations of Mongolian –Russian Railway Joint Venture (MRRJV), which some areas and buildings affected by proposed Flyover project trace, have participated in the conference room of Railway Head Quarter, where EIA study team has made presentations on current results of EIA and Social impact study of Ajilchin flyover feasibility study that is going to be built over the UB railway.

1. Chief of Technical Policy and Projects Center Erdenebulgan.Sh
2. Vice chairman of Signalization Communication, Energy Authority Sukhbaatar.Ts
3. Vice chairman of Security Service Delgersaikhan.U
4. General engineer of Passenger's Transportation Authority Tsogtgerel
5. Chief of Passenger Coach Depot Dorjbat.L
6. Chief engineer of Passenger Coach Depot Jamiyansuren
7. General engineer of Energy brigade No.1 Enkhtaivan.M
8. General engineer of Signalization brigade No.2 Gungaajantsan.L
9. General engineer of UB station Munkhtsooj.Ts
10. Chief of UB railway Fire department Bayrjargal.Yu
11. Engineer of Construction and Usage department Chintuya.P
12. Engineer of Technical Policy and Projects Center Chinzorig.D

As result of this meeting, Railway authority has send a letter addressed to the head of UB Road Department on views and concerns of MRRJV regarding the proposed Flyover project.
A translation copy of this letter is attached in annex 15

APPENDIX 15. A COPY OF TRANSLATION OF LETTER FROM RAILWAY AUTHORITY ON FLYOVER PROJECT.

UNOFFICIAL TRANSLATION OF THE LETTER SENT FROM MR. ERDENEBULGAN, HEAD OF THE CENTER FOR TECHNICAL POLICY, DRAWING AND PROJECT OF UB RAILWAY (UBTZ)

Address: 210535 Zamchny str 1, Bayangol District
Ulaanbaatar
Phone: 244840
Fax: 242202, 244490

Date: 15th of October 2012. Letter No. 13/276

Attn: CAPITAL CITY ROAD DEPERTMENT

Re: Comments on Ajilchin Flyover project

Herewith, we are delivering the comments and some recommendations regarding the feasibility study on Ajilchin flyover project, in which route some of subsidiary organizations of UBTZ are being affected.

1. A Russian- Mongolian joint venture 'Ulaanbaatar railway' has been established in 1949 in accordance with the agreement built between the governments of former Mongolian People's Republic and Soviet Union. As per the chapter 5 and provision b of this agreement, it points out that the buffer zone of 120 meters along entire railway route as well as of 300 meters, where railway stations located, are given to the UBTZ for its use with no expiry date indicated. So, one would need to find out a solution, how to allocate land replacement costs in this situation.
2. International fiber optical cables, technological cables as well as electrical cables that provide safety of railway locomotives and energy supply for traffic signals and other important constructions are allocated along the railway main route and subroutes. These are needed to be taken into consideration while developing the proposal.
3. If there is relationship or coordination of Flyover project with ongoing work of 1.06 km road renovation/expansion, which takes place in the west part Narny road within the territory of 4th khoroo of Bayangol district.

Regarding the affected constructions and building:

4. Passenger's locomotive station is the only enterprise in Mongolia, which in charge of maintenance, repair and passenger transportation nation-wide. It needs to ensure it's continues activity.
5. Auto transport center and fuel distribution station are provide all transportation services to ensure everyday operations of railway.
6. Railway Fire station also plays role to ensure fire safety at Railway in 24 hours and a part of fire safety operations of UB city. In order to displace this organization, one would need to agree with Capital city Emergency Department and other relevant organizations, prior.
7. The repair workshop of the Second division of Railway is in charge of ensuring traffic safety of locomotives in main routes and subroutes and everyday maintenance repairing works
8. Storehouses for vegetables are play important role to provide foods to various employees living along railway routes as well as serve as luggage upload and unload platforms.

In addition, there is a plan to construct a new railway station and as well as other development plans and all of these need to be taken into consideration

Copies of this letter are sent to the following organizations:

- UB Land Department
- Ajilchin Flyover Project Feasibility Study Team
- Environmental consulting company ENVIRON LLC

SH. ERDENEBULGAN DIRECTOR

APPENDIX 16. AGENDA OF SECOND PUBLIC CONSULTATION MEETING

ENVIRON

INVITATION FOR PUBLIC MEETING

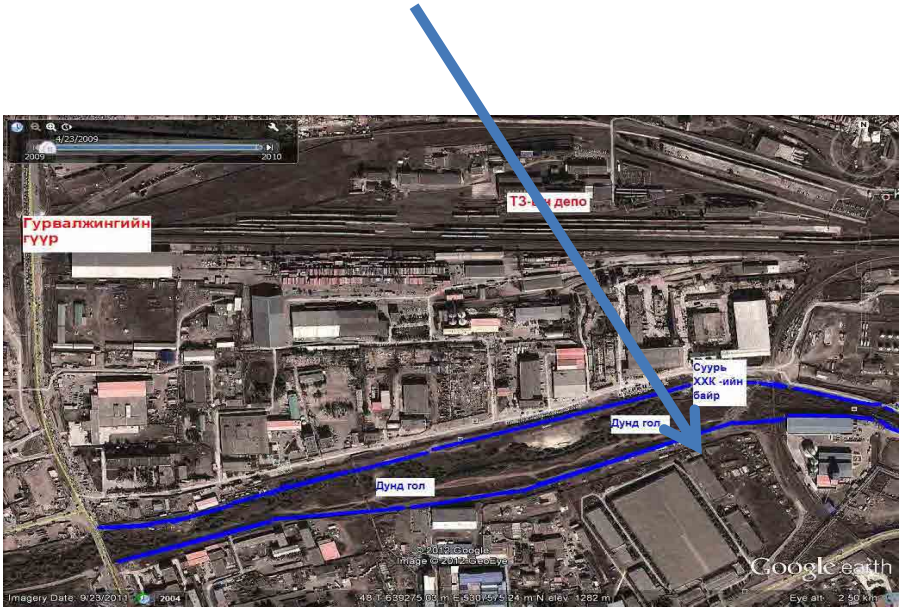
Dear invitee ……. (Name of person/director of entity)

Under auspices of the cooperation agreement between the Japanese International Cooperation Agency of the Government of Japan, the Ministry of Road, Transport, Construction and Urban Development of Mongolia and Ulaanbaatar Municipality, the feasibility study on Ajilchin Flyover project is ongoing to 2012. Within the framework of this feasibility study, an environmental and social impact study is being carried out by the Environ LLC, a government authorized research entity.

In connection with the study, the Second Public Consultation Meeting to disclose information on the findings of study results and disseminate to all population and entities located in and around the project territory is now being announced.

I kindly invite you to attend this event and receive most recent info and express your opinions regarding the proposed study.

The event will be take place at **3PM on 17th November 2012** in the Conference room of SUURI Company, which is located in the north east of Dund River Road. Location of Suuri Company is shown on the map below:



EIA Team of ENVIRON LLC.

MEETING AGENDA

15.00	-	15.10	Registration
15.10	-	15.20	A short intro on Ajilchin Flyover project, - Mr. Hasbaatar, specialist of UBRD
15.20	-	15.40	Question/clarifications
15.40	-	16.00	A short intro results of EIA report and Resettlement study plan – Mr. Erdenesaikhan, study team leader and director of Environ LLC
16.00	-	16.15	Question/clarifications
16.15	-	16.30	Results of property valuation of affected HH and entities and resettlement action plan under the Ajilchin Flyover project – Mr. Tuvdendorj, study team member and Social study expert of Environ LLC
16.30	-	16.45	Question/clarifications
16.45	-	16.55	Issues on legal environment for resettlements and grievance redress mechanism– Ms. Enkhtuya, specialist of UB Land department in charge of resettlement
16.55	-	17.05	Question/clarifications
17.10			Meeting closing

Questions and clarifications on this meeting can be obtained from Mr. Tuvdendorj, coordinator of social events and lawyer of Environ LLC through the following phones 9100-0331 (cell) and 311938 (office).

APPENDIX 17. A COPY OF MINUTES OF MEETING OF 2ND PCM

"Ажилчны гудамжны гүүрэн гарц" төсөл

Олон нийтийн уулзалтанд ирсэн албан байгууллагуудын жагсаалт 2012 оны 11-р сарын 16

Д/д	Байгууллагын нэр	Хүний нэр	Албан тушаал	Гарын үсэг	Холбоо барих утас
1	Хөвсгөл трейд ХХК	Л. Мөнхчулуун	менежер	[illegible]	99110347
2	Цуудгал ХХК	Л. Энхжаргал	Захирал	[illegible]	99180996
3	[illegible] ХХК	М. Батцэцэг	Инженер	[illegible]	88078117.
4	"Вагнер Ази ТТ" ХХК	Ц. Баясгалан	Архитектор	[illegible]	99281225
5	НАЗГ	Хасбаатар	Төсөл хариуцсан мэргэжилтэн	[illegible]	99990131
6	НГА.	Энхтуяа.	Газар зохион байгуулалт	[illegible]	96641021
7	Бадрал ХХК	М.Алтан-Очир	Г/захирал	[illegible]	91112130
8	"Мегам трейд" ХХК	Д. Эрдэнэбаяр		[illegible]	96672550
9	~~Бат-Урах Суурь ХХК~~	Д. Эрдэнэбаатар		[illegible]	96682640
10.	Суурь ХХК	Б. Бадрах	[illegible]	[illegible]	99225545
11	[illegible] ХХК	Ш. Алтансүхбаатар	инженер	[illegible]	88050071
12.		Ц. Ган-Од	Хуульч	[illegible]	89110894
13.	Мон Карготан ХХК.	Н. Зоригт баатар	Захирал.	[illegible]	99117369.
14	[illegible] ХХК	Н. [illegible]	[illegible]	[illegible]	99910331
15.	[illegible] ХХК	Я. Сайнбаяр	Захирал	[illegible]	99011533.
16	[illegible] ХХК	А. [illegible]	менежер	[illegible]	99919910
17	Бадрал ХХК	С. Санжаа	менежер	[illegible]	88113952
18	Суурь ХХК	Цогзол	[illegible]	[illegible]	88740421
19	Суурь ХХК	[illegible]	хуулийн [illegible]	[illegible]	99646333
20	Байгаль орчин эрүүл мэнд ТББ	Ш. Тамирбаатар		[illegible]	99130131
21	САНГАА ПҮРЭВ				98664006

22.	Environ LLC.	Ц. Ундралжаргал	инженер	Ц. Унрэн	99667363
23.	Хувиараа	Б. Мөнхбаясгалан			99947281
24	"Цэжэр гэрэг" ТББ.	Б. Тумэнжаргал	тэргүүн	[illegible]	91910212
25	Хувиараа	Доржсүрэн		[illegible]	99185031
26.	"Сабасфон" ХХК.	[illegible]	ахлах [illegible]	[illegible]	91000837

APPENDIX 18. LIST OF PARTICIPANTS OF 2ND PCM

MINUTES OF MEETING

ON THE SECOND PUBLIC CONSULTATION MEETING FOR DISCLOSING THE RESULTS OF DETAILED ENVIRONMENTAL IMPACT STUDY AND LAND ACQUISUTION AND RESETTLEMENT STUDY REPORTS

Date: 16 November 2012

Venue: Conference room of Suuri LLC, 4th Khoroo, Bayangol District, Ulaanbaatar city

Names of participants:

1. Mr. Munkhchuluun, manager, Khuvsgul Trade LLC
2. Mr. Enkhmend, Director, Tsuurden LLC
3. Ms. Batsuren, accountant, Tsuurden LLC
4. Mr. Gayabazar, manager, Wagner Asia LLC
5. Mr. Khasbaatar, officer, Ulaanbaatar city Road Department
6. Ms. Enkhtuya, officer in charge of resettlement, UB Land Administration Department
7. Mr. Altan ochir, Deputy director, Badral LLC
8. Mr. Erdenebayar, manager, Metal trade LLC
9. Mr. Erdenebaatar, inhabitant of 4th khoroo Bayangol district
10. Mr. Badrakh, manager, Suuri LLC
11. Mr. Altansoyombo, manager, Just Oil LLC
12. Mr. Gan Od, lawyer, Just Oil LLC
13. Mr. Zorigtbaatar, Director, Mon karotage LLC
14. Mr. Erdenesaikhan, Director, Environ LLC
15. Mr. Sainbold, Director, SJBU LLC
16. Mr. Rinchendorj, manager, NOTS LLC
17. Mr. Sanjaa, manager, Badral LLC
18. Mr. Tsendsuren, human resource manager, Suuri LLC
19. Mr. Tumurbaatar, public relations officer, Environment and Health NGO
20. Mr. Purev, inhabitant, of 4th khoroo Bayangol district
21. Ms. Undraltsetseg, EIA manager, Environ LLC
22. Ms. Munkhbayasgalan, resident of Gobi 88, 3rd Khoroo, Khan uul district
23. Ms. Tumenjargal, chairwomen, Blue Planet NGO
24. Mr. Dorjsuren, inhabitant of household living on the shore of Dundgol River
25. Mr. Tuvdendorj, social study expert, Environ LLC

Issues for discussion:

Disclosure of information to public on the study of Environmental Impacts of Proposed Ajilchin Flyover Bridge

Disclosure of information to public on the study of Land Acquisition and Resettlement

The opening of the information disclosure was made by Mr. Erdenesaikhan. He introduced that this is the second time we invited people from the area, where Flyover bridge project is proposed. In first meeting, we introduced about the necessities of Flyover Bridge and that it is included into the General Development Plan of Ulaanbaatar City. We met with all potentially affected entities and citizens and provided related info and in turn gathered info from them. We appreciated cooperation from those who provided info.

As per our plan of studies on DEIA and LARP, which were shared with you in our first meeting, the study teams have worked for three months to identify all potential negative and positive impacts on surrounding environment and society and to develop possible actions to eliminate all identified negative impacts, if not possible then to mitigate and minimize. We are going to share with you the results of these studies and get your comments and feedback. I would like to emphasize that the main purpose of LARP study is to fully compensate all affected entities and citizens so that no one is worsened off and everyone benefits because of the project.

As in the meeting agenda, Mr. Khasbaatar, specialist of Ulaanbaatar Road Department made a short speech.

In accordance with City Development Plan, there are 8 flyover bridges will be built and among them Ajilchin Flyover. The feasibility study has been done and within which, Environ conducts studies on DEIA and LARP and nearing completion. There are three alternatives on Flyover bridge direction have been studied and east –west direction was selected as the most suitable and less cost one. The main reason for selecting this direction was to link industrial zone with residential zones of Ulaanbaatar and to reduce the heavy traffic volume created currently. In addition, it will be very necessary for development of satellite cities and balancing the traffic volumes.

Mr. Erdenesaikhan introduced results of DEIA study: air, water, soil quality, lab results of surface and underground water and soil samplings; noise and vibration levels, wildlife, aquatic life, plants and impacts and the proposed actions to reduce impacts and environmental management and monitoring plans to follow, when project progresses.

Question and answers:

Mr. Altanochir (Badral LLC): from my observation, air pollution is not due to concentration of vehicles as Erdenesaikhan stated but, too much concentration of too many construction factories and markets that sell construction materials in this area. These need to be moved out of city. With this, I am not agree with your proposal to reduce traffic volume through affecting our business and taking part of our land. If you like to build, why you do not build road along and above

Dundgol River? Once river is polluted as your study discovers, then one can construct columns along both sides of shore and make road. It does not need make too broad road and impact person's property.

Mr. Erdenesaikhan: I understand your concern. It was not decision of only this study. A feasibility study for various alternatives for reducing the traffic volume was done and many road and traffic experts are involved and various factors have been analyzed and that resulted in a final route.

Zorigtbaatar (Mon Karotage LLC): can you show whose objects are affected and how much are those affected?

Mr. Tuvdendorj (Social study expert on LARP) shared the results of LARP: introduced the ultimate goal of LARP, legal environment of Mongolia and JICA guidelines, resettlement impacts: affected entities, citizens and properties; compensation and livelihood restoration measures; grievance redress mechanism and LARP implementation arrangements, M&E of LARP.

Ms. Enkhtuya (Land Administration Department): with introducing impacts of project to population and entities, we officially announce the Cut -of- Date for receiving compensation and or any other assistance for resettlement. Cut -of- Date means no one/entity will be allowed by the Land Administration department to newly settle in this area and extend their land. Also no one from today who moved to this place will be able to receive any assistance for resettlement.

Altansoyombo (Just Group LLC): Who defines this Cut-of-Date? Is there any provision in regulation?

Enkhtuya: there is no definition on this in regulation but once there is no regulation, we follow international best practices and JICA guidelines. It is essentially means to restrict those people, who tries to make profit on others issues.

Mr. Altanochir (Badral LLC): Mongolia has very bad regulatory basis for land resettlement. In addition to this, recently there was road expansion in front of our entity. Why talking another expansion?

Mr. Tuvdendorj: Yes, we agree that we have a weak regulation on land acquisition and resettlement. Existing legal gaps are complemented by regulatory measurements on this project, which JICA and World Bank have been applying successfully for many countries. Moreover, a

draft law on Land Acquisition and Resettlement is being discussed publicly and if this passes through the Parliament, the legal environment will be much improved.

Ms. Enkhtuya: there was not many practice before for this type of public projects to inform all people, study impacts and disseminate related results as with this project. We appreciate the project proponents. I understand your concerns on your property and land, but you have to conscious about your citizen's duty. Public interest is also essential.

Ms. Enkhmend (Tsuurden LLC): I understood from the study that there is no clear info on our company's land permission license. We have a land permission license until 2013.

Mr. Tuvdendorj: We have all official info on land license from Land Administration Department and we have not found license info on your company. We have been requesting related info several times, but it resulted in no info. It is in your interest to provide all necessary info to the study team.

Mr. Munkhchuluun (Khuvsgul trade LLC): ROW line passes through a water reservoir of 200 m3 located to the northwest corner of our company. Is it possible not to dismantle the reservoir?

Mr. Erdenesaikhan: the part of Flyover Bridge will be constructed on air along your portion of land. I am not quite sure if the bridge columns will be created exactly on your land. Even if columns will not be in your land, it will be impacted by construction process.

Mr. Zorigtbaatar (Mon Karotage LLC): to the north of my company, there is garden area of Mongol Tulkhuur LLC. Can't you move ROW to this garden area instead of passing through my entire land area? I am not against of improving the road. Regarding the property compensation, you should be aware while making valuation that costs will be changed with passing years.

Mr. Erdenesaikhan: regarding compensation and livelihood restoration strategy, affected person's living condition should not be reduced with project implementation. I would like to re-emphasize Tuvdendorj's introduction of resettlement results. As was explained, every affected person/entity will receive compensation/assistance differently according to the provisions indicated in the entitlement matrix.

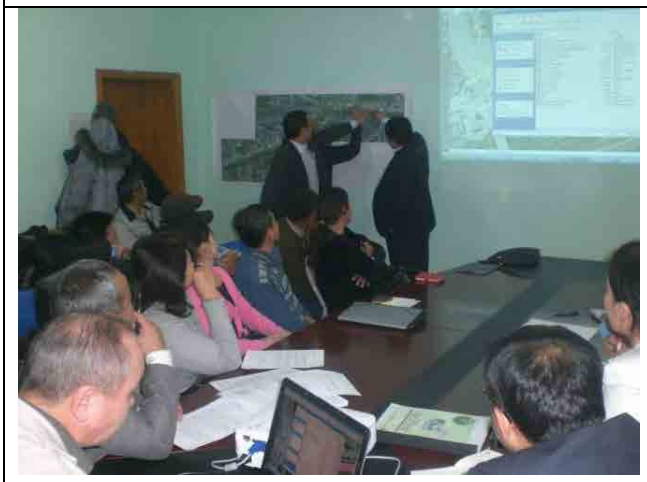
Mr. Altansoyombo: Once Ulaanbaatar city will not be moved to another location, the responsible organizations should make a good planning so that traffic volumes are adjusted and coordinated in roads between the flyover bridges. Otherwise, with building a flyover it shifts traffic jam into another roads.

Gayabazar (Wagner Asia LLC): I very much appreciate that study team policy on resettlement supplements gaps in Mongolian legislation and it ensures that affected people will be suffered with construction of Flyover Bridge.
Tumurbaatar (NGO): When the construction of flyover will be started?
Mr. Khasbaatar: Once the loan agreement on flyover construction will be established between Mongolian and Japanese governments. If very optimistic, we anticipate agreement may be in 2014, otherwise in 2016 or after.
Thank you for coming and providing comments and feedback.

Meeting ends.

APPENDIX 19. PICTURE TAKEN AT 2ND PCM






付属資料-10

用地取得・住民移転計画書

JICA

PREPARATORY SURVEY

FOR

AJILCHIN FLY-OVER CONSTRUCTION PROJECT

IN

ULAANBAATAR CITY

LAND ACQUISITION AND RESETTLEMENT PLAN

DECEMBER 2012

ABBREVIATIONS

AH	Affected household
AP	Affected person/entity
EMA	External monitoring agency
GAF	Grievance action form
GOM	Government of Mongolia
HH	Household
IRP	Involuntary Resettlement Policy
LAR	Land Acquisition and Resettlement
LARF	Land Acquisition and Resettlement Framework
LARP	Land Acquisition and Resettlement Plan
M&E	Monitoring and evaluation
MRT	Ministry of Roads and Transportation,
NGO	Nongovernment organization
OP	Operational Policies (World Bank)
PAPs	Project Affected Persons
PIU	Project Implementation Unit
ROW	Right of way
WG	Working Group

DEFINITION OF TERMS

Affected Household (AHs): All persons residing under one roof and eating from the same kitchen, who are adversely affected by the Project, or any of its components; may consist of a single nuclear family or an extended family group

Project affected People/ Entity (PAPs): Any person/entity affected by loss of assets, income or business due to Project-related changes in the use of land, water or other natural resources

Compensation: Cash or in-kind payment of the replacement cost of an asset lost due to Project-related impacts

Entitlement: Range of measures comprising compensation, income restoration, transfer assistance, income substitution, and relocation, which are due to affected people, depending on the nature of their losses, to restore their economic and social base

Income Restoration: Reestablishment of income sources and livelihoods of PAPs

Involuntary Resettlement: Full or partial, permanent or temporary physical displacement (relocation, loss of residential land or shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) as a consequence of development projects, compelling PAPs to rebuild their lives, incomes and asset bases

Land Acquisition: The process whereby a person is compelled by a government agency to acquire all or part of the land a person owns or possesses to the ownership and possession of the government agency for public purpose in return for compensation

Rehabilitation: Compensatory measures provided under the ADB Policy Framework on Involuntary Resettlement other than payment of the replacement cost of acquired assets.

Relocation: The physical resettlement of an AP from her/his pre-Project place of residence

Relocation assistance - Support provided to persons who are physically displaced by a project. Relocation assistance may include transportation, food, shelter, and social services that are provided to the displaced persons during their relocation. It may also include cash allowances that compensate displaced persons for the inconvenience associated with resettlement and defray the expenses of a transition to a new locale, such as moving expenses and lost work days.

CONTENTS

CHAPTER 1 INTRODUCTION

1.1 Project description

Ajilchin Flyover (the Project) is planned to be constructed in the territories of the 4th khoroo of Bayangol district and 3rd khoroo of Khan-Uul district of Ulaanbaatar city and will be located between Narny Bridge and Gurvaljin Bridge. The alignment stretches from the right-hand end of Narny zam road to the south, passing above railway lines, and continues along Baruun Teeverchdiin Street and ends at the intersection of Ajilchin Street. A flyover bridge is planned to be 828 m in length and an access road to the flyover bridge with a length of 2.2 km and width of 17 m will be constructed. The Project will improve auto road networks of the city, as well as disperse and reduce traffic volumes of Gurvaljin and Narny bridges. Moreover, the traffic volume of a main magisterial auto road alignment parallel to Peace Avenue and of Peace Avenue will be reduced and an auto road network running west-east through the city will be improved. Moreover, as the Project is located in an industrial zone of Ulaanbaatar city, which is specialized for providing services of international freight shipping, transportation and logistics, chemical subsistence and petroleum storage, custom bonded warehouse and car and truck storage, it is expected to bring greater economic benefits.

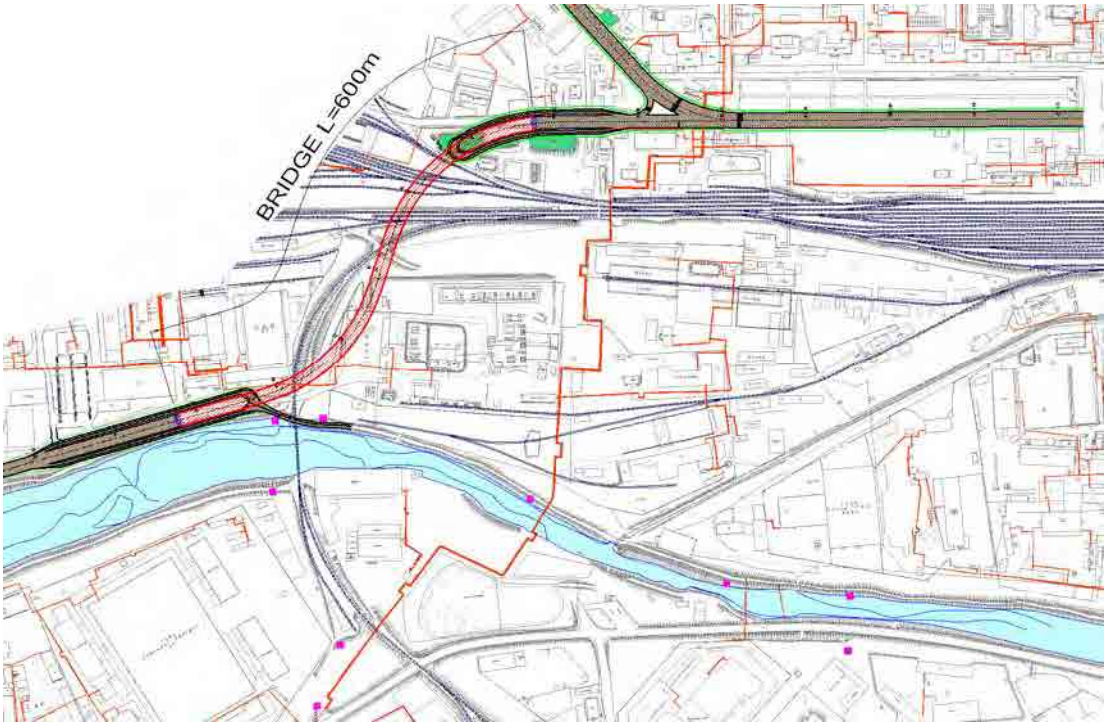


Figure 1. Project Area Map

The proponent of the Project is the Ministry of Roads and Transportation, and Road Department of the Municipality. The Project's civil works are expected to commence on March 2014, and be completed on 2018.

The project is planned to be implemented under the following schedule.

First stage: Feasibility Study is being implemented from March 2012 to April 2013.

Second stage: The Project requires approval by the Mongolian Parliament. A Loan Agreement shall be concluded between the Mongolian Government and the Japanese Government if a Japanese yen loan is taken out.

Third stage: Detailed Engineering Design and Preparation of Bid Documents will be conducted for twelve (12) months after a consultant has been selected according to the loan agreement.

Fourth stage: Bidding and selection of the Contractor will be carried out within six months.

Fifth stage: Construction work will be implemented for 4 years.

1.2 Objective of the LARP

The objective of this LARP is to stipulate all relevant entitlements, procedures and compensation, relocation and rehabilitation measures due to the affected persons/entities for the acquisition of land under the Project, while safeguarding their livelihoods. The Land Acquisition and Resettlement Plan (LARP) was prepared in compliance with JICA Guidelines for Environmental and Social Considerations April 2010 (JICA Guidelines) and World Bank Operational Policy 4.12 "Involuntary Resettlement" (World Bank OP 4.12).[1] The LARP describes in detail project affected people's entitlements (PAPs); income and livelihood restoration strategy; institutional arrangements; consultation, participation and disclosure; grievance redress mechanism; monitoring and reporting framework (including external monitoring for projects with significant involuntary resettlement impacts), budget and time-bound implementation schedule. The preparation of LARP supports a more systematic approach to management of project social risks and opportunities, helping to enhance the development impact of the project and improve the living standards of the displaced people.

The policy framework and entitlements for this LARP are based on the applicable Mongolian Laws and the JICA Guidelines. All provisions of this LARP are directed at ensuring that no displaced persons shall be worsen off as a result of the Project. Key safeguard principles are:

(i) Adverse social and physical impacts are avoided, minimized, and mitigated;
(ii) Stakeholders, and more importantly PAPs, will benefit from the Project;
(iii) PAPs are provided with sufficient compensation and assistance for lost assets which will help them improve or at lease restore their pre-project standard of living; and
(iv) Resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.

[1] JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies

CHAPTER 2 RESETTLEMENT POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1. Legal Framework for Involuntary Resettlement in Mongolia

The basic legislative framework for involuntary resettlement (IR) consists of the Constitution (1992), the Law on Land (2006) and the Law on Allocation of Land to Mongolian Citizens for Ownership (2003). The Law on Land governs expropriation of land allocated for possession or use. The Law on Allocation of Land to Mongolian Citizens for Ownership contains provisions respecting expropriation of land taken from private ownership. Both laws provide for compensation to a certain extent. The Civil Code may require the State to provide compensation beyond that required by the Law on Land.

According to Article 5.1 of the Law on Land states that any land other than that owned by the citizens of Mongolia shall be the property of the State. Individual's property rights are protected by the Constitution; Art.16.3 of the Constitution prohibits expropriating private property unlawfully, and obligates the State to make due compensation and payment in the case of taking private property for public use.

Law on Allocation of Land to Mongolian Citizens for Ownership

Article 32.1 states that special cases in which owned land can be acquired are:

- Ensuring national defense and security
- Creating a permanent surveillance field for scientific and technological tests or experiments and environmental or forecast observations
- Building national roads, engineering lines, buildings and constructions

The State must notify owners and enter into negotiations with owners at least one year prior to a decision to expropriate land, attempting to agree on the:

- Value of the land and immovable property located on it
- Transportation costs regarding resettlement or relocation
- Investment made by the owner of the land
- Location, size, characteristics and quality of replacement land that is provided by the State
- Conditions and deadline for vacating the land
- Amount of compensation, payment procedures and date

If an agreement is reached, the owner must vacate within one year of the agreement date. If there is no agreement, the dispute will be referred to the court.
Under Article 33 *soum* and district governors may establish servitudes over private land for the purposes of access through the land, installing survey markers, drainage or other land management measures. No compensation need be paid for such access. If the land becomes difficult or impossible to use because of the servitude, the owner has the right to demand that the authorities purchase the land or compensate for damages.

Article 37 outlines the principles applicable to compensation that landowners are entitled to upon expropriation:

- Replacement land must be not worse in character and quality than the owner's land
- Land and immovable property will be compensated at their value
- Improvements made to the land will be financially compensated for
- Losses incurred by the owner due to the taking of the land and relocation must be compensated for
- No compensation is paid for immovable property built or improvements made after the notice given at the start of the process

Law on Land

The Law on Land contemplates three kinds of private land tenure: (1) ownership, which may be granted only to citizens of Mongolia; (2) possession, granted under license, to Mongolian citizens, economic entities and organizations, for terms of 15 to 60 years, extendable up to 40 years at a time; (3) use, granted under contract or lease to foreign countries and legal entities.

The Law on Land lists special cases for which land in private possession can be acquired by the State.

- land under special government protection;
- border strip land;
- land taken to ensure national defense and security;
- land given to foreign diplomatic missions and consulates, as well as residents
- offices of international organizations;
- land for scientific and technological tests, experiments and sites for regular use
- environmental and climatic observation;
- *aimag*-level reserve rangeland;
- hayfields for government fodder reserves.

Moreover, land belonging to any classification of the unified land territory can be taken in special cases.

The State body/and or municipality in charge of land issues must notify the affected persons and undertake negotiations. If the negotiation is amicably completed, the government issues a decision on land acquisition and the governor of the appropriate level concludes an agreement with the affected person. The affected person must vacate the land within 90 days of the agreement date, except that this may only be required between May 15 and September 15. If there is no agreement or if a dispute arises, it may be referred to the court.

Under Article 43, possessors are entitled to replacement land or compensation for land under possession including the current market price of buildings and other constructions plus all expenses related to relocation.

There is no clear provision in the Law on Land concerning LAR over land that is in use, except the obligation of the land office to provide prior notice. The Law is silent on negotiation and compensation, except to say that the provision on compensation for possessors is not applicable to them.

There is possible protection for users of land under the principles of the Civil Code, which may entitle them to compensation for immovable assets built in accordance with the contract and with the proper permission.

The actual local practice of LAR among Ulaanbaatar city and District level land administration officers does to some extent reflect the above-mentioned laws based on contracts between autonomous legal persons, but also maintains certain elements of involuntary land acquisition and resettlement. After identification of the required properties, affected persons are sent official notifications or “demand letters” by the District Land and Property Departments, often repeatedly, if no positive response to the government’s claim to land is forthcoming. Thereafter, negotiations about the terms of compensation take place with titled PAPs (owners and possessors) and eventually a written agreement is reached. Land has been valued according to the Cabinet resolution 103 of April 13, 2003, which determines land valuation tariffs (e.g., MNT 13,200 per m^2 in the case of UB yurt areas). There is no official data information on market value of the land. Non-titled occupants of land are considered illegal land users and are evicted on the basis of Article 27.4 of the Land Law, which states that “possessing land without a valid license is prohibited.”

Compensation for structures follows a detailed assessment and application of unit rates based on the market values of construction and services, minus depreciation, as assessed by the local Property Relations Agency (PRA). Depreciated replacement cost is calculated in accordance with International Valuation Standards, under Cabinet Decree No. 336 of 2010.

LAR has been applied to recent projects funded by the ADB in compliance with the social safety policy of the Bank. For instance, advanced principles including paying compensation to possessors, applying a fixed tariff set by the government or market price whichever is higher to calculation of the compensation, land by land principle for persons without a proper license who lost their entire land, compensation for facilities on lands and excluding deficiency in property evaluation have been implemented. Currently, many cases of urban development as well as re-development projects have been implemented with a lack of applicable law that regulates LAR.

In January 2013, the Law on Land Expropriation was submitted to the Parliament. The proposed law only applies to cases of involuntary resettlement that are undertaken by the State for justified public use through use of its powers of eminent domain. This means the entity affected does not have the option to refuse land acquisition and resettlement if the State decides to pursue the case using the provisions set out in the proposed law. The Government is attempting to improve the existing legal framework for LAR while integrating the social safeguard principles into national legislation for land acquisition through eminent domain within the context of Mongolia and achieve a balance between individual property rights and the rights of the State to apply eminent domain for justified public use.

The provisions are founded on the key principle of fair compensation. The draft proposed by this LARP recommends that the involuntary resettlement process (i) is to be justified as an unavoidable measure on the basis of public interest, and (ii) ensures fair compensation through a transparent, consultative and participatory process with the affected entities, whereby agreements are reached based on inventory assessments and valuation, social impact assessment and mutual negotiations. If such negotiations fail, there is a final step whereby the project proponent/initiator may continue the process by use of expropriation.

2.2 JICA Policies on Involuntary Resettlement

The key principles of JICA policies on involuntary resettlement are summarized below:

1. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.
2. When population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken.
3. People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.
4. Compensation must be based on the full replacement cost as much as possible.
5. Compensation and other kinds of assistance must be provided prior to displacement.
6. For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public.
7. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.
8. Appropriate participation of affected people must be promoted in planning, implementing, and monitoring resettlement action plans.
9. Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.

The above principles are complemented by the World Bank OP 4.12, since it is stated in JICA Guidelines that "JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies." Additional key principles based on World Bank OP 4.12 are as follows.

1. Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including a population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits (Paragraph 16).
2. Eligibility to Benefits includes the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who do not have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying (Paragraph 14~16).
3. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based (Paragraph 11).
4. Provide support for the transition period (between displacement and livelihood restoration) (Paragraph 6(c)(i)).
5. Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc(Paragraph 8).
6. For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, an abbreviated resettlement plan is to be prepared (Paragraph 25).

2.3 GAP Analysis of Mongolian Legal Framework and JICA Guidelines on Involuntary Resettlement

The JICA Guidelines state that projects must comply with national laws and standards, and not deviate significantly from World Bank Policies and international safeguard standards. Moreover, JICA encourages project proponents to take measures to the PAPs in terms of a policy framework if national laws and regulations related to the environmental and social considerations of the project are significantly inferior to international standards and good practices. Table 1 below has shown the difference revealed by comparing key policy issues in the JICA Guidelines and Mongolian laws and regulations pertinent to involuntary resettlement. Moreover, the table presents measures to be taken under the Project in the right-hand column.

Table 1. Comparison of JICA policy and Mongolian laws and regulations on Involuntary Resettlement

Item	Provision of Mongolian Laws	JICA/WB Policies[2]	Measures taken under the Project
Land Acquisition and Resettlement Policies	• Invoking eminent domain is only legally recognized when taking back land for special use by the State, including lines and networks and other objects of national scale (Land Allocation Law, Articles 32 and 37; Land Law,	Eminent domain is generally recognized and subject to policy provisions aiming at avoiding and minimizing land acquisition and resettlement and replacement of lost assets and rehabilitation of	Minimized land acquisition and avoided resettlement as much as possible through route selection and road design.

[2] The relevant policy papers are *Operational Manual OP4.12 Involuntary Resettlement* (December 2001, Revised February 2011) for the World Bank and JICA Guidelines. Since the JICA Guidelines clearly state that JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies in Section 2.6, Laws, Regulations and Standards of Reference, the Table covers both JICA's Guidelines and OP4.12 of WB.

	Articles 42 and 43). The Civil Code of Mongolia is the legal basis for contractual agreements on the transfer of land in the Right-of-Way (ROW) from Project Affected Persons (PAPs) to the government (Chapter 15, Articles 1, 6, 7, 8, 109 and 112, among others).	livelihoods.	
Eligible PAPs	• Licensed owners, possessors and users of land can transfer their titles to other legal persons recognized under the Land Law (Articles 35 and 38) and the Land Allocation Law (Article 27). • Non-titled occupants of land as illegal possessors are not eligible to transfer the land occupied or receive compensation (Land Law, Article 27.4). • The Civil Code recognizes the right of a long term non-owner occupant of ownerless immovable property (incl. land) to own it after 15 years, if registered in the State register (104.2).	Lack of formal legal title to land is not a bar to compensation entitlements. PAPs with formal legal rights and PAPs with recognizable claims to land/assets are entitled to compensation for affected assets at replacement cost. PAPs with no recognizable claims to the land they are occupying are entitled to resettlement assistance in lieu of compensation such that they are no worse off than before the project.	All the lands which will be acquired by the project are possessed lands; all PAPs hold formal legal titles. Thus, all PAPs are eligible for compensation entitlements.
Compensation for Land	Contractually agreed payment for land transferred to the government. • Local practice applies the government land valuation tariff (Cabinet Resolution 103, 2003), but negotiates with PAPs as well. • Replacement land can be provided if PAP's entire land or a large part thereof is acquired.	Land compensated for in-kind (replacement land of similar size and quality) and/or cash compensation at replacement cost (amount needed to acquire land of similar size, quality, location advantages and level of improvements, including transaction costs).	For full loss or in case the remaining land becomes economically unviable, the PAP may choose between the following alternatives: i) provision of replacement land of comparable size, value, location, and utility as lost plot; ii) cash compensation at replacement rates or the government compensation tariff, whichever is higher, based on contractual agreement. For partial loss or in case the remaining land plot is economically viable, the above-mentioned ii) will be applied for the lost plot.

Compensation for Structures	Contractually agreed payment for transfer of structures located on land acquired. The value of structures is determined either by the government valuation tariff (Cabinet Resolution 336, 2010) or at market rates, with depreciation deducted from the gross value of the structure.	Structures compensated for in-kind (replacement of structure of similar size, quality and amenities) and/or cash compensation at replacement cost (amount needed to construct new structure of similar size, quality and amenities, without deduction of depreciation). PAPs shall be permitted to salvage materials.	Compensation amount is estimated according to replacement cost based on Cabinet Resolution 336, 2010 or market prices.
Income and Livelihood Rehabilitation	No provision in contractual agreements for transfer of property.	Assistance for economic rehabilitation due to loss of income sources or means of livelihoods, including (i) income compensation or support for the period of interruption of business or employment, (ii) economic support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; and (iii) additional development assistance, such as land preparation, credit facilities, training, or job opportunities.	PAPs are eligible for income and livelihood rehabilitation.
Relocation and Transaction Cost	All registration and other fees, as well as cost of relocation, are responsibility of parties to a contract and can be included in a contract.	Relocation and transfer expenses, including fees for the registration of properties and transfer tax, are part of the replacement cost of lost assets and included in compensation.	PAPs are eligible for compensation for relocation and transfer cost.
Grievance Redress	The Land Law refers disputes over land to the governors of administrative units and eventually the courts (Article 60). The Civil Code and Land Allocation Law refer various types of disputes to the courts.	An adequate grievance redress mechanism for affected people is required.	Working group on land acquisition[3], which will be established in UB City, handles grievances.
Information Disclosure and Public Consultation	No provision for public consultation and information disclosure. In practice, all cases involve a period of negotiation.	PAPs are to be fully informed and closely consulted on compensation and resettlement options. Draft, final and revised Land	Public consultations are organized to discuss the land acquisition plan. The final plan is disclosed

[3] As for the details regarding the working group, please see Chapter 7 Institutional Arrangement and Implementation Schedule of Land Acquisition and Resettlement Plan for the Project.

		Acquisition and Resettlement Plan (LARP) is to be disclosed to relevant PAPs through public consultation meetings, and discussed with PAPs in order to reflect their feedback to the LARP.	also through public consultations.
Cut-off Date	No provision in Mongolian laws.	An eligibility cut-off date is typically the date the census begins. The cut-off date could also be the date the project area is delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated.	A cut-off date has been defined by Dept. of Property Relation in Ulaanbaatar on May 10th 2013 and the notice was sent to Bayangol District. It is expected that the Cut-off date would be announced through website of UB City and also through direct notification to PAPs.
Right-of-Way	BNbD (Building Norms and Regulations) Clause 6.24 state that 20 to 25m of ROW is required for Urban Arterial Road.	No conflict with WB requirements.	In order to minimize land acquisition, ROW is defined as road width plus 1 meter at the out side .

CHAPTER 3 SCOPE OF LAND ACQUISITION AND RESETTLEMENT IMPACT

The JICA study team has been working on developing the most viable Project design based on socio-economic development trends of Ulaanbaatar city, population growth while studying current traffic volume and future traffic trends. Two basic alternative routes "East-West" and "North-South" and three alternatives within each of these two alternatives have been analyzed in terms of traffic volume, road safety and the Project's economic, financial and social costs.

A key deciding factor in selecting project alternatives was the JICA Guidelines, which state that involuntary resettlement and loss of means of livelihood are to be avoided when feasible. The chosen project alternative requires minimal land acquisition and has the least adverse impact on the communities in the project area. By exploring all viable alternatives the Project has successfully minimized the scope of involuntary resettlement.

Access roads to Ajilchin Flyover will be constructed on existing roads, except for a new bridge and road section passing under the bridge. Most of ROW consists of existing road alignment and public land; however, some parts require the acquisition of land and other fixed assets along the proposed alignment. All of the affected lands are Possessed Land which belong to 17 entities including 2 self-employed persons. Out of 17 affected plots, PAP-01 and PAP-04 have expanded the land beyond the boundaries of their possession. These PAPs have already built moveable and immoveable structures.

As mentioned earlier, the Project area is dominantly an industrial zone, therefore only possession rights have been granted. Currently ownership right is granted for Mongolian citizens using land for residential purposes and residences in the area designated for ownership by Citizens' Representatives Khural of Ulaanbaatar city. Possession right is a long-term contract regarding the use of the land between individual Mongolians or economic entities, institutions on the one hand and the State on the other. Right over the land is for 15–60 years, with a possibility of renewal for another 40 years subject to the approval of the concerned governors. In practice, possession right is allocated 5 to 15 years in most cases, in order to accommodate rapid urban growth and demand for ever-increasing social and economic infrastructures on the one hand, and to manage land effectively on the other hand. A possession license confers on the holder all the rights of owners except permanent disposal through sale or contribution and limitations on land use to those prescribed in the contract. A total of 17,558.7 m^2 of possessed land need to be acquired for ROW to construct the Ajilchin Flyover.

3.1 Affected Entities at Census

Table 2 and 3 indicate the number and types of affected entities in the Project. A total of 17 entities including 2 self-employed persons will be affected. As the Project is located in the industrial zone of Ulaanbaatar city, which is specialized for providing services of international freight shipping, transportation and logistics, chemical and petroleum storage, custom bonded warehouse and car and truck storage, mostly business entities are affected by the activities of the Project. The Yearly or Monthly Incomes of each entity were estimated based on interviews and information from the tax office.

Table 2. Summary of project affected entities

	Name of entity	Business activity	Number of employees	Tax record (2012)	Estimated income
PAP-01	Jamzam LLC	Car trade	—	N/A	—
PAP-02	SJBU LLC	Car trade	8	N/A	—

PAP-03[4]	UB Railway Mongolian-Russian Cooperation	Railway operation, freight forwarding and custom bounded warehouse	—		
PAP-04	Badral LLC	Petrol station	7	9,012,000	90 million MNT/year
PAP-05	Ulaanbaatar Railway Department 2	Vehicle storage	120		
PAP-06	Railway system's commercial business center	Business office	78		
PAP-07	Just Group LLC	Petrol station	7	5,378,400	54 million MNT/year
PAP-08	Railway Fire Station	Fire brigade	128		
PAP-09	Road transport service center of Railway	Petrol storage, car maintenance	—		
PAP-10	Khuvsgul Trade LLC	Bulk petrol storage	16	74,589,000	746 Million MNT/year
PAP-11	Tsuurden LLC	Garage for heavy machinery	20	17,958,000	180 million MNT/year
PAP-12	Gatsuurt LLC	Heavy machinery storage	5	N/A	—
PAP-13	NOTS LLC	Road transportation, containers, window factory	100	9,676,500	100 million MNT/month
PAP-14	Mon Carotage LLC (Zorigtbaatar)	Road transportation and custom bounded warehouse	35	N/A	50 million MNT/month
PAP-15	Erdenebaatar	Room lease (Self-employed)	1	N/A	4.0 million MNT/month
PAP-16	Erdenebayar	Car maintenance warehouse (Self-employed)	1	N/A	2.5 million MNT/month
PAP-17	Mongol Tulkhuur LLC	Trade	15	N/A	—

Note: PAP-03, PAP-05, PAP-06, PAP-08, and PAP-09 belong to the Mongolian Railway.

[4] This entity has a problem with land possession regarding PAP-01 and PAP-02, and the problem needs further clarification.

Table 3. Information on Self-employed Persons

	Name of PAPs	Relation to head of household	Sex	Age	Education	Employment status	Monthly income (MNT)
PAP-15	D. Erdenebaatar	Head	Male	40	Vocational	Self-employed	Unstable and unidentifiable
	B. Purevsuren	Spouse	Female	41	University	Accountant in public organization	500,000 MNT
	E. Sayiinnyambuu	Child	Male	20	Completed secondary school	Student	—
	E. Narangarav	Child	Female	13	Primary school	Student	—
PAP-16	D. Erdenebayar	Head	Male	46	University	Coach in Temuujin school	280,000 MNT
	Ts. Oyundari	Spouse	Female	40	University	Engineer at MKA LLC	1,000,000 MNT
	T. Undram	Child	Female	19	Completed secondary school	Student	—

Affected entities:

PAP-01, PAP-02 and PAP-03 are located in an area which has been reserved for construction of a building by the Mongolian-Russian Joint Venture. All three run temporary parking lots on the land and their land will be affected partially. Some of the area belonging to PAP-01 has been expanded beyond the boundaries of their possession.

PAP-04 offers petrol providing services. The roof and gas station of the PAP will be affected. However, the affected facilities belonging to PAP-04 have been expanded beyond the boundaries of their possession.

PAP-05 belongs to the UB Railway and has about 120 employees. It ensures the operability and safety of machines and mechanisms. A garage, three buildings, a cement square, gas station and warehouse on the affected land will be affected.

PAP-06 has 15 chain stores, and it is a non-profit organization that provides railways stations that are located along the UB railway, employees of the junction stations, locomotive workers and citizens with food and daily consumption products. It has a total of 78 staff. There are two vegetable storage pits with a capacity of 300 tons, one with a capacity of 60 tons, and concrete panels and these will be affected.

PAP-07 is a branch of a company providing Just Oil petrol and it has seven employees. Part of its plot without fences will be affected.

PAP-08 belongs to the UB Railway. The operational radius of this department is 100 km. This is a special object that provides fire safety and security from some major railway objects such as a UB Station, Locomotive Station, and Wagon Department. This department has a total of 128 employees. A building with a firefighting truck garage, block and one iron fence with a rolling gate, shelter, and concrete square area in front of the building and water fountain will be affected.

PAP-09 provides fuel and auto vehicle services to railway organizations and part of the land, service center office, post guards, cement square and fence will be affected.

PAP-10 uses its plot for the purpose of oil storage and to operate a petrol station. An iron/concrete panel fence of the company will be affected.

PAP-11 uses its land for the purpose of storing mechanisms. More than 60% of the land of PAP-11 will be affected by the project and the entity needs to be relocated since their business can not be continued.

PAP-12 provides heavy machinery services and a small portion of the land will be affected.

PAP-13 provides an auto transportation service, container maintenance, vacuum window production, and real estate property brokerage service. The company has over 100 staff and has seasonal business; thus the number of employees goes up in the summer and falls in winter. One sandwich house (pre-fabricated building) for an office, one garage, a warehouse, cement square, concrete panel with an iron gate, wooden latrine, and high-voltage iron shed are located on land possessed by the company and 71 percent of these structures are affected by the project. Therefore, the entire land will be acquired.

PAP-14 provides geological exploration, auto vehicle repair and maintenance services. It has 35 employees and will be entirely affected by the project and will be relocated. The affected premises includes land, a sandwich warehouse, a garage, two greenhouses, a brick building for a generator, a carriage or wagon assembled on the concrete base, concrete embankments with a concrete base, two self-moving metal doors, one movable metal barn and six containers. This land will partially be affected.

PAP-15 comprises four members: the parents (ages 40 and 31), and their son and daughter. This family possesses the land and lives in a house with an area of 418 $m^2$and rents out 15–18 m^2 as rooms for 20 households. This land will be partially affected but the building where the 20 households including the owner are living is not affected.

PAP-16 is comprised of three members, both the wife and husband are employed and they live in an apartment. This family runs an auto vehicle repair and maintenance business on the land that they possess or they rent out the land to earn 2.5 million MNT from such business. One sandwich house (pre-fabricated building) that is used for business, one wooden barn for a guard post, one clay building, a wooden fence and metal door of the fence will be affected by the road development work.

PAP-17 provides data information and advertisement services. Steel fence and 560 m^2 of green space behind of parking lot will be affected by the Project.

3.2 Affected Land

The total size of affected land under possession is 17,559 m^2. As shown in Table 4, as for PAP-11, PAP-13 and PAP-14, all or the majority of their land will be acquired and therefore unavoidably they will be relocated. PAPs whose land belongs to other entities will be only partially acquired, and relocation will not be necessary for them. In addition, some land which is occupied by AFO-01, AFO-04 and AFO-11 without a license will also be acquired, although the exact size of such land has not been clarified at this stage.

Table 4. Possessed land to be acquired for ROW

Plot name		Plot number	Land use	Date granted possession right	Validity period	Size of plot land (m^2)	Size of affected land (m^2)	Percentage of land lost
PAP-01	Jamzam LLC	18640310667007	Commercial	Unknown	Unknown	1,506	N/A	N/A
PAP-02	SJBU LLC	18640310608008	Commercial	2012.06.22	5 years	1,000	63.2	6.32%
PAP-03	UB Railway Mongolian-Russian Joint Venture	18640309863987	Railway operation, passenger transportation, freight forwarding	Unknown	Unknown	58,546	375.6	0.6%
PAP-03(2)	Green Park		-do-				3410	
PAP-05	UB Railway Department 2	18640309300985	Auto garage & warehouse	Unknown	Unknown	15,207	1,919.1	12.68%
PAP-06	Railway system's Commercial business center	18640309100995	Vegetable pits	Unknown	Unknown	15,149	4,701.8	31%
PAP-07	Just Group LLC	18640310318072	Commercial	2008.06.25	5 years	2,000	512.4	25.6%
PAP-08	Railway Fire Station	18640310213084	Fire brigade	Unknown	Unknown	4,559	1,890.0	41.5%
PAP-09	Road transport service center of Railway	1864031008541	Car maintenance Bulk petrol storage	Unknown	Unknown	28,215	1,786.4	6.3%
PAP-10	Khuvsgul Trade LLC	18639309972760	Commercial	2010.03.25	5 years	26,887	687.5	2.6%
PAP-11	Tsuurden LLC		Commercial	Unknown	Unknown	1,311	797.6	60.8%
PAP-12	Gatsuurt LLC	18639309776765	Commercial	Unknown	Unknown	10,918	147.7	1.4%
PAP-13	Nots LLC		Commercial	Unknown	Unknown	2,797.2	2,797.2	100%
PAP-14	Mon Carotage LLC (Zorigtbaatar)	18638309906421	Commercial	Unknown	Unknown	1,727.5	1,230	71.2%
PAP-15	D. Erdenebaatar	18638309815403	Residential & commercial	Unknown	Unknown	1,000	400.0	40%
PAP-16	D. Erdenebayar	18638309815403	Commercial	Unknown	Unknown	1,124	488.2	43.4%
PAP-17	Mongol Tulkhuur LLC	18638309855486	Commercial	2008.08.25	5 years	17,285	559.6	3.2%

3.3 Affected Structures

A total of 56 immovable structures and 56 movable structures including containers, an iron shed and wagon will be affected. Fences, concrete panels and gates with a total length of 2,153m, belonging to 15 affected entities, will need to be dismantled, moved or replaced. Other immovable structures include houses, warehouses, four latrines, containers, sheds, fountain, yurts, garages, cement squares, guard posts, a water kiosk and water reserve tank.

Table 5. Summary of Affected Structures

No.	Type of Structure	Unit	Quantity	Remarks
PAP-01	Steel Fence w/concrete foundation	m	50	
PAP-02	Steel Fence w/concrete foundation	m	20	
PAP-03	Steel Fence w/concrete foundation	m	120	
PAP-03(2)	Steel Fence	m	477	
PAP-04	Gas Station (Roof and Petrol Pump)	式	1	
PAP-05	Fuel Storage Tank	式	1	
	2 Story building	m^2	2,304	1 Nos
	Brick Building	m^2	106.2	3 Nos.
	Cement square	m^2	54.6	
	Removable Concrete Panel	M	117	
	Steel Fence w/concrete foundation	m	26	
	Wooden Garage	m^2	1100	1 Nos.
PAP-06	Warehouses for vegetable storage pit	m^2	2,138	3 Nos.
	Removable Concrete Panel	M	220	
PAP-08	Office Building	m^2	1206.6	1 Nos.
	Shelter (corrugated-roof)	m^2	12.6	1 Nos.
	Cement square	m^2	124.5	
	Fountain	Nos.	1	
	Steel Fence w/concrete foundation	M	235	
PAP-09	2 story building for office	m^2	829	1 Nos.
	Guard Post	m^2	62	2 Nos.
	Cement square	m^2	135	
	Wooden fence／wire net	M	210	
PAP-10	Removable concrete panel	M	65	
	Steel Fence w/concrete foundation	M	16	
PAP-11	Concrete Block Building	m^2	15	1 Nos.
	Latrine	Nos.	1	
	Steel Fence w/concrete foundation	M	176	
PAP-12	Removable Concrete Panel	M	44	
PAP-13	Building	m^2	245.6	1 Nos.
	Pre-fabricated building	m^2	1000	1 Nos.
	Bick Building	m^2	50	1 Nos.
	Garage (Brick)	m^2	72.5	1 Nos.
	Cement square	m^2	120	
	Iron shed for high-voltage facilities	Nos.	1	
	Latrine	Nos.	1	
	Water kiosk	Nos.	1	
	Steel Fence w/concrete foundation	M	320	
PAP-14	Pre-fabricated building	m^2	133	1 Nos.
	Brick building	m^2	36	1 Nos.
	Green House	m^2	288	2 Nos.
	Latrine	Nos.	1	
	Removable Concrete Panel	M	244	
PAP15	Wooden Fence	M	37	
PAP-16	Wooden Building	m^2	52	2 Nos.

	Latrine	Nos.	1	
	Wooden Fence	M	53	
PAP-17	Steel Fence w/concrete foundation	m	150	

3.4 Affected Entities to be relocated

According to the proposed project design and drawings, three entities residing on the plots of PAP-11, PAP-13 and PAP-14 will be physically displaced by losing all or 71.2% of the total land holdings. Physically displaced entities will be compensated based on the entitlements shown in Table 6 in Chapter 5.

3.5 Affected Businesses

Some of the affected entities use the affected land for storing heavy machinery and heavy trucks used for mining, coal transportation, and construction in winter, when mining activity and civil works experience a temporary shutdown. The permanence of business activities will be ensured through helping them to find a relocation site equivalent to the old site or similar facilities to rent till the affected entities re-establish the affected structures on the remaining land. Some of them use their affected land for manufacturing products such as windows or to improve containers, while some use it to protect major railway objects and civilians from fire in an area with a radius of around 5 km. However, some affected entities will experience a temporary loss in business income during relocation and construction of the Ajilchin Flyover.

A total of five affected entities (PAP-04, PAP-06, PAP-07, PAP-11, PAP-13[5], PAP-14 and PAP-16) will experience lost income during relocation and civil work. Business losses will be compensated on the basis of income during the interruption period.

Resettlement impacts identified in LARP preparation need to be updated and reaffirmed at the project implementation stage of the Detailed Engineering Design. Moreover, LARP needs to be updated in accordance with the Land Expropriation Law if the law is endorsed by the Parliament of Mongolia. In case compensation strategy is significantly changed during Detailed Engineering Design stage, the revised LARP has to be checked and agreed by JICA prior to implementation.

[5] Business loss of this PAP does not include loss from a factory making foam-like materials that had only just started operations.

CHAPTER 4 CONSULTATION AND ENGAGING PAPS FOR PREPARATION AND IMPLEMENTATION OF LARP

PAPs must be fully informed, closely consulted, and encouraged to participate in any decision making pertinent to land acquisition and resettlement, including the final design of the flyover, preparation of contractual agreements, determination of prices for assets to be transferred, selection of replacement plots and the restoration of livelihoods and business.

Disclosure of information to and consultation with PAPs at an early stage ensures that they can express their opinions, apprehensions and objections. Project proponents, including government stakeholders, can address the issues raised and, upon careful consideration, incorporate them in the final design and LARP, in so far as they are compatible with applicable local law and the JICA Guidelines. In this way, delays in implementation due to unforeseen conflicts can be avoided.

During disclosure of the draft and final LARP, their rights and entitlements, shall be fully explained to the PAPs. The final LARP will be presented to PAPs, and endorsed by the Ulaanbaatar City Government.

The consultation and public disclosure process for the Project involve the following steps:

- Individual consultations with PAPs during and after the census and socio-economic survey and notification of individual PAPs as well as cut-off date.
- Public consultation meeting with all PAPs to disclose the draft LARP, including eligibility and entitlements, grievance procedures and monitoring, and to discuss changes and other concerns of the PAPs and other stakeholders.
- Continued individual consultations to prepare contract negotiations and address individual concerns.
- Individual negotiations of contract terms with affected PAPs.
- Public consultation meeting with all PAPs to disclose and discuss revised draft LARP.
- Public consultation meeting with all PAPs to disclose Approved LARP and to announce the date, venue, and time of the payment of agreed property transfer prices and other compensation or entitlements.
- Additional individual and public consultation meetings will be held throughout the planning and implementation of the LARP as required if any issues arise.
- Attendance lists of all public consultations will be kept and attached to the LARP and subsequent monitoring reports.

Two public meetings to prepare the PAPs for land acquisition and to disclose and discuss the draft LARP were held in July and November 2012. The preference regarding consultation about compensation was also discussed with PAPs and the relevant information was collected. Record of the meetings are shown in Appendix 2.

CHAPTER 5 COMPENSATION STRATEGY AND LIVELIHOOD REHABILITATION MEASURES

The application of policies, laws and regulations pertaining to IR eligibility and compensation and rehabilitation entitlements for this Project are summarized in the Entitlement Matrix in Table 6 below.

Not all the types of losses covered by the IR policy will necessarily be experienced by households affected by the Project. Further, each PAP may experience a different combination of the losses indicated in the first column. Each case must be investigated and determined carefully so that all possible losses of the PAP are covered.

All PAPs will be eligible for compensation and rehabilitation entitlements irrespective of their property status, including unlicensed occupants of land, and of the type of use of their property (residential, commercial).

Affected possessors, in case of partial loss of under 50 percent of their land, will transfer their license for the affected plot to the GOM and retain the possessor license for the remaining plot. Their possessor licenses will not be cancelled or subject to automatic expiration. In case of a full loss of land they will be provided with a replacement plot and licenses with state registration.

Affected land will be compensated either at replacement cost based on market rates for comparable land or the applicable government compensation tariff, whichever is higher, or, in the case of full loss of a plot of land, with replacement land, including land preparation and restoration of utility services (electricity, water etc.), as applicable. The loss of 50 percent or more of a plot is considered a full loss eligible for compensation for the entire plot, if the AP so desires.

For the Project, replacement cost of the affected land has been estimated according to the government compensation tariff which is 26,400 MNT per square meter of owned land based on the following justification.

- No actual market value based on integrated data on market rates and/or information on land transactions between organizations and individuals is available since no land for business use is traded in Ulaanbaatar.
- According to the Cabinet Resolution № 103 dated 2003 which stipulates the valuation of land cost, the land cost should be estimated by computing basic cost (440,000 MNT/m^2) multiplied by the Zone Factor. The Zone Factor of the Project site is defined as 0.2 to 1.0 in accordance with the land use and site condition. The zone factor can be assumed to be “0.6” on average for the project, so that the land cost of the Project site will be 26,400 MNT/m^2.
- Figures ranging from 13,200 to 21,600 MNT/m^2 have been adopted for five (5) road construction projects financed by the ADB since 2009.
- According to the “Cadastral valuation on Urban Land Use” 2012, Ms. O. Nyamsuren[6], the price of 1 m^2 of land fluctuates between 3,300 and 121,000 MNT when dividing the yurt

[6] A cadastral price survey of lands in the yurt area was conducted in 2010. The valuation template for the yurt area parcel has been developed using a cadastral valuation based on market value. This can be used for various activities including determining the amount of taxes and payments, value of immovable properties, initial auction price of property sale and

area of Ulaanbaatar into 15 zones, and defines the base price of the zone. The market rate of the yurt area of land near the Khan–Uul and Bayangol Districts, which is the Project location, was almost the same as the government compensation tariff.

- No procurement cost is required for land possession except for a commission charge of the application for Mongolian citizens. Proof of creditworthiness shall be attached to the application for land possession.

Affected structures will be compensated for at replacement cost based on the prevailing market rates for comparable types of structures without deducting depreciation. Materials may also be salvaged by the PAPs.

Any temporary impact outside the Right of Way (ROW) due to construction disturbances will be handled through establishing temporary property servitude (easement) by the government over the temporarily affected land based on an agreement with the PAPs regarding the purpose (removal of fence, construction activity for laying of pipelines and restoration of the land and fences), duration (construction period at specific site) and compensation fee.

Loss of income will be compensated for through short-term financial compensation equivalent to the loss, i.e., for the period of interruption of business or employment.

All relocation, transfer and transaction expenses (fees and duties) will either be waived by the government or included in the contract price of the affected properties.

A detailed account of the LAR impact and compensation of losses for each individual PAP's s presented in Table 7.

banks' loan amount, compensation for taking back lands for state use and providing individuals, government and non-government organizations with information as well as insurance.

Table 6. Entitlement Matrix

Type of Loss	Eligibility	Compensation Entitlements	Implementation Issues	Responsible Organization
Land (commercial, for full loss or in case the remaining land becomes economically unviable)	Possessor	The PAP may choose between the following alternatives: • Replacement land for land lost through provision of replacement plot of comparable size, value, location, and utility as lost plot. Possession license extended for longer periods up to 60 years as stated in Land Law. • At their choice or if equivalent replacement land is unavailable, cash compensation at replacement rates or the government compensation tariff, whichever is higher, based on contractual agreement. • Assistance to find replacement land.	• Consult with relevant PAPs. • Identify the exact size of affected land and facilities. • Estimate the compensation amount and prepare the replacement land. • Prepare LARP. • Approve LARP. • Disclose the contents of LARP. • Make contract for land acquisition and its compensation. • Pay compensation amount to relevant PAPs.	PIU/WG for land acquisition
Land (commercial, for partial loss or in case the remaining land plot is economically viable)	Possessor	• Cash compensation for the portion acquired at replacement rates or the government compensation tariff, whichever is higher, based on contractual agreement. • If land is located in areas of the City Approved to allocate land for ownership in the land management plans, ownership certificate on the remaining land. • If land is not identified for land allocation for ownership, possession certificate on the remaining land.	Same as the above.	PIU/WG for land acquisition
Structures (commercial) (this includes acquisition of a portion of land where the residual land is no longer viable)	Possessor	Cash compensation for lost part of structure and reconstruction of remaining structure at replacement cost based on market rates or the government tariff used for budgeting public works (Cabinet Resolution 336, 2010), whichever is higher, without deduction of depreciation, based on contractual agreement.	Same as the above.	PIU/WG for land acquisition
Livelihood Rehabilitation Measures/Enterprise-based Income	All business entities so affected	• For temporary business loss with or without physical displacement due to land acquisition or construction activities by the Project, cash	• Consult with relevant PAPs. • Conduct socio-economic survey on relevant PAPs.	PIU/WG for land acquisition

		compensation equal to net income lost during interrupted period. • For permanent closure, compensation shall include any costs required for physical and financial re-establishment of business. If the business needs to be relocated, the business entities affected may choose between the following alternatives: (i) replacement land prior to relocation; or (ii) if an acceptable plot of land cannot be found, rehabilitation measures including outright cash payment for a limited time while the owner shifts to a new enterprise. The maximum cash payment will be equivalent to the net income of the enterprise for 1 year.	• Estimate income loss. • Pay compensation to relevant PAPs.	
Livelihood Rehabilitation Measures/Employment	All employees so affected.	• For temporary employment loss due to land acquisition or construction activities, cash compensation for lost wages for the period of interruption of employment. • For permanent employment loss, cash indemnity of 3 months wages. In addition, skills development training and assistance to arrange new employment will be provided.	• Consult with relevant PAPs. • Conduct socio-economic survey on relevant PAPs. • Estimate wage loss. • Pay compensation to relevant PAPs.	PIU/WG for land acquisition
Relocation Assistance	All DPs that are physically displaced, permanently or temporarily.	• The following items on actual cost basis at current market rates will be provided. • Cost of developing residential resettlement sites; • Cost of transporting affected people and their assets to the resettlement sites. • Any transfer fees, taxes or other administrative costs; • Costs of identifying new housing or land. • Cost of consultation with the host community. • Any expense for temporarily and physically sheltering DPs between the time of displacement and the time of relocation.	• Consult with relevant PAPs. • Estimate amount of relocation assistance. • Pay relocation assistance to relevant PAPs.	PIU/WG for land acquisition

Table 7. List of affected entities and assets with compensation strategy

	Total licensed land (m^2)	Affected land (m^2)	Affected land as proportion of total land (%)	Total compensation for land (MNT)	Type of affected structure(s)	Total compensation of affected structures (MNT)	Days of business loss	Compensation of business loss (MNT)
PAP-01	1,506	N/A	N/A	No compensation	Fence	2,250,000	—	—
PAP-02	1,000	63.2	6.32%	1,668,480	Fence	1,734,240	—	—
PAP-03	58,546	375.6	0.6%	9,915,840	Fence	10,357,920	—	—
PAP-03 (2)		3410		90,024,000	Fence	41,499,000	—	—
PAP-04	600	N/A	N/A	No compensation	Gas station	100,000,000	30	2,250,000
PAP-05	15,207	1,919.1	12.68%	50,664,240	Fence, 3 buildings, garage, warehouse, gas station, cement square	3,933,624,059	—	—
PAP-06	15,149	4,701.8	31%	124,127,520	Fence, 3 vegetable pits	1,171,266,160	180	76,200,000
PAP-07	2,000	512.4	25.6%	13,527,360	—	6,763,680	30	4,500,000
PAP-08	4,559	1,890.0	41.5%	49,896,000	Fence, building, shelter, fountain, cement square	658,048,970	—	—
PAP-09	28,215	1,786.4	6.3%	47,160,960	Fence, 2 guard posts, building, cement square	1,175,354,592	—	—
PAP-10	26,887	687.5	2.6%	18,150,000	Fence, water reserve tank	65,482,500	—	—
PAP-11	1,311	797.6	60.8%a	21056640	Fence, shed, container, yurt	9,441,000	90	45,000,000-
PAP-12	10,918	147.7	1.4%	3,899,280	Fence	5,799,640	—	—
PAP-13	2,797.2	2,797.2	100%	73,846,080 or replacement plot	Fence, 2 buildings, garage, warehouse, water kiosk, iron shed, latrine, cement square, container	814,950,462	180	240,000,000
PAP-14	1,727.5	1,230	71.2%	32,472,000 or replacement plot	Fence, 1 building, 2 greenhouses, warehouse, container, wagon, yurt	135,875,796	180	60,000,000
PAP-15	1,000	400.0	40%	10,560,000	Fence	6,390,000	—	—
PAP-16	1,124	488.2	43.4%	12,888,480	Fence, 2 buildings, guard post, container	29,056,672	90	7,500,000
PAP-17	17,285	559.6	3.2%	14,773,440	Fence	14,136,720	—	—

Compensation for business losses

PAP-04 will experience a business loss due to the construction work. During the re-construction of the affected facility, 30% of their income might be reduced. In this regard, the business loss shall be compensated for as a 3.0-month income loss which is equivalent to 2.25 million MNT.

PAP-06: Out of 78 employees, 6 full-time employees who are paid from the income generated by the rent and unloading services will lose their work at least for 6 months due to land acquisition. Therefore 18 million MNT, which is 6 months' salary (500,000 MNT/month) for these 6 full-time employees and 58.2 million MNT which is the income generated from rent and unloading services, making for a total of 76.2 million MNT shall be paid by the project to cover the losses.

PAP-07's access to entrance and exit to and from the main road shall be obstructed. However it can be accessed from the other side (apartment complex side). The branch shall be accessed from only one side during the construction work, which may increase the probability of reduced revenue. According to a preliminary calculation, the branch shall be closed for 30 days during the exit and entrance maintenance and 4.5 million MNT (54 million MNT × 1/12) will be paid to cover the business losses.

PAP-11: Most of their land will be affected by the Project so that they have to move their equipment and facilities. Income for three (3) months (45 million MNT) needs to be compensated as business loss.

PAP-13: Monthly income is over 100 million MNT. The activities that are carried out inside the affected structures account for around 40% of all income and equal 40 million MNT. Therefore, business loss due to physical displacement and restoration at new location after the relocation is calculated to require 6 months, and thus 240 million MNT will be paid for compensation.

PAP-14: Monthly income from all operations comes to about 50 million MNT and most income comes from geological exploration. Income that comes from activities in the affected plot is estimated to account for 20% (10 million MNT) of all income. Due to physical displacement and interruption, a business loss is calculated to be worth 6 months of income, and thus 60 million MNT will be paid for compensation.

PAP-16[7] earns 2.5 million MNT per month from his business in the affected plot. Due to relocation to the new boundary within the plot, it will be impossible to run a business for 3 months while demolishing and re-building the buildings inside the fence; thus 7.5 million MNT will be paid to cover the business losses during this period.

[7] Compensation for structures of this PAP does not include valuation of bricks that were placed in the plot for an unknown purpose.

CHAPTER 6 GRIEVANCE REDRESSING MECHANISM

The Khoroo Governor as Vice Chairman of the WG will be the initial recipient of any grievance and log it in the specialized format, tentatively named as the Grievance Action Form (GAF). The GAF will be signed by the Khoroo Governor and the AP, who will receive a signed copy. All GAFs shall be consolidated by the Khoroo Governor and presented to the WG for deliberation and appropriate action, on a weekly basis. Grievances unresolved at the WG level within two weeks shall be referred to the respective District Governor for resolution within one week. Recommendations of the Governor will be referred to the Citizens' Representative Khural for approval and final action. If there are still unresolved grievances after another week, a case may be filed by the claimant in the appropriate courts.

Table 8. Grievance Redress Procedure

Item No.	Procedures	Period
PAP lodges grievance with Khoroo Governor		
1	Khoroo Governor prepares GAF and initiates WG meeting	2 weeks or less
	The WG addresses grievance, informs PAP and initiates action	
If grievance is not resolved		
2	WG submits grievance to District Governor	1 week or less
	District Governor addresses grievance, informs PAP and proposes resolution to District Citizens Representative Khural	
	District Citizens Representative Khural initiates action for resolution	1 week or less
If grievance is not resolved		
3	Grievance is referred to court system	Open

CHAPTER 7 INSTITUTIONAL ARRANGEMENTS AND LARP IMPLEMENTATION SCHEDULE

Organization and administrative arrangements for the effective preparation and implementation of the resettlement plan will be identified and put in place prior to the commencement of the process; this will include the provision of adequate human resources for supervision, consultation, and monitoring of land acquisition and rehabilitation activities (Table 9).

The WG, which includes representatives of the Property Relations Agency and Road Department, is responsible for identifying the owners and occupants of affected land and valuing the properties of PAPs. The PIU of the Project is responsible for updating the LARP.

As the LARP is implemented, the WG ensures resettlement safeguard compliance prior to any land acquisition or resettlement. Overall, however, it is PIU and the LAD who are responsible for adequately supervising the implementation of project LARP. The PIU will be responsible for reporting the progress in implementing the LARP to the Ministry of Road and Transportation (MRT). Monitoring of compliance with the LARP and the LARF during implementation is carried out by PIU and an external monitoring agency (EMA). Members of WG for land acquisition are as follows:

i) Governor of Bayangol District (Chairman)
ii) Governor of Khoroo (Vice Chairman)
iii) Land acquisition specialist of UB City (Member)
iv) Representative from the UB City Road Department (Member)
v) Representative from the UB City Property Relations Department (Member)
vi) Representatives of the PAPs (Member)
viii) Representative from a CBO or NGO registered by the government (Member), if available.

Table 9. LARP Implementation Schedule

Work Items	1st Year				2nd Year				3rd Year				4th Year				5th Year				6th Year			
	1	2	3	4	1	1	2	3	4	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Detailed engineering design																								
Bidding and construction work																								
Public consultation																								
Cadastral survey																								
Identification of affected plot and buildings																								
Review of Land Acquisition and Resettlement Plan																								
Valuation of compensation cost																								
Disclosure of compensation framework to PAPs																								
Endorse the LARP																								
Processing of payment																								
Securing land for relocation																								
Restoration of affected structures on the remaining land and/or replacement land																								
Implementation of livelihood rehabilitation measures																								
Internal monitoring																								
External monitoring																								
Formation of WG																								

CHAPTER 8 RESETTLEMENT BUDGET

Table 10 presents the budget for LAR in the Ajilchin Flyover, based on the compensation strategy discussed in Chapter 5. It provides the unit rates, the number of units affected and the compensation, costs for rent, relocation, and transaction. The contingency cost, at 10 percent of the cost of items 1 to 7, is intended to cover unanticipated impacts and costs arising during LARP implementation. Costs for compensation and rehabilitation, as well as costs for transaction and relocation for each PAP are covered in the Project cost.

Table 10. Budget for Land Acquisition and Resettlement

Asset type	Unit	Unit rate (MNT)	No. of units	Cost (MNT)
1. Land				
Possessed	m^2	26,400	21,766	574,622,400
Subtotal				**574,622,400**
2. Structures				
Petrol station with three gas pumps and six columns	item	100,000,000	1	100,000,000
Petroleum gas station	item	200,000,000	1	200,000,000
Two-story building	m^2	1,350,000	3,133	4,229,550,000
Building (office)	m^2	619,270	1206.6	747,211,182
Building (prefab)	m^2	509,800	1133	577,552,420
Building (brick)	m^2	380,316	244.2	92,873,167
Greenhouse	m^2	50,000	288	14,400,000
Garage (wooden and clay)	m^2	509,800	1100	560,780,000
Garage (brick)	m^2	380,316	72.50	27,572,910
Shelter	m^2	50,000	12.60	630,000
Shed	m^2	45,000	15.00	675,000
Guard post	m^2	380,316	62.00	23,579,592
Vegetable pit	m^2	509,800	2,138	1,089,952,400
Cement square	m^2	195,000	434.1	84,649,500
Fountain	item	2,500,000	1	2,500,000
Iron shed for high-voltage facilities	item	15,000,000	1	15,000,000
Latrine	item	246,000	4	984,000
Water kiosk	item	6,000,000	1	6,000,000
Moveable concrete panels	m	87,500	690	60,375,000
Moveable iron fence	m	87,000	477	41,499,000
Iron/wooden fence	m	30,000	300	9,000,000
Moveable iron with concrete foundations	m	45,000	1113	50,085,000
Subtotal				**7,934,869,171**

3. Business loss				
Business loss PAP-04	Month	2,250,000	3.0	13,500,000
Business loss PAP-06	Month	12,700,000	6.0	76,200,000
Business loss PAP-07	Month	4,500,000	1.0	4,500,000
Business loss PAP-11	Month	15,000,000	3.0	45,000,000
Business loss PAP-13	Month	40,000,000	6.0	240,000,000
Business loss PAP-14	Month	10,000,000	6.0	60,000,000
Business loss PAP-16	Month	2,500,000	3.0	7,500,000
Subtotal				**446,700,000**
4. Transaction costs				
Notary fees (contracts MNT 1 to 10 million)	Lump sum	10,000	6	60,000
Notary fees (contracts MNT 10 and 25 million)	Lump sum	25,000	2	50,000
Notary fees (contracts MNT 25 and 50 million)	Lump sum	50,000	1	50,000
Notary fees (contracts MNT 50 to 100 million)	Lump sum	100,000	2	200,000
Notary fees (contracts MNT 100 and 500 million)	Lump sum	200,000	1	200,000
Notary fees (contracts MNT up 500 million)	Lump sum	300,000	5	1,500,000
Cadastral map survey	Lump sum	50,000	17	850,000
Service fee	Lump sum	5,000	17	85,000
Property rights registration fee	Lump sum	12,000	17	204,000
Subtotal				**3,199,000**
5. Relocation assistance				
Container, iron shed	Nos.	250,000	55	13,750,000
Steel Wagon	Nos.	350,000	1	350,000
Yurt	Nos.	100,000	2	200,000
Transportation for physically displaced PAPs (PAP 11, 13 and 14)	Lump sum	5,000,000	3	15,000,000
Subtotal				**29,300,000**
6. Rent				
Renting garage PAP-08	Days	30,000	180	5,400,000
Subtotal				**5,400,000**
GRAND TOTAL				**8,994,090,571**

The PIU will allocate 100 percent of the cost of compensation at replacement cost and allowances to PAPs before LARP implementation for disbursement together with the respective LADs' accountant.

The PIU will work with the Land and Property Department (LPD) of Bayangol District to manage the process of formal contractual agreements with PAPs and disbursement of compensation. Payment of 75 percent of compensation will be made within 1 month of the time of conclusion of contractual agreements. The remaining 25 percent will be paid at the time of vacating of the affected assets. No land will be acquired by the government or handed over to the PIUs for commencing construction work without full payment of the compensation due to the PAPs.

CHAPTER 9 MONITORING AND EVALUATION

Land acquisition shall be monitored in compliance with the LARP during implementation by PIU as well as by an external monitoring agency (EMA), that has been engaged by the PIU. EMA can be an independent person with the required skills.

a) Internal Monitoring

Internal monitoring is implemented to ensure: (i) proper execution of responsibilities of key stakeholders; (ii) protection of the rights of PAPs; (iii) adequate and prompt payment of compensation; and (iv) timely grievance redress. The WG conducts its own internal monitoring of land acquisition and submits monthly reports to the PIU. The PIU compiles such information in its quarterly reports to MRT. Upon completion of land acquisition activities in the Project, the WG will prepare a resettlement completion report for submission to MRT.

In addition, the State Professional Inspection Agency (SPIA) will independently audit and monitor the agencies involved in the land acquisition and resettlement process, based on the relevant laws and regulations. Table 11 provides the format for the monthly LAR monitoring reports.

Table 11. Internal Monitoring Form (Sample)

Land acquisition and resettlement activities	Planned total	Unit	Progress in Quantity			Progress in %		Expected Completion Date	Responsible Organization
			During the quarter	Till the last quarter	Up to the quarter	Till the last quarter	Up to the quarter		
Preparation Stage									
Employment of consultants		Man-Month							PIU/WG
Implementation of Census Survey (incl. Socioeconomic Survey)									PIU/WG
Public Consultation (1st)		Date							PIU/WG
Finalization of LARP		Date							PIU/WG
Finalization of PAPs List		No. of PAPs							PIU/WG
Public Consultation (2nd)		Date							PIU/WG
Implementation Stage									
Progress of Compensation Payment									
PAP-		No. of entities							PIU/WG
PAP-		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
Progress of Land Acquisitions									
PAP -		ha							PIU/WG
PAP -		ha							PIU/WG
PAP -		ha							PIU/WG
PAP -		ha							PIU/WG
Progress of Livelihood Rehabilitation Measures/ Enterprise-based Income									
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
Progress of Relocation Assistance									
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
Times in Grievance Ajustment									
PAP -		responded / received							WG
PAP -		responded / received							WG
PAP -		responded / received							WG
PAP -		responded / received							WG

b) External Monitoring and Evaluation

The main objectives of external monitoring are to: i) assess the effectiveness, impact and sustainability of land acquisition and resettlement measures; ii) determine whether safeguard compliance has been met; and iii) learn strategic lessons for future policy formulation and planning. The PIU has to establish an External Monitoring Agency (EMA), which will investigate and assess the land acquisition process for the Project. Over three years, the EMA will conduct the monitoring and submit monitoring reports to the PIU. External monitoring consists of the following activities:

- Review and verification of the internal monitoring reports submitted by PIU;
- Review and augmentation of the socio-economic baseline surveys, if necessary;
- Assess the contents of compensation for land acquisition and business losses;
- Assess adequacy for measure to PAPs and living standards/incomes of PAPs before and after the Project;
- Assess PAP's satisfaction level towards resettlement implementation;
- Assess compliance level regarding relevant laws and guidelines; and
- Assess the process of consultation with local stakeholders

The EMA (independent monitoring agency/person) has to be engaged in LAR activities through competitive tenders for the external monitoring and evaluation. The Consultant will have experience with land acquisition and resettlement monitoring and evaluation according to the JICA Guidelines.

The M&E services will be required for a period of 3 years. During implementation of the LARP, external monitoring by the Monitor will be undertaken every six (6) months at the project site for an input of five (5) days, totaling 25 days for 5 inputs. Two annual evaluations will be conducted for the project after completion of LARP. The timing of these investigations may be staggered depending upon the progress of project. The total input of the Monitor will amount to 25 days of domestic consultancy.

Monitoring Schedule

Inputs and Tasks	Timing	Report Due
1. Baseline Surveys	Start of LARP implementation	Within 3 months of start of each input
2. Monitoring of Implementation	Month 7 of LARP implementation	
3. Monitoring of Implementation	Month 13 of LARP implementation	
4. Evaluation	1 year after completion of LARP implementation	
5. Evaluation	2 years after completion of LARP implementation	

Budget for the Monitor

Professional fees, survey assistants, domestic travel,	MNT

reporting and miscellaneous costs for 25 days	
Lump sum per day	300,000
Totaling for 25 days	7,500,000

The monitoring reports will be prepared every six months during the implementation of the LARP. After completion of resettlement, the Monitor will conduct annual evaluations for two years.

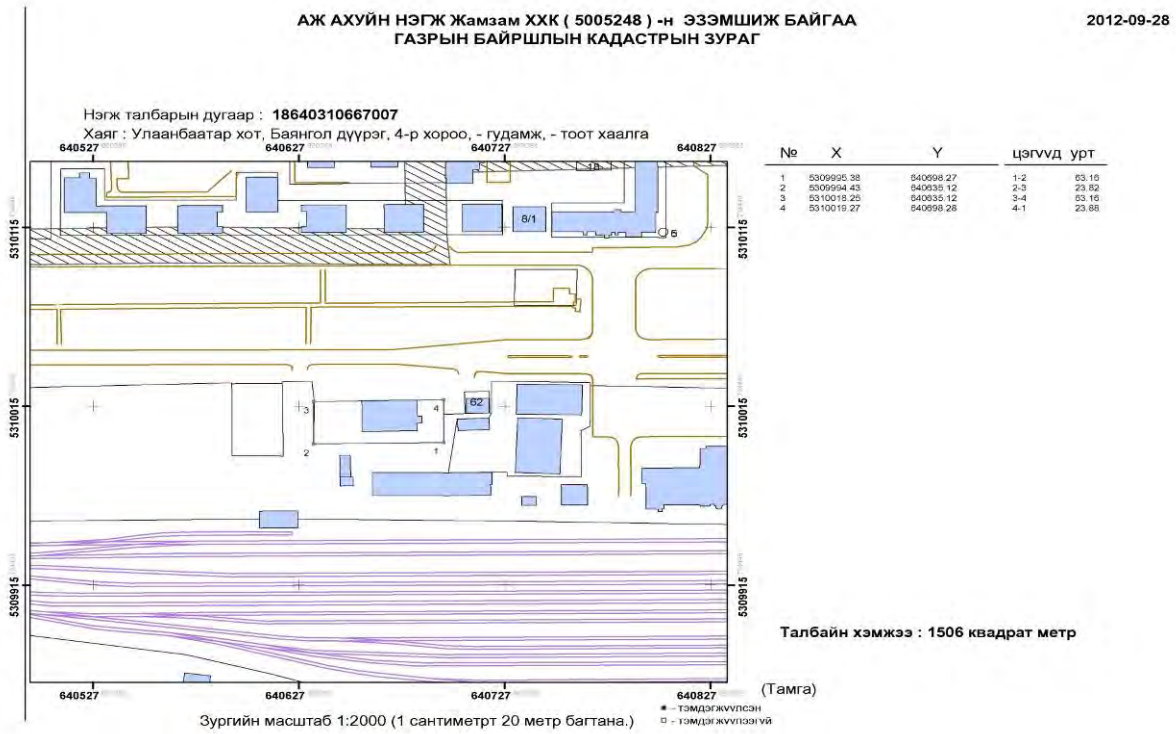
The costs for the external monitoring and evaluation will be borne by MRT in the administration cost for the Project.

Appendix 1: Asset Inventory

PAP-01: Jamzam LLC

Picture 1: Part of land to be acquired

Picture 2: Iron fence to be moved



Picture 3: Cadastral MAP AP-01

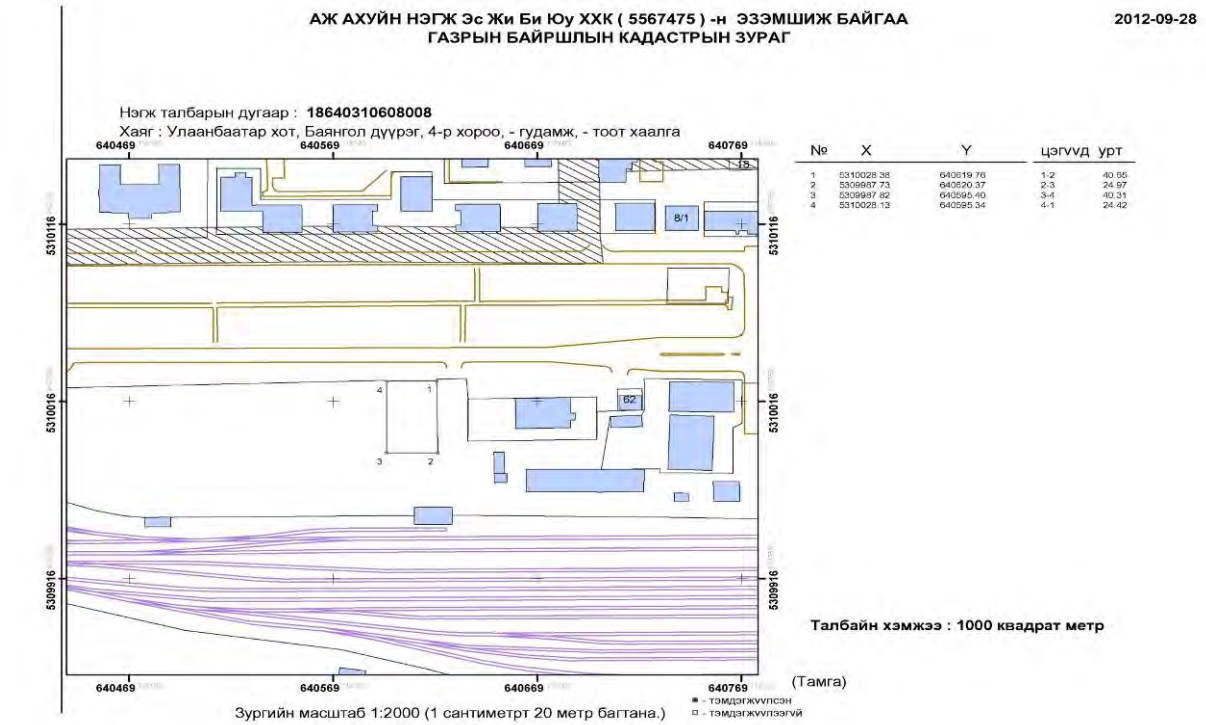
Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-01	Land	Possessed & unlicensed for commercial use	Acquire unlicensed land partially	m^2	n/a	n/a	n/a
	Fence	Iron bar panels, attached to land on concrete foundation, in good condition	Move to the remaining land	m	50	45,000	2,250,000
						Total	**2,250,000**

PAP-02: "SJBU" LLC

Picture 1: Part of land to be acquired

Picture 2: Iron fence to be moved



Picture 3: Cadastral MAP PAP-02

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-02	Land	Possessed for commercial use	Acquire land partially	m^2	63.2	26,400	1,668,480
	Fence	Moveable iron fence and swing gate	Move to the remaining land	m	20	**45,000**	**900,000**
						Total	**2,568,480**

PAP-03: "Ulaanbaatar Railway" Mongolian – Russian Joint Venture

Picture 1: Part of land to be acquired

Picture 2: Iron fence to be moved

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
AP-03	Land	Possessed for commercial use	Acquire land partially	m^2	375.6	26,400	9,915,840
	Fence	Moveable iron fence	Move to the remaining land	m	120	45,000	5,400,000
						Total	**15,315,840**

PAP-**03(2): Public Garden**

Picture 1: Part of land to be acquired

Picture 2:Iron fence and trees to be restored

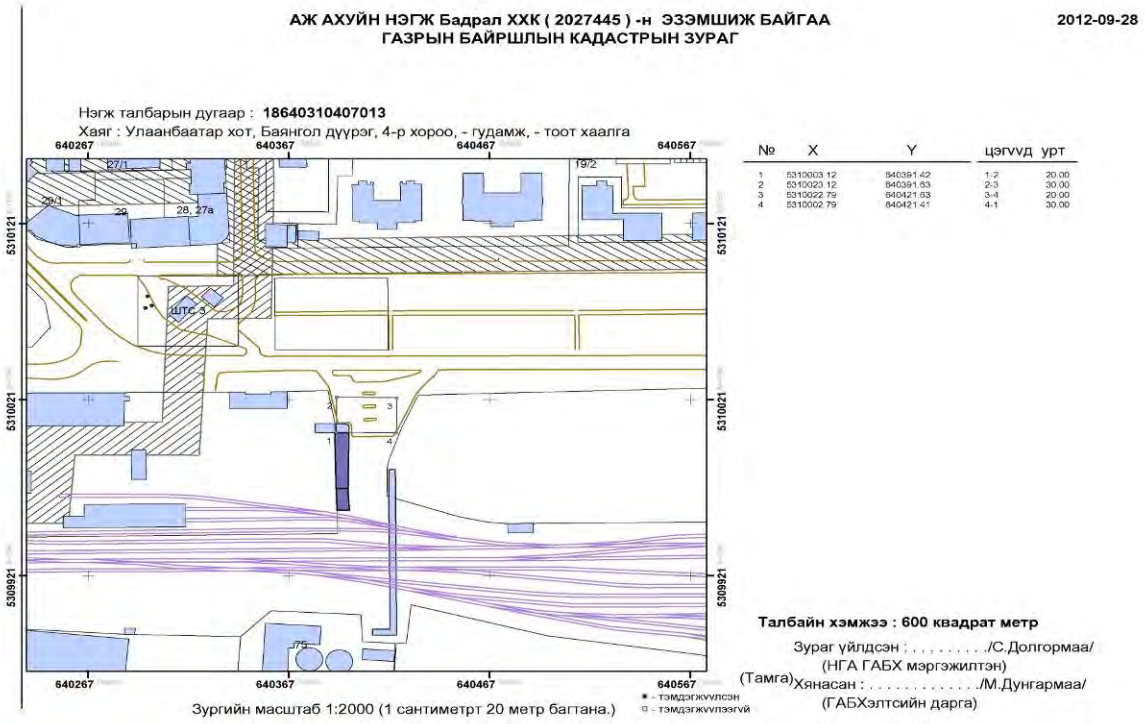
Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
AP-03(2)	Land		Acquire land partially	m^2	3,410	26,400	90,024,000
	Fence	Moveable iron fence	Move to the remaining land	m	**477**	87,000	41,499,000
						Total	**131,523,000**

PAP-04: "Badral" Petrol Filling Station

Picture 1: Part of land to be acquired

Picture 2: Gas station to be relocated



Picture 3: Cadastral MAP PAP-04

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-04	Land	Possessed & unlicensed for commercial use	Acquire unlicensed land partially	m^2	n/a	n/a	n/a
	Gas station	Petrol station with 3 gas station and 6 columns	Relocated on the remaining land	item	1	100,000,000	100,000,000
						Total	**100,000,000**

PAP-05: “Railway Auto Garage”

Picture 1: Part of land to be acquired

Picture 2: Brick house for staffs` cloak room to be relocated

Picture 3: Garage or warehouse to be relocated

Picture 4: Small house to be relolaced

Picture 5: Concrete panels to be moved

Picture 6: House for toilet and storage with sewerage tank

Picture 7: Cement square for pediatric

Picture 8: Cement square for transport

Picture 9: Iron fence, warehouse, gas station

Picture 10: Road to the reservoirs to me moved

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-05	Land	Possessed for car and truck storage	Acquire land partially	m^2	1,919.1	26,400	50,664,240
	House	Brick house for staffs` cloak room	Dismantle and rebuild on the remaining land	m^2	2,304	1,350,000	3,110,400,000
	Garage	Wooden and clayed for garage	Dismantle and rebuild on the remaining land	m^2	1100	509,800	560,780,000
	House	Small brick house	Dismantle and rebuild on the remaining land	m^2	44.4	380,316	16,886,030
	Fence	Concrete panels with rolling iron gate	Move to the remaining land	m	117	87,500	10,237,500
	House	Small brick house for toilet and storage with sewerage tank	Move to the remaining land	m^2	43.8	380,316	16,657,841
	Cement square	Total cement area to be destroyed	Remove	m^3	54.6	195,000	10,647,000
	Fence	Iron fence that blocks gas station	Move to the remaining land	m	26	45,000	1,170,000
	Warehouse	Brick house for storage	Move to the remaining land	m^2	18	380,316	6,845,688
	Gas station	Underground petrol reservoirs	Move to the remaining land	Item	1	200,000,000	200,000,000
						Total:	**3,984,288,299**

PAP-06: Railway Auto Garage 3

Picture 1: Part of land to be acquired

Picture 2: Vegetable storage pit 1 to be relocated

Picture 3: Vegetable storage pit 2 to be relocated

Picture 4: Vegetable storage pit 3 to be relocated

Picture 5: Concrete panels to be moved

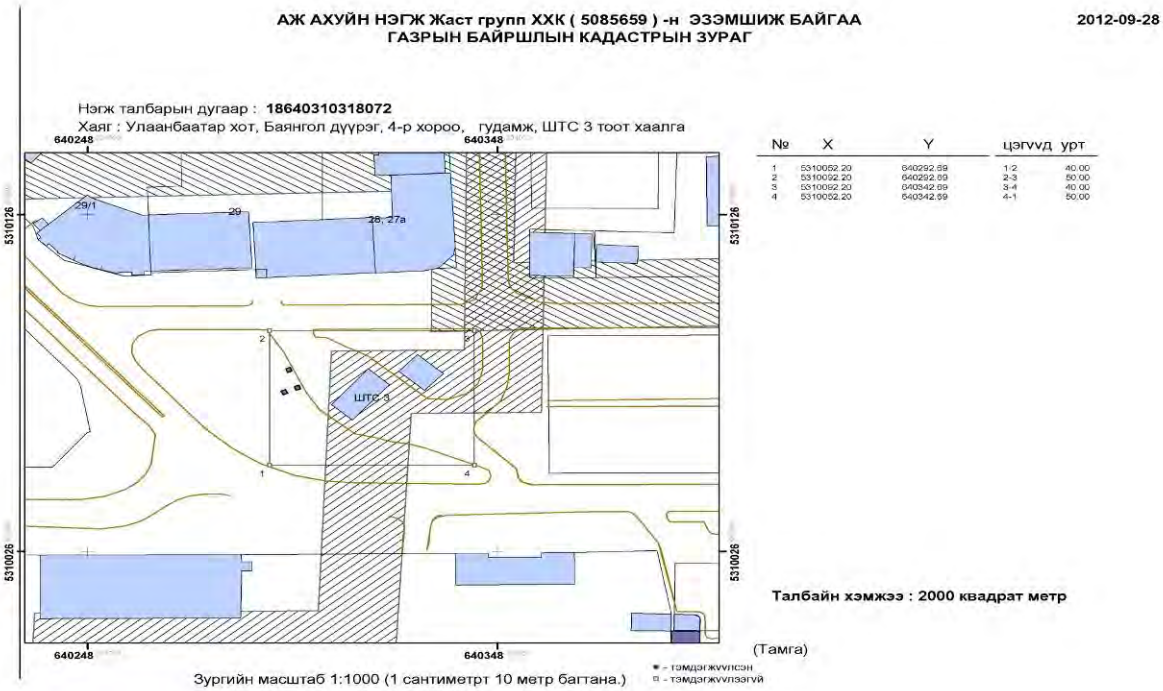
Affected Assets And Replacement/Compensation Costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-06	Land	Possessed land for warehouse and cellar	Acquire land partially	m^2	4,701.8	26,400	124,127,520
	Warehouse	Underground vegetables storage pit	Dismantle and rebuild on the remaining land	m^2	1,006	509,800	512,858,800
	Warehouse	Underground vegetables storage pit	Dismantle and rebuild on the remaining land	m^2	150	509,800	76,470,000
	Warehouse	Underground vegetables storage pit	Dismantle and rebuild on the remaining land	m^2	982	509,800	500,623,600
	Fence	Concrete panels with moveable iron gate	Move to the remaining land	m	220	87,500	19,250,000
						Total:	**1,233,329,920**

PAP-07: "Just Oil" Petrol Filling Station

Picture 1: Part of land to be acquired

Picture 2: Photo of Just Oil Petrol Filling Station



Picture 3:Cadastral MAP PAP-07-PAP-09

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-07	Land	Possessed for commercial use	Acquire land partially	M^2	512.4	26,400	13,527,360
						Total	**13,527,360**

PAP-08: "Railway Fire Station"

Picture 1: Part of land to be acquired

Picture 2: Brick and clayed house to be relocated

Picture 3: Brick and clayed house from front side to be relocated

Picture 4: Brick house/garage in side

Picture5: Smal shelter and iron fence to be moved

Picture 6: Fountain to be relocated

Picture 5: Cement square to be rebuilt

Picture 6: Iron fence to be relocated

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-08	Land	Possessed for storage of firefighting apparatuses use	Acquire land partially	m^2	1,890	26,400	49,896,000
	House	Brick and clayed structure	Dismantle and rebuild on the remaining land	m^2	961	619,270	595,118,470
	Shelter	Small shelter with iron bar and roof	Dismantle and rebuild on the remaining land	m^2	12.6	50,000	630,000
	Fountain	Improvement with iron gate	Dismantle and rebuild on the remaining land	item	1	2,500,000	2,500,000
	Cement square	Cement squares for transport and parade	Dismantle and rebuild on the remaining land	m^3	124.5	195,000	24,277,500
	Fence	Iron bar panels, attached to land on concrete foundation, concrete block in good condition and rolling iron gate	Move to the remaining land	m	235	45,000	10,575,000
						Total	**682,996,970**

PAP-09: "UB Railway Transport Service Center"

Picture 1: Part of land to be acquired ***Combined. Totally 1786.4m2***

Picture 2: Petroleum reserve storage to be relocated

Picture 3: Brick house for guard post of petrol station to be moved

Picture 4: Cement square of petrol station to be moved

Picture 5: Brick house for office

Picture 6: Brick house for guard post of the center and cement squares to be moved

Picture 7: Iron fence to be moved

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-09	Land	Possessed for petroleum reserve use	Acquire land partially	m^2	1,786.4	26,400	47,160,960
	Guard post	Brick house for guards of petrol station	Relocate to the remaining land	m^2	20	380,316	7,606,320
	Cement square	Squares in petrol station and in front of office, gate	Rebuild	m^3	135	195,000	26,325,000
	House	2-storey brick house for office	Dismantle and rebuild on the remaining land	m^2	829	1,350,00	1,119,150,000
	Guard Post	Brick house for guard post	Dismantle and rebuild on the remaining land	m^2	42	380,316	15,973,272
	Fence	Moveable iron fence with swing gate	Move to the remaining land	m	210	30,000	6,300,000
						Total	**1,222,515,552**

PAP-10: "Khuvsgul Trade" LLC

Picture 1: Part of land to be acquired

Picture 2: Underground water reserve tank to be relocated

Picture 3: Iron fence to be moved

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-10	Land	Possessed for commercial use	Acquire land partially	m^2	687.5	26,400	18,150,000
	Fence	Iron bar panels, attached to land on concrete foundation, in moderate condition	Move to the remaining land	m	16	45,000	720,000
		Concrete panels	Move to the remaining land	m	65	87,500	5,687,500
						Total	**24,557,500**

PAP-11: "Tsuurden" LLC

Picture 1: Full of land to be acquired

Picture 2: Small block shed and container to be relocated

Picture 3: Block wall to be relocated

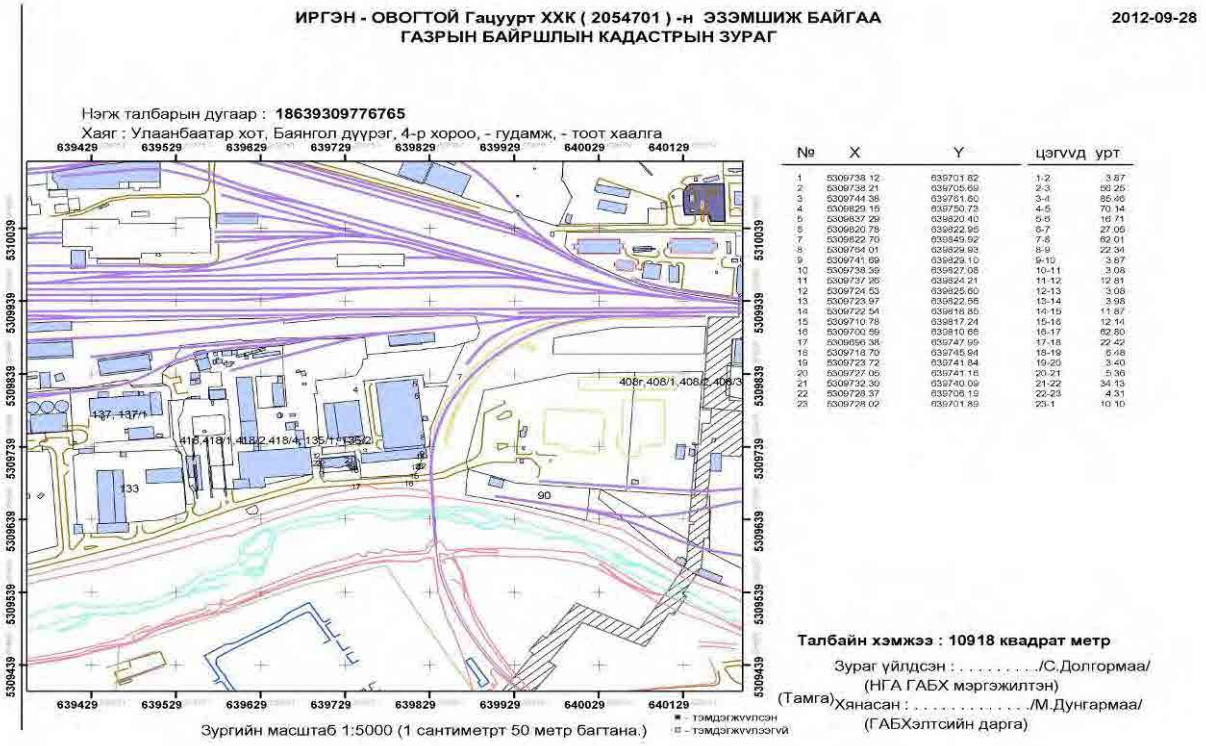
Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-11	Land	Unlicensed for commercial use	Acquire unlicensed land fully	M^2	797.6	26,400	21,056,640
	Shed	Small block shed	Dismantle and rebuild on the replacement land	M^2	15	45,000	675,000
	Container	Moveable iron container	Move to the replacement land	item	2	250,000	500,000
	Fence	Concrete block with iron rolling gate	Dismantle and rebuild on the replacement land	M	176	45,000	7,920,000
	Ger	Ger for the guard	Dismantle and rebuild on the replacement land	item	1	100,000	100,000
	Latrine	Wooden	Dismantle and rebuild on the replacement land	Item	1	246,000	246,000
						Total	**30,497,640**

PAP-12: "Gatsuurt" LLC

Picture 1: Part of land to be acquired

Picture 2: Concrete panels to be moved

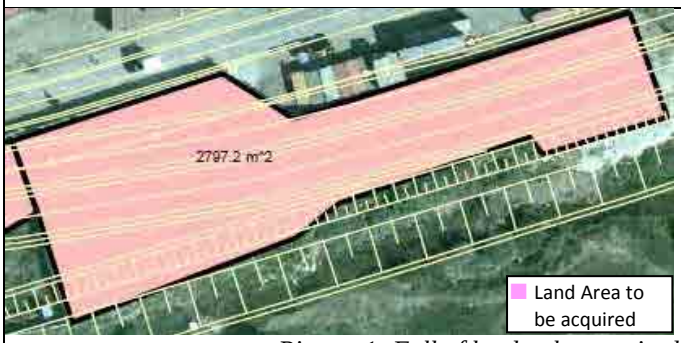


Picture 3: Cadastral MAP PAP-10, 12

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-12	Land	Possessed for commercial use	Acquire land partially	m^2	147.7	26,400	3,899,280
	Fence	Moveable concrete panels	Dismantle and move to the remaining land	m	44	87,500	3,850,000
						Total	**7,749,280**

PAP-13: "NOTS" LLC



Picture 1: Full of land to be acquired

Picture 2: Brick house to be relocated

Picture 3: Sandwich structures for office, vacuum window factory and water kiosk to be relocated

Picture 4: Brick house for toilet and garage to be relocated

Picture 5: Concrete panels to be relocated

Picture 6: Water kiosk

Picture 7: Containers to be moved to the replacement land

Picture 8: Cement square

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP-13	Land	Possessed for commercial use	Acquire land fully	m^2	2,797.2	26,400	73,846,080
	House	Brick house for office	Dismantle and rebuild on the replacement land	m^2	245.6	619,270	152,092,712
	House	Sandwich structures for office, vacuum window factory	Dismantle and rebuild on the replacement land	m^2	1000	509,800	509,800,000
	Garage	Brick garage	Dismantle and rebuild on the replacement land	m^2	72.5	380,316	27,572,910
	Warehouse	Brick warehouse and toilet	Dismantle and rebuild on the replacement land	m^2	50	380,316	19,015,800
	Fence	Moveable concrete and iron panels	Dismantle and rebuild on the replacement land	m	320	45,000	14,400,000
	Water kiosk	Small brick house with pump	Dismantle and rebuild on the replacement land	item	1	6,000,000	6,000,000
	Iron shed	Shed for high voltage	Dismantle and rebuild on the replacement land	item	1	15,000,000	15,000,000
	Latrine	Wooden	Dismantle and rebuild on the replacement land	Item	1	246,000	246,000
	Cement square		Dismantle and rebuild on the replacement land	m^3	120	195,000	23,400,000
	Container	Movable iron containers	Move to the replacement land	item	42	250,000	10,500,000
						Total	**851,873,502**

PAP-14: Zorigtbaatar N. ("MonCarotage" LLC)

Picture 1: Full of land to be acquired ***Totally 1229.3m2***

Picture 2: Sandwich warehouse to be relocated

Picture 3: Concrete panels to be elocated

Picture 4: Brick house for generator to be relocated

Picture 5: Container and ger to be moved

Picture 6: Waggon on concrete foundation to be relocated

Picture 7: Iron shed to be moved

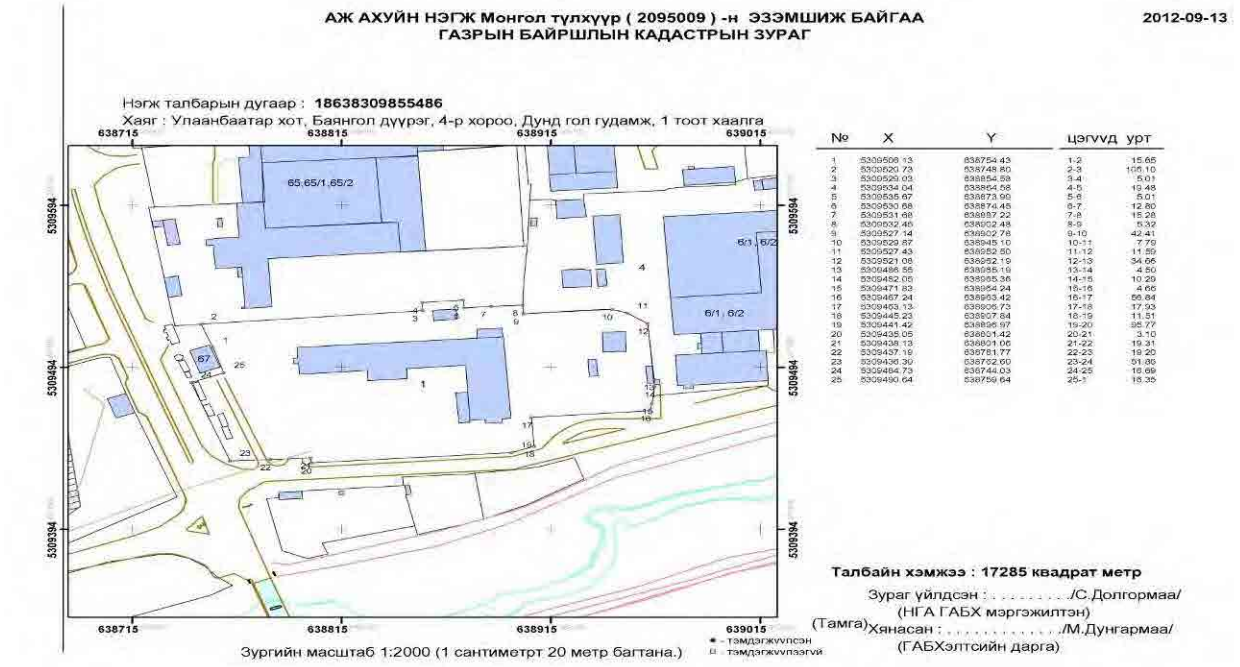
Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP -14	Land	Possessed for commercial use	Acquire land fully	m^2	1,230	26,400	32,472,000
	Warehouse	Sandwich warehouse	Dismantle and rebuild on the replacement land	m^2	132.9	509,800	67,752,420
	Greenhouse	Greenhouse	Dismantle and rebuild on the replacement land	m^2	144	50,000	7,200,000
	Greenhouse	Greenhouse	Dismantle and rebuild on the replacement land	m^2	144	50,000	7,200,000
	Fence	Moveable concrete panels	Dismantle and rebuild on the replacement land	m	244	87,500	21,350,000
	House	Brick house for generator	Dismantle and rebuild on the replacement land	m^2	36	380,316	13,691,376
	Container	Movable structures including 1 iron shed	Move to the replacement land	item	7	250,000	1,750,000
	Wagon	Moveable structure on concrete foundation	Move to the replacement land	item	1	350,000	350,000
	Ger	Ger for the guard	Dismantle and rebuild on the replacement land	item	1	100,000	100,000
	Latrine	Wooden	Dismantle and rebuild on the replacement land	Item	1	246,000	246,000
						Total	**152,111,796**

PAP-15: Erdenebaatar D**.**

Picture 1: Part of land to be acquired

Picture 2: Wooden fence to be relocated



Picture 3: Cadastral MAP AP-13-AP17

Affected assets and replacement/compensation costs

Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
Land	Possessed for commercial& residential use	Acquire land partially	m^2	400	26,400	10,560,000
Fence	Wooden fence with poor condition	Dismantle and rebuild on the remaining land	m	37	30,000	1,110,000
					Total	**11,670,000**

PAP-16:Erdenebayar D.

Picture 1: Part of land to be acquired
Size of land needs to be changed!!! Totally 2124m2.

Picture 2: Sandwich house for office and storage

Picture 3: Guard post to be moved

Picture 4: Small building to be relocated

Picture 5: Containers to be moved

Picture 3: Wooden fence to be moved

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP -16	Land	Possessed for commercial & residential use	Acquire land partially	m^2	488.2	26,400	12,888,480
	House	Sandwich house for office	Dismantle and rebuild on the remaining land	m^2	40	380,316	15,212,640
	Guard post	Iron shed on wooden fence	Dismantle and rebuild on the remaining land	item	1	250,000	250,000
	Small house	Wooden and clayed small shop not operated	Dismantle and rebuild on the remaining land	m^2	12	380,316	4,563,792
	Fence	Wooden fence with poor condition	Dismantle and rebuild on the remaining land	m	53	30,000	1,590,000
	Container	Movable	Remove to the remaining plot	Item	3	250,000	750,000
	Latrine	Wooden	Dismantle and rebuild on the replacement land	Item	1	246,000	246,000
						Total	**35,500,912**

PAP-17: "Mongol Tulkhuur" LLC

Picture 1: Part of land to be acquired

Picture 2: Iron fence to be moved

Affected assets and replacement/compensation costs

ID	Asset type	Description and characteristics	Activity	Unit	Q'ty	Unit rate (MNT)	Cost (MNT)
PAP -17	Land	Possessed for commercial use	Acquire land partially	m^2	559.6	26,400	14,773,440
	Fence	Iron fence with concrete fence	Dismantle and rebuild concrete base and move iron fence to the remaining land	m	150	45,000	6,750,000
						Total	**21,523,440**

Appendix 2: Record of 1st Public Meeting

Meeting place: Meeting room of Suuri LLC, Industrial Road, Bayangol District Ulaanbaatar city.

Meeting date: 2 PM, 27 July 2012.

Meeting started at 2 PM and ended 4 PM.

Meeting participants:

1. N. Erdenesaikhan, director of consulting company Environ LLC, team leader of Environmental and social survey.
2. G. Hasbaatar, specialist of UB Road department
3. O. Enkhtuya, specialist, Resettlement Division, UB Land department
4. D. Chinzorig, engineer, UB Railway Joint Venture
5. Ch. Erdenedalai, State inspector, Department of Railway
6. B. Munkhzul, representative, Mongolian Association for Conservation Nature NGO
7. B. Tumenjargal, representative, Environment and Security Center of Mongolia NGO
8. O. Chimeddorj, vice director, Khuvsgul Trade LLC
9. B. Davaadulam, manager, Global Shariin Gol LLC
10. B. Ulambayar, engineer, Tsuurden LLC
11. B. Otgonbayar, engineer, NRTS LLC
12. E. Chgnaasuren, manager, Suuri LLC
13. B. Solongo, lawyer, Gobi LLC
14. J. Khorloo, Advisor to Director, Suuri LLC
15. J. Demberel, manager, Wagner Asia LLC
16. Ts. Ganbaatar, manager, Mon Karotage LLC
17. D. Erdenebaatar, manager, Metal Trade LLC
18. Kh. Ariunzaya, spokesperson, Suuri LLC
19. P. Tuvdendorj, lawyer, Environ LLC
20. G. Undralbat, EIA manager, Environ LLC
21. D. Lhamsuren, manager, San Industrial LLC
22. D. Munkhbayar, resident, Gobi 88
23. D. Erdenebaatar, resident, Gobi 88
24. Kh. Munguntuya, resident, Gobi 88
25. T. Munkhbold, resident, Gobi 88
26. M. Ganbat, supervisor, CTI engineering LLC

Protocol was made by Tuvdendorj, lawyer of Environ LLC.

Mr. Erdenesaikhan opened meeting and thanked all participants for their coming and introduced purpose and agenda of the meeting. The purpose of the meeting was to introduce about the start of Flyover project's environmental and social studies, which would provide pros and cons of the project in terms of surrounding environment and residents and entities located within and nearby project. With this, all participants have an opportunity to express their views upon receiving all information related to this project. He explained that this project is implemented by the UB Road department and Environ was hired to conduct the EIA and resettlement studies. JICA supports the current studies.

Mr. Hasbaatar made a short presentation on policy and programs of UB road department to improve road network and reduce traffic jams. He briefed about UB plan on proposed flyover bridges in the 7 intersections, including Ajilchin Flyover project.

Mr. Erdenesaikhan made a short presentation on environmental and social studies to be take place in conjunction with Ajilchin Flyover project and introduced about EIA and Resettlement plans. He also explained the Right of Way of project, based on recently acquired blueprint and about the affected households and entities.

He emphasized all current studies focused to identify possible negative and positive changes in surrounding environment and social elements during construction and exploitation of Flyover project and elaborate ways to reduce the negative changes and to disseminate and share all findings with all stakeholders including residents and economic entities located in and around project site.

Ms. Enkhtuya briefly introduced about the UB Land department policies on resettlement issues related with ongoing and planned infrastructure projects.

Question and answer session:

Demberel Wagner Asia LLC: regarding the RoW picture, you would need to have a very clear delineation of affected objects and nearby objects in the picture. When this info will be available?

Erdenesaikhan: as soon as we get the detailed RoW, we will visit each affected entities and households and explain to relevant persons and identify the size and impacts.

Erdenedalai, Railway inspector: why road width while intersecting with the Railway?

Hasbaatar: there is in and out road traces to flyover bridge and therefore it is looks wide. We have reviewed several routes before reaching the consensus with all decision makers in our department and consultants.

Chinzoring, Railway Joint Venture: As current railway organization is joint venture of Russia and Mongolia, we cannot solve this issue (meaning that several infrastructures and buildings of this organization are affected by the project) without negotiation with our partner. Also, we kindly request you to make presentation in our organization so that relevant people get more clear picture of Ajilchin Flyover project.

Erdenesaikhan: We plan to make the public meeting 2 times and one public meeting on resettlement plan. We will discuss about your request and let you known soon.

Khorloo, Suuri LLC: As this is very important project, those, who plan to do this project need to have a long term perspective so that all current and possible future problems are solved within this project. Meaning that make double passes, allow heavy trucks to use this flyover, use of land beneath Flyover Bridge etc.

Enkhtuya, Land department: Existing legal environment is not suitable to current situation on resettlement and compensation. For example, we use outdated rate of land resettlement compensation of government on 2005, which is MNT13,200 per square meter of land and which does not reflect current market price. Also, I recommend to review certificates/licenses of your immovable properties and land if these are legal and or meet legal requirements etc. if everything is legal, then, it is easier for affected person.

Munguntuya, resident: is government going to change current decree on land valuation?

Enkhtuya, Land dept: we are discussing about a draft law on resettlement. If this law passes via parliament, the government would be changing the valuation rate.

Demberel, Wagner Asia: I would like to thank organizers of this meeting. From my previous experience, those who implements project, worked forcefully without taking permission from affected people. I appreciate your approach to introduce first about the start of study to be taken place before the Flyover project. This gives opportunity for possible affected people to make changes on their plans or postpone the decision, if someone starts to invest on land.

Hasbaatar, UBRD: Can you provide Railway authority view on possible two routes of railway via UB?

Chinzorig, UB railway: yes, we have provided all relevant info to JICA study team. Our request is not to cross the future road with railway. Again remind, we will be very happy if your project makes a presentation about the Flyover project among our Railway decision makers. One would need to understand that railway is joint venture of two countries.

Hasbaatar, UBRD: yes, we understand this situation. Let's agree on timing for making presentation via communication.

Erdenesaikhan thanked all participants for their visit and active participation and provided contact address in case of info request and comments.

Appendix3: Record of 2nd Public Meeting

MINUTES OF MEETING

Date: 16 November 2012

Venue: Conference room of Suuri LLC, 4th Khoroo, Bayangol District, Ulaanbaatar city

Names of participants:

1. Mr. Munkhchuluun, manager, Khuvsgul Trade LLC
2. Mr. Enkhmend, Director, Tsuurden LLC
3. Ms. Batsuren, accountant, Tsuurden LLC
4. Mr. Gayabazar, manager, Wagner Asia LLC
5. Mr. Khasbaatar, officer, Ulaanbaatar city Road Department
6. Ms. Enkhtuya, officer in charge of resettlement, UB Land Administration Department
7. Mr. Altan ochir, Deputy director, Badral LLC
8. Mr. Erdenebayar, manager, Metal trade LLC
9. Mr. Erdenebaatar, inhabitant of 4th khoroo Bayangol district
10. Mr. Badrakh, manager, Suuri LLC
11. Mr. Altansoyombo, manager, Just Oil LLC
12. Mr. Gan Od, lawyer, Just Oil LLC
13. Mr. Zorigtbaatar, Director, Mon karotage LLC
14. Mr. Erdenesaikhan, Director, Environ LLC
15. Mr. Sainbold, Director, SJBU LLC
16. Mr. Rinchendorj, manager, NOTS LLC
17. Mr. Sanjaa, manager, Badral LLC
18. Mr. Tsendsuren, human resource manager, Suuri LLC
19. Mr. Tumurbaatar, public relations officer, Environment and Health NGO
20. Mr. Purev, inhabitant, of 4th khoroo Bayangol district
21. Ms. Undraltsetseg, EIA manager, Environ LLC
22. Ms. Munkhbayasgalan, resident of Gobi 88, 3rd Khoroo, Khan uul district
23. Ms. Tumenjargal, chairwomen, Blue Planet NGO
24. Mr. Dorjsuren, inhabitant of household living on the shore of Dundgol River
25. Mr. Tuvdendorj, social study expert, Environ LLC

Issues for Discussion:

Disclosure of information to public on the study of Environmental Impacts of Proposed Ajilchin Flyover Bridge

Disclosure of information to public on the study of Land Acquisition and Resettlement

The opening of the information disclosure was made by Mr. Erdenesaikhan. He introduced that this is the second time we invited people from the area, where Flyover bridge project is proposed. In first meeting, we introduced about the necessities of Flyover Bridge and that it is included into the General Development Plan of Ulaanbaatar City. We met with all potentially affected entities and citizens and provided related info and in turn gathered info from them. We appreciated cooperation from those who provided info.

As per our plan of studies on DEIA and LARP, which were shared with you in our first meeting, the study teams have worked for three months to identify all potential negative and positive impacts on surrounding environment and society and to develop possible actions to eliminate all identified negative impacts, if not possible then to mitigate and minimize. We are going to share with you the results of these studies and get your comments and feedback. I would like to emphasize that the main purpose of LARP study is to fully compensate all affected entities and citizens so that no one is worsened off and everyone benefits because of the project.

As in the meeting agenda, Mr. Khasbaatar, specialist of Ulaanbaatar Road Department made a short speech.

In accordance with City Development Plan, there are 8 flyover bridges will be built and among them Ajilchin Flyover. The feasibility study has been done and within which, Environ conducts studies on DEIA and LARP and nearing completion. There are three alternatives on Flyover bridge direction have been studied and east –west direction was selected as the most suitable and less cost one. The main reason for selecting this direction was to link industrial zone with residential zones of Ulaanbaatar and to reduce the heavy traffic volume created currently. In addition, it will be very necessary for development of satellite cities and balancing the traffic volumes.

Mr. Erdenesaikhan introduced results of DEIA study: air, water, soil quality, lab results of surface and underground water and soil samplings; noise and vibration levels, wildlife, aquatic life, plants and impacts and the proposed actions to reduce impacts and environmental management and monitoring plans to follow, when project progresses.

Question and Answers:

Mr. Altanochir (Badral LLC): from my observation, air pollution is not due to concentration of vehicles as Erdenesaikhan stated but, too much concentration of too many construction factories and markets that sell construction materials in this area. These need to be moved out of city. With this, I am not agree with your proposal to reduce traffic volume through affecting our business and taking part of our land. If you like to build, why you do not build road along and above Dundgol River? Once river is polluted as your study discovers, then one can construct columns along both sides of shore and make road. It does not need make too broad road and impact person's property.

Mr. Erdenesaikhan: I understand your concern. It was not decision of only this study. A feasibility study for various alternatives for reducing the traffic volume was done and many road and traffic experts are involved and various factors have been analyzed and that resulted in a final route.

Zorigtbaatar (Mon Karotage LLC): can you show whose objects are affected and how much are those affected?

Mr. Tuvdendorj (Social study expert on LARP) shared the results of LARP: introduced the ultimate goal of LARP, legal environment of Mongolia and JICA guidelines, resettlement impacts: affected entities, citizens and properties; compensation and livelihood restoration measures; grievance redress mechanism and LARP implementation arrangements, M&E of LARP.

Ms. Enkhtuya (Land Administration Department): with introducing impacts of project to population and entities, we officially announce the Cut -of- Date for receiving compensation and or any other assistance for resettlement. Cut -of- Date means no one/entity will be allowed by the Land

Administration department to newly settle in this area and extend their land. Also no one from today who moved to this place will be able to receive any assistance for resettlement.

Altansoyombo (Just Group LLC): Who defines this Cut-of-Date? Is there any provision in regulation?

Enkhtuya: there is no definition on this in regulation but once there is no regulation, we follow international best practices and JICA guidelines. It is essentially means to restrict those people, who tries to make profit on others issues.

Mr. Altanochir (Badral LLC): Mongolia has very bad regulatory basis for land resettlement. In addition to this, recently there was road expansion in front of our entity. Why talking another expansion?

Mr. Tuvdendorj: Yes, we agree that we have a weak regulation on land acquisition and resettlement. Existing legal gaps are complemented by regulatory measurements on this project, which JICA and World Bank have been applying successfully for many countries. Moreover, a draft law on Land Acquisition and Resettlement is being discussed publicly and if this passes through the Parliament, the legal environment will be much improved.

Ms. Enkhtuya: there was not many practice before for this type of public projects to inform all people, study impacts and disseminate related results as with this project. We appreciate the project proponents. I understand your concerns on your property and land, but you have to conscious about your citizen's duty. Public interest is also essential.

Ms. Enkhmend (Tsuurden LLC): I understood from the study that there is no clear info on our company's land permission license. We have a land permission license until 2013.

Mr. Tuvdendorj: We have all official info on land license from Land Administration Department and we have not found license info on your company. We have been requesting related info several times, but it resulted in no info. It is in your interest to provide all necessary info to the study team.

Mr. Munkhchuluun (Khuvsgul trade LLC): ROW line passes through a water reservoir of 200 m3 located to the northwest corner of our company. Is it possible not to dismantle the reservoir?

Mr. Erdenesaikhan: the part of Flyover Bridge will be constructed on air along your portion of land. I am not quite sure if the bridge columns will be created exactly on your land. Even if columns will not be in your land, it will be impacted by construction process.

Mr. Zorigtbaatar (Mon Karotage LLC): to the north of my company, there is garden area of Mongol Tulkhuur LLC. Can't you move ROW to this garden area instead of passing through my entire land area? I am not against of improving the road. Regarding the property compensation, you should be aware while making valuation that costs will be changed with passing years.

Mr. Erdenesaikhan: regarding compensation and livelihood restoration strategy, affected person's living condition should not be reduced with project implementation. I would like to re-emphasize Tuvdendorj's introduction of resettlement results. As was explained, every affected person/entity

will receive compensation/assistance differently according to the provisions indicated in the entitlement matrix.

Mr. Altansoyombo: Once Ulaanbaatar city will not be moved to another location, the responsible organizations should make a good planning so that traffic volumes are adjusted and coordinated in roads between the flyover bridges. Otherwise, with building a flyover it shifts traffic jam into another roads.

Gayabazar (Wagner Asia LLC): I very much appreciate that study team policy on resettlement supplements gaps in Mongolian legislation and it ensures that affected people will be suffered with construction of Flyover Bridge.

Tumurbaatar (NGO): When the construction of flyover will be started?

Mr. Khasbaatar: Once the loan agreement on flyover construction will be established between Mongolian and Japanese governments. If very optimistic, we anticipate agreement may be in 2014, otherwise in 2016 or after.

Thank you for coming and providing comments and feedback.

Meeting ends.