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MINISTRY OF CONSTRUCTION & HOUSING  
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ERBIL-ALTUNKOPRI (HAWLER-PRDE) HIGHWAY  
ENVIRONMENTAL AND SOCIAL ASSESSMENT REPORT  
(ESA)




JULY, 2006

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## ABBREVIATIONS

<b>PROTEK:</b>	Protek Project Consultants Engineering Design & CAD Services Ltd.
<b>ÇINAR:</b>	Çınar Engineering Consultancy and Project Services LTD.
<b>YILMAZER:</b>	Yilmazer Education and Engineering Ltd.
<b>Project:</b>	Erbil-Altunkopri (Perdi) Road Improvement Project
<b>IDA:</b>	International Development Association
<b>GDRB:</b>	General Directorate of Roads and Bridges
<b>ESMP:</b>	Environmental and Social Management Plan
<b>EMS:</b>	Environmental Management System
<b>ESA:</b>	Environmental and Social Assessment
<b>ISCST3:</b>	Industrial Source Complex Short Term Version 3
<b>PM:</b>	Particulate Matter
<b>SO<sub>2</sub>:</b>	Sulphur Dioxide
<b>NO<sub>x</sub>:</b>	Nitrogen Oxides
<b>CO:</b>	Carbon Monoxide
<b>US EPA:</b>	United States Environmental Protection Agency
<b>GLC:</b>	Ground Level Concentration

## **1. PROFESSIONALS INVOLVED**

This study was conducted under the full consultancy and organization of ÇINAR Engineering Consultancy and Project Services Limited who will be referred as ÇINAR within the full text of this report. The responsible staff of ÇINAR for conduction of the Erbil-Altun Kopri (Perdi) Highway Environmental and Social Assessment study is Banu GÖLE as the project coordinator, Muhsin DERVIŞOĞULLARI, Meltem GÜVENER and Serkan MURATLI as the project engineers.

Ms. Göle has had over 16 years of experience as an Environmental Engineer (MSc). She is qualified in air-pollution dispersion and air-quality modeling. She also has worked successfully in noise dispersion estimation and due diligence studies. She has been the Lead Project Manager for the preparation of Environmental Impact Assessment (EIA) or Pre-EIA reports and the follow up of the Turkish EIA Procedure for highway projects and quarries in the General Directorate of Turkish Highways for more than 7 years. Ms. Göle has specialized knowledge of and experience regarding the Turkish Regulations on the Environment.

Mr. Dervişoğulları has had around 4 years of experience as an Environmental Engineer (BSc). He is qualified in environmental monitoring services and baseline environmental surveys of various projects.

Ms. Güvener has had around 4 years of experience as an Environmental Engineer (MSc). She is qualified in air pollution dispersion modelling and noise modeling as well as preparation of EIA Reports and Environmental Management Plans.

Mr. Muratlı has had around 8 years of experience as a Geological Engineer (MSc). His main area of interest is Field Geology, Geological Mapping, Geological Sections, Slope Stability, Topographic Features, Geotechnical Investigations (Drilling), Deep Excavations (Piling and Anchorage), Geological Mapping, Soil and Rock Sampling and GIS Studies.

Baseline air quality and noise measurements were conducted by the Laboratory Technician, Muhittin İKİNCİ. Mr. İkinci has had over 8 year experience on environmental measurements. He has worked on different environmental air quality, noise and stack gas measurement projects, water, wastewater and soil sampling activities.

Additional Consultancy was supplied from Ankara University, Biology Department for flora and fauna assessment studies. For this purpose the ecological studies within the context of this report were conducted by a team of professionals from Ankara University, Assistant Professor Dr. Nuri Yiğit for faunistic evaluations and Assistant

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Professor Dr. Latif Kurt for floristic evaluations. Ms. Fatma Dinç, the biologist of ÇINAR coordinated the ecological studies and preparation of ecological sections of this report.

Mr. Yiğit has over 16 years of experience as an academic staff at the Faculty of Science and the Department of Biology. His main areas of interest are the general faunal ecology in Turkey, distribution of Turkish carnivores, mammalian field ecology, ecology of Mammalia rodentia, *Lebistes reticularis*, *Tilapia nilotica* (Pisces: Cichlidae), the step ecology and the observed erosion effects.

Mr. Kurt also has over 16 years of experience as academic staff at the Faculty of Science and the department of Biology. His main areas of interest are floral systematic, general floral ecology and vegetation sociology, geological distribution of flora species and environmental biology.

Ms. Dinç has over 15 years of experience as biologist (MSc). Her main areas of interest are vegetation mapping, flora and fauna surveys for various EIA projects, general floral and faunal ecology.

Moreover, sociologists and some experts from the department of social sciences in Salahaddin University (Hewler/Iraq) have also been involved in this rehabilitation project. Assistance of some experts working as officials took also part in social and environmental assessment processes during the weekends. Their contributions are appreciated deeply. However, the social data gathered in this way are not recorded anywhere to which one can refer. They worked for the sake of friendly relationships. Nowadays, there is no other chance to employ any social experts. However, they are so friendly but, hesitate to be nominated. This might be because of the formerly prevailing martial law. No one can change this situation swiftly. Based upon the experiences got during the 5 year period in 1980s and the last 3 year period in Iraq, one may state that the transition is imperceptibly slow. However the data gathered unofficially widen the investigators opinion what is going on sociologically in regards with the rehabilitation project of the Hewler-Prde highway.

## **2. INTRODUCTION**

The (1x2) undivided existing Erbil-Altun Kopri (Perdi) Highway, which is 38.5 km of length, connects the biggest cities of Northern Iraq, Erbil and Kirkuk. The existing Erbil-Altunkopri Highway has been inadequate for current traffic load. As the importance of Erbil is considered for future improvements, then it would be understood that it is irresistible to rehabilitate the existing highway by improving the capacity and physical standards. For this reason, the rehabilitation of the existing highway whose environmental impacts are assessed within the scope of this report is under consideration.

The strategical importance of Erbil and the necessity to rehabilitate the existing highway could be stated as follows;

- Being in the middle of Iraq, Erbil connects the three Governorates by means of trade,
- Erbil is probably the oldest continuously inhabited and is the fastest growing city in Iraq,
- Erbil has large agricultural areas,
- Salahaddin University with all Colleges is located in Erbil,
- Many agricultural, irrigational and research offices are placed in Erbil, and
- An international airport is located in Erbil.

With the increase of international flies from Erbil Airport and after completion of the Erbil–Zakho Divided Highway with 3 lanes in each direction (3x2), Erbil will be the capital of transportation and at last the capital of the Region.

In that case Erbil–Altun Kopri (Perdi) Highway will have greater importance than today. It is assumed that the vehicles coming from Turkey will prefer the route Zakho–Duhok–Erbil–Kirkuk–Baghdad, and the vehicles coming from Iran will use the route of Shaqlawa–Erbil– Kirkuk–Baghdad.

Because of the development in highway transportation, the increase in international transportation, and the positive economic and commercial contributions, there is a need for improvement of the physical standards of the Erbil–Altun Kopri Highway in order to meet the increasing traffic capacity.

### **3. SCOPE AND PURPOSE**

The environmental and social assessment of the Erbil–Altun Kopri (Perdi) Highway rehabilitation project is conducted;

- to describe the baseline environmental conditions,
- to identify both the positive and negative potential environmental impacts during construction stage and road operation, and
- to describe the proposed mitigation measures to reduce the potential impacts associated with these stages.

The existing undivided highway with 1x2 lane will be rehabilitated as 2x2 divided highway with improved capacity and physical standards to serve for the increasing traffic demand.

Due to the proposed funding arrangements for the Erbil–Altun Kopri (Perdi) Highway project, World Bank Environmental Guidelines which apply to the international funding institutions were considered. The World Bank requires environmental and social assessment (ESA) for projects proposed for Bank financing to ensure that the project will be conducted in environmentally sound and sustainable, and thus to improve decision making. ESA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the project.

Accordingly ESA examines the project's potential environmental risks and impacts in its area of influence, project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The preventive measures over mitigatory or compensatory measures, whenever feasible have been favoured.

The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of ESA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

- Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.

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- **Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.
- **Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further ESA action is required for a Category C project.
- **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in sub-projects that may result in adverse environmental impacts.

Erbil–Altun Kopri (Perdi) Highway project is considered to be a Category B project for which an Environmental and Social Assessment is required.

In addition, a number of the requirements of the World Bank Safe Guard Policies were not applied to the project such as the requirement to investigate the “impact upon local people and communities” or “involuntary resettlement”. Since no disturbance of local people or involuntary resettlement is expected due to the project.

The Environmental and Social Assessment study was conducted within the scope of this report to describe the baseline environmental conditions, to assess the proposed impacts and to describe the proposed mitigation measures to reduce those potential impacts.

Topographical map of the study area is given in Figure 1.



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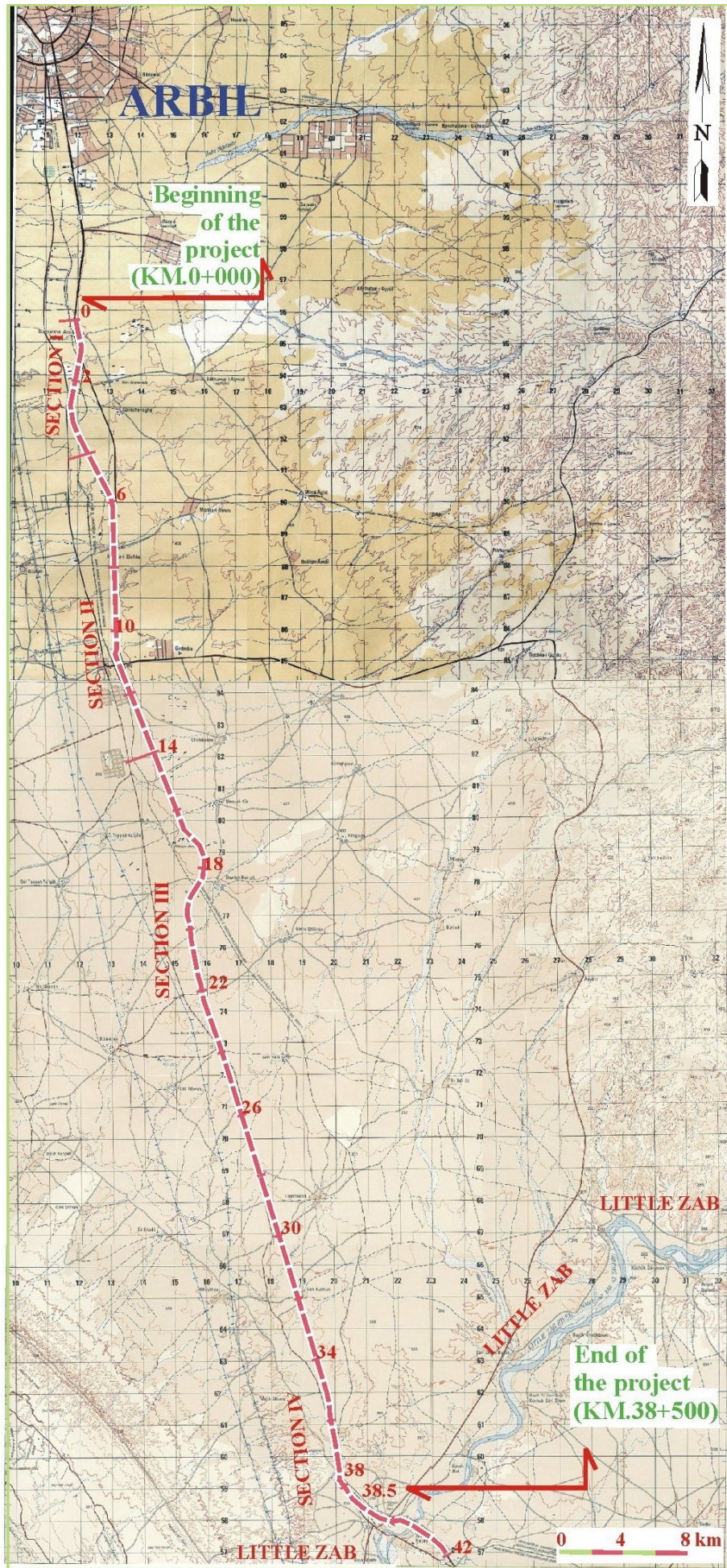


Figure 1. Topographical Map of the Study Area

#### **4. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

The Erbil Altunkopri Highway rehabilitation and construction project is located within the boundaries of Northern Iraq. For this reason in addition to the World Bank Environmental Guidelines which is the funding organization, the environmental legislation of the Iraq should also be used during the assessment process. However no applicable environmental regulation of Iraq could be obtained for assessment purposes. For this reason, in this report all the assessment studies were conducted according to the World Bank Environmental Guidelines.

Drawing on world-wide experience with pollution prevention in many different industries, the World Bank Group has developed many guidelines on industrial pollution. This is a very comprehensive attempt to date to provide a broad audience in developing countries and elsewhere with advice and practical guidelines on how to reduce pollution in a wide range of industrial sectors.

The Pollution Prevention and Abatement Handbook, published by the World Bank and the International Finance Corporation (IFC), in collaboration with the United Nations Industrial Development Organization and the United Nations Environment Program, provides general information on good practice in abating industrial pollution and detailed guidance on pollution control in 40 industrial sectors.

The results of the baseline air quality measurements and air quality modeling study are compared with the following regulatory levels; World Bank standards, and USEPA Standards. Limit values are listed in the related section.

The results of the baseline noise measurements, the results of construction and operation noise level calculations were compared with the World Bank standards and EXIM Environmental Guidelines which are also presented in the related sections.



## **5. DESCRIPTION OF THE PROPOSED PROJECT**

The first section of the highway, from Erbil to Kore is about to be finished as an expressway. The middle section, from Kore to the main interchange at the airport (Bashur) area, has great significance to provide comfortable journey to its vicinity and to the larger cities at further northern part of the country.

The existing undivided Erbil-Altunkopri (Perdi) Highway with 1x2 lane will be rehabilitated as 2x2 divided highway. Lane width: 3.5 m. Width of the median with two future additional lanes: 10.5 m,. Intersections will be level crossing., Road shoulders width: 2.5 m. Drainage will be performed basically by culverts, side ditches, and collectors. In this study, the possible alternatives of the highway project are searched by PROTEK and YILMAZER in order to find;

- a corridor that is much more stable than the existing route,
- the shortest route,
- an alignment which is easily constructible with less construction cost,
- an environmental friendly construction route, and
- an alignment having easily accessible construction material in the close vicinity.

The alternative routes and selection of the proposed route is discussed in detail in the next sections.

### **5.1. Topography and Land Drainage**

Between Erbil and Perdi, the highway crosses a gently smooth landscape with broad valleys separated by very low rounded ridges. The route follows the terrain with minimal earthworks.

River Bridges and box culverts are used for the smaller valleys and minor watercourses, respectively. As this highway was adapted to the existing highway the culvert dimensions will be recalculated to check the suitability of existing culverts for extension. If the existing dimensions are smaller than the calculated dimensions, the calculations are repeated for existing dimensions to prove that they have not enough capacity.

### **5.2. Land Usage**

The highway route passes through prime agricultural lands beyond the limits of the rehabilitation project. As it is known, the rehabilitation project ends . Farming in Northern Iraq is an income source for the residents. For irrigational purposes, farmers use branches of Great Zab, Bastora and Khazır Rivers beyond the project area.

The main agricultural products are cereals while at the locations close to the residential areas various types of agricultural products could be seen. At the locations where topsoil is poor, the land is used for animal grazing.

### **5.3. Description of the Route**

The proposed highway corridor runs in north-south direction from Erbil to Perdi, having a length of approximately 38 km. This highway is like the first section of Erbil-Kirkuk connection. There is a Canalized Four-leg Intersection at CH=12+000 connecting the highways at Erbil-Kirkuk and Qushtapa-Grd Mala directions.

Protek Proje Design Team studied on 1/25.000 scaled maps and prepared the proposed route of the highway. Vertical and horizontal geometry design was adapted to the existing highway geometry.

### **5.4. Traffic Studies**

Traffic forecasts have been conducted to estimate the future requirements of those elements of design related to forecast flows. The basis of the forecasts and the assumptions made, are described as follows. The existing traffic data has been analysed to provide estimates of:

- Capacity,
- Level of service,
- Annual average daily traffic (AADT),
- Traffic growth,
- Peak hour flows,
- Tidal flows, and
- Proportion of vehicles.

**Traffic Conditions:** Traffic conditions that influence capacities and service levels include vehicle type and lane or directional distribution.

***Vehicle Type:*** The entry of heavy vehicles-that is, vehicles other than passenger cars (a category that includes small trucks and vans) - into the traffic stream affects the number of vehicles that can be served. Heavy vehicles are vehicles that have more than four tires touching the pavement.

***Directional and Lane Distribution:*** In addition to the distribution of vehicle types, two other traffic characteristics affect capacity, service flow rates, and level of

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service: directional distribution and lane distribution. Directional distribution has a dramatic impact on two-lane rural highway operation, which achieves optimal conditions when the amount of traffic is about the same in each direction. Capacity analysis for multilane highways focuses on a single direction of flow. Nevertheless, each direction of the facility usually is designed to accommodate the peak flow rate in the peak direction. Typically, morning peak traffic occurs in one direction and evening peak traffic occurs in the opposite direction. Lane distribution also is a factor on multilane facilities. Typically, the shoulder lane carries less traffic than other lanes.

## **6. ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS**

The Erbil-Altunkopri highway is a 38.5 km. of existing (1x2) undivided highway that connects the biggest cities of Northern Iraq, Erbil and Kirkuk and has a strategic importance for the country. The Project is located in the Northern Iraq within the residential boundaries of Erbil and Kirkuk.

### **6.1. Climate**

The prevailing climate in this region is very hot and dry in summer and springs. It is mild in winter. Snowfall is very rare. It can be seen over the mountain ranges at further north and east. Hence one may say that the precipitation in studied area is in general in the form of rainfall ranging from 300 to 400 mm/year. However, in early springs the green grasses cover all the low lands for a few weeks. Then, they become dry because of the lack of water.

No continuous meteorological data could be obtained for Iraq and specifically Erbil, instead continuous meteorological data was obtained from Cizre meteorological station of Turkey which is considered to be representative for the area. Meteorological data constitutes a great significance for especially air quality modelling studies conducted within the scope of this study.

According to the information obtained for Cizre meteorological station of Turkey the prevailing wind directions for the year 2004 on annual basis is North-North-West (NNW). About 19 % of the time wind blows from this direction.

#### **6.1.1. Temperature**

The project site has temperatures averaging 20-25°C, where orchards of olives, citrus fruits, and figs can be maintained.

Mean annual temperatures in this region vary sharply with elevation, decreasing as one descends towards south. The summers in the lower elevations can be oppressively hot and semi-nude, while it stays pleasantly cool in regions deep inside the mountains. There is a large temperature difference between day and night and also between winter and summer. In summer, the temperature reaches to 45°C in daytime and goes down below 20°C at night while in winter times, the daily temperature ranges from about -15°C to about 15°C. This area has semi-arid weather that is hot and dry in summer, cold and wet in winter. Spring and autumn are short compared to summer and winter.

This contrast the climate has been progressively sharpened by the destruction of the forests and overgrazing at the lower elevations. Many areas known until very recently

for their soft climates are now semi-barren, denuded landscapes that alternate between summer heat and winter freezes.

### **6.1.2. Precipitation**

In contrast to most other parts of the Middle East, precipitation in Northern Iraq is regular and bountiful. It follows a Mediterranean regime, with a winter-spring maximum.

The precipitation is ranging from 350mm in the Erbil area to more than 1100mm at Sherwan-Mazen in the high mountains bordering Iran. It starts in September and usually ends by May. The annual rainfall in Kurdistan of Iraq is not much less than annual rainfall in Europe, but the annual rainfall in Europe is well distributed.

The maximum rainfall on the south and south-east slopes, such as Erbil and Suleimaniyah cities, the valley winds are main cause of local rainfall in Dohuk city.

The east and the north of the region have mountainous characteristic, the south and west sections are formed of valleys. The precipitation is very little and in the form of rain at lower elevations and it is in the form of snow in winter time at higher elevations. Since precipitation values could not be obtained from official organizations, the precipitation maps that are attached were used.

The total precipitation is less than 0-10 mm between June-August, 10-70 mm between September-November, 71-350 mm between December-February and 71-310 mm between March-May. When these values are taken into consideration, the maximum precipitation is found to be nearly 740 mm.

The precipitation amounts were comparable to the official measurement values of south-east region of the neighbour country Turkey and those data were used. The measurement stations are in Hakkari and Cizre, and their maximum annual precipitation is between 600-800 mm.

### **6.2. General Geological Characteristics of the Region**

This section of the report is prepared with the reference of the report Hewler - Kirkuk Highway Hewler - Prde Section (KM.0+000–38+500) General Characteristics, October 2005 prepared by Yilmazer Education and Engineering Ltd.

The general geological setting at and around the project area can be summarized as in the following paragraphs. The prevailing dominant unit is Pliocene aged sedimentary formation. It unconformably overlies the Miocene aged sedimentary unit

and the other older units. Clay is widespread in the Pliocene units. However, the deltaic deposits appear as grain supported conglomerate and sandstone in the study area where hilly topography dominates.

### **6.2.1. Site Geology and Stratigraphy**

The great majority of the geological units in the study area are represented mainly by Late Tertiary and Quaternary units. The Pliocene aged sedimentary rocks comprise majority of the geological units within the corridor. The common rock types are; conglomerates, sandstones, siltstones, mudstones, claystone and calcareous mudstone.

All are grain supported. Because of the lack of mineral cement, they can be described as very weak to extremely weak rock. At some localities calcareous material bound the sand and gravels yielding moderately strong rocks.

The geological units in the vicinity of the study area are summarized in a generalized columnar section presented in Figure 2 and the geological map of the study area is given in Appendix 1.

### **6.2.2. Hydrogeology**

Hydrogeologically there is not any problem along the road route. All the creeks are seasonal and very small. They do not have large water catchment areas limited with a few km<sup>2</sup>. Depth to the stagnant groundwater table, except stream courses and the adjacent areas, is well below 30 m in the study area.

The Little Zab river at the south of study area presently drains very large area. Hence very thick sequence of the deltaic deposits characterizes the area. There is not any wet ground. In other words, there is not any soft ground condition which may adversely affect the stability of the highway.

### **6.2.3. Structural Geology and Tectonics**

The study area is a part of the Arabian Plate which pushes the Southeastern Anatolia northwards at an approximate rate of 35 mm/yr. A distinct folding formed along the mountain ranges at north. However, all these features are overlain by the flat-lying Pliocene aged sedimentary unit and recent deposits.

Bedding planes of the bedrock the Miocene aged sedimentary unit is tightly folded and faulted. It is highly recommended that the site geotechnical engineer should be so careful to detect any possible geological structural element which daylight during the excavation for motorway.

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TIME	ERA	PERIOD	SUBPERIOD	LEGEND	LITHOLOGY	EXPLANATION				
PHANEROZOIC (pN)	CENEZOIC (Cz)	QUATERNARY (Q)	Holocene	Qm		Made ground ( <b>Qm</b> ). Generally road fills. In general dense to very dense. Loose solid waste dumps are also mapped as made ground.				
				Qr		Recent deposits ( <b>Qr</b> ): Undifferentiated Quaternary deposit (Qts: top soil; Qrs: residual soil; Qsw: slope wash deposits; Qa, Qc, and Qt). In general it is soft to stiff and loose to medium dense in character. In all cases it gets better with depth, particularly where they were derived from calcareous rocks of the Miocene aged sedimentary rock unit.				
				Qc		Clayey recent deposits ( <b>Qc</b> ).				
				Qa		Alluvium ( <b>Qa</b> ): The alluvial deposits accumulated within stream courses and flood plains. In general loose to dense and GW-SM in character. Alluvial fan deposits ( <b>Qaf</b> ) are also considered as Qa.				
				Qtr		Old river (terrace) deposits ( <b>Qtr</b> ): It is rare. However, towards the Little Zap River some characteristic features are observed. In general dense to very dense. Behaves as rock where its major constituents were derived from limestone				
		TERTIARY (T)	Miocene	Pliocene	Pls		Pliocene aged sedimentary unit ( <b>Pls</b> ): The unit is observable at further western part of the vicinity area. Grains were derived from sedimentary rock of Tertiary to Cretaceous unit at north. The unit is coarsely bedded and the bedding planes are very gentle. Bedding is the main discontinuity type. It is undulating, rough, irregular, discontinuous, and without clay.			
						Mis		Miocene aged sedimentary unit ( <b>Mis</b> ): The unit is characterized by a thick sequence of the sedimentary rock. About 90% of the geological units, crossed by the proposed alternatives, are layers of the unit Mis. Conglomerate, sandstone, siltstone, mudstone, claystone, argillaceous limestone, and clayey gypsate constitute the majority of the unit. Large outcrops of the unit are observable in further north and east of the delineated area. Bedding is the main discontinuity type. It is in general planar to undulating, rough, irregular, continuous, and in places with mineral (CaCO <sub>3</sub> ), silt to clayey infill.		
							Kk		Basically the Upper Cretaceous mélangé ( <b>Km</b> ): It is characterized by a thick chaotic accumulation of exotic lithologies. Medium to mega olistoliths are observable. They are in places embedded within tectono-sedimentary binding material. The major constituents of the alluvium in the Little Zap River and the other major streams were derived from this unit. The alluvium of the Little Zap River is the main source of crushed rock and aggregate.	
								Middle to Upper		

**Figure 2.** Generalized columnar section of the study area

The bedding planes are the major type of the discontinuities. Stability of the slopes is directly governed by the bedding attitudes. The common dip amount of the bedding planes is below  $10^{\circ}$ . It is an amount less than the internal friction angle which in turn, denotes that there would not be any plane type slide in cut slopes.

#### **6.2.4. Seismicity and Geotechnical Properties**

The project area is under the influence of the northwards moving Arabian Plate (AP). The AP is stable internally and faulted along its boundary at further north.

The Red Sea is in its ocean floor spreading phase. It is becoming an ocean. The rate of enlargement is around 45 mm/yr. However, the Arabian plate pushes northern Iraq and southern Anatolia northwards at a rate of around 35 mm/yr. As aforesaid, the study area is so stable. It moves as a whole. It is called as continental drift. Hence the margins of the plate tectonically and seismically are active.

Saravat Mountain range of the Arabian Plate along the eastern coast of the Red Sea has formed by the extension and expansion of the Red Sea. The western boundary is called Dead Sea fault which extends from Red Sea to Eastern Anatolia through Dead Sea, the fertile land between Eastbank and Westbank of Palestine, Hatay (Turkey), and Elazığ to the North Anatolian Fault [Karlıova (snowy and grassy fertile low land plain): triple junction of DSF and eastern and western extensions of the NAF].

The groundwater table, except stream courses and the adjacent areas, is well below 30 m. At that depth the underlying units turn into rock. Hence seismicity does not have any adverse affect on stability of the structures. In spite of that, earthquake coefficient is accounted as 0.1 and 0.2 for design of earthworks and structures respectively. Earthquake disaster increases as the depth to the water table decreases. The degree of earthquake disaster is directly proportional with the depth to the bedrock. Consequently one may say that the corridor is stable in term of seismicity by taking the prevailing geotechnical conditions into account. Designs will be executed in regards with the prevailing geotechnical conditions.

Geological and geotechnical properties remain almost unchanged from beginning to the end. However, some submarine channel deposits are being intersected. The dominating unit P1s becomes more granular at such crossing. Hence the alignment is subdivided into 4 similar sections which are summarized below.



*The first part (KM.0+000 – 3+000)*

This is the first section of the alignment. It will be the continuation of the double carriageway coming out from the Erbil city center. The area has high percentage of clayey soil. Thickness of the top soil in places exceeds 0.40 m.

At least 0.4 m thick uppermost level at the bottom level of a cut must be replaced with granular material. It can be borrowed from the right hand side of the route at KM.3+000. Fill material also can be borrowed from the same pit. CBR values are around 3 and 30 respectively for the natural formation at this subsection and for the pit area. However, it is recommended to use borrow pit material from the source at the eastern end of the road.

The geological units, from top to the bottom, are recent deposits, and the Pliocene aged sedimentary unit (PIs). Clay fraction dominates in both units. The recent unit transits into Pliocene aged deltaic (shallow marine) deposits. This area can be considered as far land from submarine valleys in front of the deltas. Hence the majority of the unit consists of fines from clay to silt. However, some sandy horizons were also detected during the field investigation.

The internal friction angle ( $\phi,^\circ$ ) varies from 5 to 15 whereas cohesion (c, kPa) changes between 40 to 80. Those values increase with depth and also become greater as the moisture content goes down.

Earthworks will be 100% soil. Depth of cuts and height of the fills are less than 4 and 6 m orderly. Slope for cuts and embankments is recommended as 2H:1V ( $\alpha \cong 27^\circ$ ).

*The second part (KM.3+000 – 14+000)*

This section is characterized by basically granular soils of the unit PIs. There are some creeks which work as linear sources recharging the groundwater through the sandy and/or gravelly soils.

The geological units are detrital sedimentary rocks of the unit PIs. The upper mantle is highly weathered and turned into soil. However it gets stronger with depth. In places clayey levels are also observable. However the granular soils dominate.

Thickness of the top soil in places does not exceed 0.40 m. Alluvium thickness is less than 4 meters in stream courses because of the uplifting character of the region. Internal friction angle ( $\phi,^\circ$ ) varies from 10 to 42 whereas cohesion (c, kPa) changes between 25 to 60. Those values increase with depth and also become greater as the moisture content goes down.

Earthworks will be 90% soil and 10% rippable. Depth of cuts and height of the fills are less than 10 and 8 m orderly. All of them will be stable even for long term cases. Slope for cuts and embankments is recommended as 2H:1V ( $\alpha \cong 27^\circ$ ).

*The third part (KM.14+000 – 30+000)*

This is the longest section. The main geological units are alluvium, colluviums, slope-wash deposits, and Pls. Thickness of the top soil in places exceeds 0.40 m.

Internal friction angle ( $\phi,^\circ$ ) varies from 5 to 35 whereas cohesion (c, kPa) changes between 30 to 80. Those values increase with depth and also become greater as the moisture content goes down.

Earthworks will be 100% soil. Depth of cuts and height of the fills are less than 4 and 6 m orderly. Slope for cuts and embankments is recommended as 2H:1V ( $\alpha \cong 27^\circ$ ).

*The fourth parth (KM.30+000 – 38+500)*

This is the last section where geological units are detrital sedimentary rocks of the unit Pls. Alternation of the conglomerate, sandstone, and siltstone dominates.

Bedrock crops out over the hills at western and eastern part of this last section. The Little Zab river drained and presently drains very large area. Hence very thick sequence of the deltaic deposits characterizes the area. The deltaic deposit comprises basically grain supported conglomerate. The surrounding hills can be utilized as good quality borrow-pit.

Internal friction angle ( $\phi,^\circ$ ) varies from 15 to 40 whereas cohesion (c, kPa) changes between 20 to 60. Those values increase with depth and also become greater as the moisture content goes down. At the borrow – pit area (KM.38+000) internal friction angle ( $\phi,^\circ$ ) attains to 45 and c values greater than 80 kPa due to the high compaction, being cemented by grains from silt to sand and locally  $\text{CaCO}_3$ .

Earthworks will be 90%soil and 10% rippable rocks. Depth of cuts and height of the fills are less than 10 and 8 m orderly. All of them will be stable even for long term analysis. Slope for cuts and embankments is recommended as 2H:1V ( $\alpha \cong 27^\circ$ ).

The existing road has a pavement without base and subbase material. Majority of the existing embankments have good quality subgrade material with CBR greater than 30. However, cuts do have the insitu material CBR of which changes from 10 to 30, mostly 12. Hence the pavement for the existing carriageway is redesigned in regards with the design traffic load character.

### **6.3. Environmental Baseline Conditions**

A baseline environmental assessment has been conducted at Erbil-Altunkopri (Perdi) Highway Improvement Project Site and its close vicinity in order to analyze the baseline conditions before the project commences.

Surveys were undertaken for Erbil-Altunkopri (Perdi) Highway Improvement Project area and its close vicinity between 17<sup>th</sup> of February and 18<sup>th</sup> of February 2006 to record existing baseline environmental conditions.

These environmental surveys covered the following studies:

- Baseline noise survey, and
- Baseline air quality survey.

Project is implemented on dry area. Baseline surface and groundwater quality could not be determined along the Erbil-Altunkopri (Perdi) Highway. Because, there was no surface water source intersecting the Erbil-Altunkopri (Perdi) Highway and there was no ground water well along the project site.

#### **6.3.1. Baseline Noise Survey**

The purpose of the study is to determine the baseline noise levels in the vicinity of the project site. The baseline noise levels were measured at the nearest residential areas along the Erbil-Altunkopri (Perdi) Highway.

Noise will be generated during both construction and operation phases of the project and from existing Erbil-Altunkopri (Perdi) Highway. Noise during construction phase will be generated from the operation of construction machinery as well as from auxiliary equipment and various man-camp activities. In this project, most of the noise during the operation stage will be generated by the highway vehicles.

##### **6.3.1.1. Regulatory Noise Levels**

Baseline noise measurement results were compared with the World Bank Standards and limit values given by EXIM Environmental Guidelines. Limit values stated in these regulations are listed in Table 1.

**Table 1.** World Bank and EXIM Maximum Allowable Noise Levels.

Receptor	World Bank Maximum Allowable $L_{eq}$ (dBA)		EXIM Environmental Guidelines $L_{eq}$ (dBA)	
	Daytime (07.00-22.00)	Night time (22.00-07.00)	Daytime	Night time
Residential; Institutional; Educational	55	45	60	55
Industrial	70	70	75	75
Commercial	70	70	65	60

When noise levels exceed the accepted levels given above, adequate mitigation measures must be taken to reduce the noise levels to acceptable levels.

According to the World Bank, noise abatement handbook an operating facility should achieve either the levels specified in the above table or if the baseline noise levels are already above those limits in the above table a maximum increase in the ambient noise level of 3 dBA is acceptable.

### **6.3.1.2. Methodology**

Noise survey was conducted on 17<sup>th</sup>-18<sup>th</sup> of February 2006. Purpose of the survey was to collect the baseline data regarding the background noise levels in the vicinity of the Erbil-Altunkopri (Perdi) Highway. For this purpose approximately 6-8 hours continuous noise measurements were conducted.

Topographical obstacles in this area are the main attenuation factor in the noise transmission between the source and receptor. Wind, temperature and humidity are important meteorological factors, which might influence the measurement device thus the accuracy of the measurement results. In order to prevent such an influence, for example, wind blowing across the microphone, a special wind-screen consisting of a ball of porous polyurethane sponge was used over the microphone during measurements. In addition to that to prevent the humidity effect on measurement, sound level meter was located in a place protected from rain. Humidity levels up to 90% have no influence on the instrument. During the survey, measurements were not conducted on such meteorological conditions.

Vegetative cover in the measurement area is another noise attenuation factor in addition to the topographical and meteorological ones. For instance, it is known that

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noise level decreases 3 dB while transmitting through a highly dense vegetative (i.e., forest) cover with a width of 50 m.

Agricultural fields are the main vegetative cover types around the Erbil-Altunkopri (Perdi) Highway. There are no vegetative obstacles such as trees between the Erbil-Altunkopri (Perdi) Highway and the noise measurement locations; therefore no significant effect of these obstacles is expected.

When establishing the noise measurement program, the following factors were taken into consideration for the environmental assessment:

- Significance of noise levels generated by the project activities,
- Existing noise sources near the project location, and
- Proximity of population centres sensitive to the project noise sources.

For this purpose, four noise and air quality measurement locations were selected in the vicinity of Erbil-Altunkopri (Perdi) Highway which are the main receptors. The name and coordinates of these sampling locations are listed in Table 2.

**Table 2.** The Name & Coordinates of Noise and Air Quality Measurement Locations

Measurement Locations	Location Name	GPS Coordinates	
		Easting	Northing
Grdarash Asad	ERBL 1	411976	3995365
Murtka Ali	ERBL 2	412941	3988787
Qushtapa	ERBL 3	413594	3984149
Sherava Gaura	ERBL 4	420045	3960756

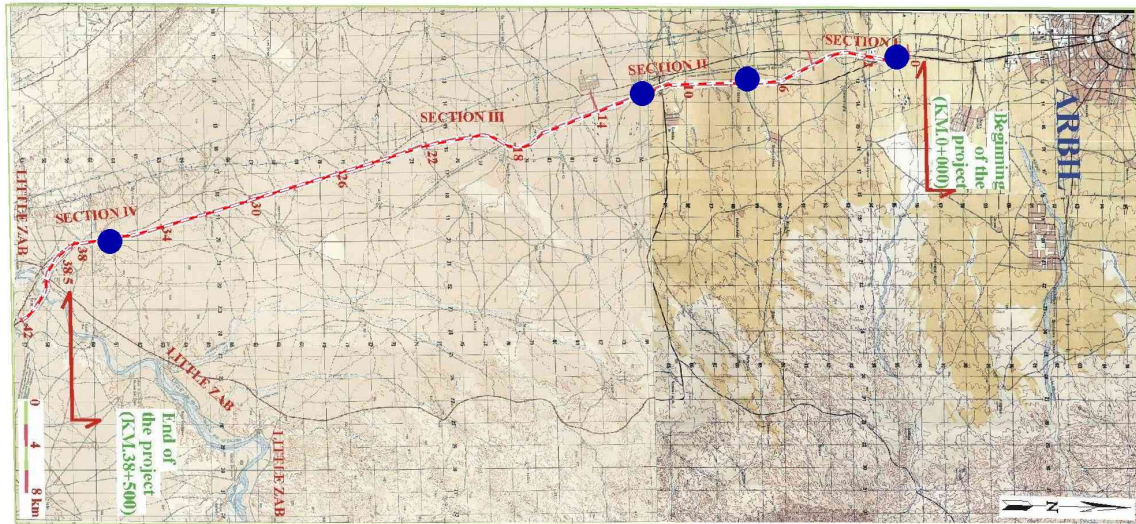
Baseline noise and air quality measurement locations are shown on the route map in Figure 3 and the photographs of the sampling locations are presented in Figure 4-7.

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**Figure 3.** Noise and Air Quality Measurement Locations



**Figure 4.** ERBL 1 (Grdarash As'ad-Baghamra Afandi)



**Figure 5.** ERBL 2 (Murtkha Ali)



**Figure 6.** ERBL 3 (Qushtapa)



**Figure 7.** ERBL 4 (Sherava Gaura)

Noise measurements were conducted by SVAN 943A sound level meter with measurement range between 26-133 dB. The equipment works in the principles according to the TS 8535 EN 60651 standards. A Photograph of SVAN 943A sound level meter is given in Figure 8.



**Figure 8.** SVAN 943A Sound Level Meter

Sound level meter was located at least 1 m away from the reflecting surfaces for the measurement accuracy. Measurements were conducted for 6-8 hours continuously, average data were taken each 5-10 minutes intervals.

### **6.3.1.3. Results of Background Noise Measurements**

The results of the measurements are listed in the following tables. The  $L_{eq}$  is the equivalent SPL. The sound from noise sources often fluctuates widely during a given period of time.  $L_{eq}$  is the average of all SPL's measured during a period of time such as one hour. The  $L_{eq}$  value can be obtained directly with an integrating sound level meter.

$L_{max}$  indicates the highest SPL and  $L_{min}$  indicate the lowest SPL measured throughout the survey period at one location.

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## ERBL 1 (Grdarash Asad)

Noise measurement at Grdarash Asad named as ERBL 1 was conducted on 18<sup>th</sup> of January 2006. Results of the measurement are listed in the Table 3.

**Table 3.** Results of the noise measurements at ERBL 1

No	START TIME	END TIME	LEG	MAX	MIN	No	START TIME	END TIME	LEG	MAX	MIN
1	07:33	07:38	66,3	82,7	43,2	34	10:18	10:23	68,3	86,5	50,3
2	07:38	07:43	67,4	75,4	48,0	35	10:23	10:28	66,6	80,3	45,6
3	07:43	07:48	67,2	78,7	50,7	36	10:28	10:33	68,4	87,5	51,1
4	07:48	07:53	68,6	75,3	48,6	37	10:33	10:38	80,3	113,4	46,3
5	07:53	07:58	68,0	80,9	49,3	38	10:38	10:43	67,5	78,8	47,1
6	07:58	08:03	67,8	80,1	51,1	39	10:43	10:48	68,0	84,7	50,5
7	08:03	08:08	67,8	76,1	43,2	40	10:48	10:53	67,6	77,3	47,0
8	08:08	08:13	67,6	76,5	48,0	41	10:53	10:58	67,3	74,3	52,7
9	08:13	08:18	68,8	85,0	50,7	42	10:58	11:03	71,6	95,0	46,7
10	08:18	08:23	66,9	77,6	48,6	43	11:03	11:08	67,4	76,4	52,8
11	08:23	08:28	66,6	76,5	52,8	44	11:08	11:13	67,6	75,3	56,5
12	08:28	08:33	67,0	81,2	56,5	45	11:13	11:18	69,2	80,2	51,4
13	08:33	08:38	67,0	72,8	51,4	46	11:18	11:23	68,0	77,6	48,9
14	08:38	08:43	67,2	82,7	53,2	47	11:23	11:28	67,5	75,4	53,2
15	08:43	08:48	67,3	75,4	51,1	48	11:28	11:33	66,3	72,8	42,1
16	08:48	08:53	67,0	78,7	46,3	49	11:33	11:38	67,4	82,7	47,7
17	08:53	08:58	68,3	75,3	47,1	50	11:38	11:43	67,2	75,4	44,2
18	08:58	09:03	66,6	80,9	50,5	51	11:43	11:48	68,6	78,7	49,9
19	09:03	09:08	68,4	85,6	47,0	52	11:48	11:53	68,0	75,3	50,0
20	09:08	09:13	80,3	80,9	51,1	53	11:53	11:58	67,8	80,9	50,9
21	09:13	09:18	67,5	86,5	50,7	54	11:58	12:03	67,4	80,1	46,3
22	09:18	09:23	73,7	80,3	48,6	55	12:03	12:08	67,6	76,1	43,2
23	09:23	09:28	67,6	78,8	47,5	56	12:08	12:13	67,7	76,5	53,2
24	09:28	09:33	67,9	84,7	51,7	57	12:13	12:18	70,3	85,0	45,8
25	09:33	09:38	67,2	81,8	47,2	58	12:18	12:23	67,9	77,6	45,5
26	09:38	09:43	67,3	81,5	50,5	59	12:23	12:28	67,8	84,8	44,3
27	09:43	09:48	67,0	77,3	51,0	60	12:28	12:33	67,6	76,5	40,3
28	09:48	09:53	67,5	88,4	43,2	61	12:33	12:38	68,8	81,2	45,8
29	09:53	09:58	96,5	124,3	48,0	62	12:38	12:43	66,9	76,1	43,1
30	09:58	10:03	75,3	101,6	50,7	63	12:43	12:48	66,6	75,7	46,5
31	10:03	10:08	73,7	101,4	48,6	64	12:48	12:53	66,2	75,9	44,0
32	10:08	10:13	67,6	85,6	47,5	<b>Average</b>			<b>68,8</b>	<b>81,6</b>	<b>48,6</b>
33	10:13	10:18	67,9	80,9	51,7						



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## ERBL 2 (Murtkali)

Noise measurement at Murtkali named as ERBL 2 was conducted on 17<sup>th</sup> of January 2006. Results of the measurement are listed in the Table 4.

**Table 4.** Results of the noise measurements at ERBL 2

No	START TIME	END TIME	LEQ	MAX	MIN	No	START TIME	END TIME	LEQ	MAX	MIN
1	10:52	11:03	58,5	81,7	38,6	26	15:03	15:13	45,5	58,2	37,0
2	11:03	11:13	56,0	80,9	37,2	27	15:13	15:23	47,4	66,9	34,4
3	11:13	11:23	71,8	96,8	37,7	28	15:23	15:33	46,4	78,7	36,3
4	11:23	11:33	49,4	70,9	35,2	29	15:33	15:43	47,0	55,1	37,2
5	11:33	11:43	46,6	61,4	36,4	30	15:43	15:53	49,2	70,0	37,1
6	11:43	11:53	51,3	73,1	34,3	31	15:53	16:03	49,8	73,6	37,7
7	11:53	12:03	51,3	77,0	37,4	32	16:03	16:13	48,9	69,9	38,8
8	12:03	12:13	45,6	59,6	35,1	33	16:13	16:23	54,8	72,0	38,0
9	12:13	12:23	56,9	79,4	35,6	34	16:23	16:33	50,4	69,2	41,3
10	12:23	12:33	48,1	67,0	36,6	35	16:33	16:43	50,2	67,0	40,3
11	12:33	12:43	50,4	73,0	35,8	36	16:43	16:53	45,5	65,6	36,9
12	12:43	12:53	50,8	70,0	35,4	37	16:53	17:03	47,4	65,4	37,1
13	12:53	13:03	51,0	78,8	37,1	38	17:03	17:13	46,4	65,2	38,0
14	13:03	13:13	58,5	79,6	37,5	39	17:13	17:23	48,1	65,0	36,9
15	13:13	13:23	56,1	79,2	36,6	40	17:23	17:33	52,9	64,7	36,2
16	13:23	13:33	47,7	68,7	36,9	41	17:33	17:43	51,4	64,5	37,0
17	13:33	13:43	46,4	58,6	37,1	42	17:43	17:53	49,1	64,3	34,4
18	13:43	13:53	56,2	77,0	38,0	43	17:53	18:03	47,6	64,1	36,3
19	13:53	14:03	45,6	60,0	36,9	44	18:03	18:13	49,2	63,9	37,2
20	14:03	14:13	46,9	63,6	36,2	45	18:13	18:23	54,1	63,7	36,9
21	14:13	14:23	45,5	63,9	37,0	46	18:23	18:33	44,9	63,4	37,1
22	14:23	14:33	58,8	78,5	38,9	47	18:33	18:43	44,6	63,2	38,0
23	14:33	14:43	47,4	64,5	37,0	48	18:43	18:53	45,5	63,0	36,9
24	14:43	14:53	44,9	60,3	37,3	<b>Average</b>			<b>50,1</b>	<b>68,7</b>	<b>37,0</b>
25	14:53	15:03	44,6	56,2	35,9						

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## ERBL 3 (Qushtapa)

Noise measurement at Qushtapa named as ERBL 3 was conducted on 18<sup>th</sup> of January 2006. Results of the measurement are listed in the Table 5.

**Table 5.** Results of the noise measurements at ERBL 3

No	START TIME	END TIME	LEQ	MAX	MIN	No	START TIME	END TIME	LEQ	MAX	MIN
1	13:14	13:19	47,3	60,6	38,0	34	15:59	16:04	55,4	66,6	43,8
2	13:19	13:24	48,0	63,6	34,2	35	16:04	16:09	51,8	60,2	41,2
3	13:24	13:29	45,2	59,2	34,3	36	16:09	16:14	52,7	62,3	42,9
4	13:29	13:34	50,0	58,3	35,9	37	16:14	16:19	51,4	67,6	40,0
5	13:34	13:39	46,9	56,7	34,5	38	16:19	16:24	56,1	74,5	43,9
6	13:39	13:44	49,6	59,4	38,8	39	16:24	16:29	69,5	95,0	44,0
7	13:44	13:49	60,4	87,5	36,6	40	16:29	16:34	53,1	71,2	45,7
8	13:49	13:54	85,3	114,5	40,3	41	16:34	16:39	52,4	65,1	44,7
9	13:54	13:59	56,8	66,3	44,8	42	16:39	16:44	53,0	65,0	45,4
10	13:59	14:04	61,5	65,5	59,4	43	16:44	16:49	52,2	63,8	43,6
11	14:04	14:09	61,6	64,8	59,5	44	16:49	16:54	53,1	68,1	43,4
12	14:09	14:14	61,6	67,1	59,5	45	16:54	16:59	54,8	73,0	44,9
13	14:14	14:19	62,4	70,4	59,4	46	16:59	17:04	53,9	72,0	44,8
14	14:19	14:24	62,8	81,7	59,4	47	17:04	17:09	63,2	77,1	50,0
15	14:24	14:29	61,4	66,9	59,4	48	17:09	17:14	63,7	72,1	61,6
16	14:29	14:34	61,7	73,8	59,5	49	17:14	17:19	64,0	75,5	61,2
17	14:34	14:39	62,3	68,4	59,8	50	17:19	17:24	75,5	104,9	57,0
18	14:39	14:44	75,4	100,8	59,5	51	17:24	17:29	82,4	101,9	60,6
19	14:44	14:49	62,3	72,3	59,3	52	17:29	17:34	54,8	87,5	66,1
20	14:49	14:54	58,6	69,3	39,7	53	17:34	17:39	53,9	114,5	43,2
21	14:54	14:59	54,7	75,8	43,0	54	17:39	17:44	63,2	66,3	41,6
22	14:59	15:04	55,5	70,9	40,6	55	17:44	17:49	58,9	65,5	39,8
23	15:04	15:09	56,5	69,9	41,1	56	17:49	17:54	52,3	64,8	45,5
24	15:09	15:14	54,3	73,4	43,2	57	17:54	17:59	54,3	67,1	43,3
25	15:14	15:19	52,1	63,1	41,6	58	17:59	18:04	57,3	66,3	45,3
26	15:19	15:24	55,5	66,3	39,8	59	18:04	18:09	55,0	66,5	46,3
27	15:24	15:29	58,9	70,3	45,5	60	18:09	18:14	54,6	66,7	47,4
28	15:29	15:34	52,3	61,7	43,3	61	18:14	18:19	51,8	72,0	38,8
29	15:34	15:39	54,3	65,7	44,5	62	18:19	18:24	52,7	77,1	36,6
30	15:39	15:44	57,3	67,1	48,1	63	18:24	18:29	51,4	72,1	40,3
31	15:44	15:49	52,6	70,5	42,4	64	18:29	18:34	56,1	75,5	40,1
32	15:49	15:54	55,3	78,2	41,9	<b>Average</b>			<b>57,3</b>	<b>72,2</b>	<b>46,3</b>
33	15:54	15:59	52,8	64,1	41,3						

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## ERBL 4 (Sherava Gaura)

Noise measurement at Sherava Gaura named as ERBL 4 was conducted on 18<sup>th</sup> of January 2006. Results of the measurement are listed in the Table 6.

**Table 6.** Results of the noise measurements at ERBL 4

No	START TIME	END TIME	LEG	MAX	MIN	No	START TIME	END TIME	LEG	MAX	MIN
1	19:26	19:31	61,2	70,7	58,3	34	22:11	22:16	42,7	54,1	36,7
2	19:31	19:36	61,9	71,1	58,3	35	22:16	22:21	57,8	73,0	38,7
3	19:36	19:41	61,5	71,1	58,5	36	22:21	22:26	54,1	67,1	37,9
4	19:41	19:46	62,9	73,9	59,0	37	22:26	22:31	51,1	68,4	35,5
5	19:46	19:51	62,7	78,6	59,0	38	22:31	22:36	50,1	70,8	35,3
6	19:51	19:56	56,7	67,5	43,5	39	22:36	22:41	37,0	40,0	35,8
7	19:56	20:01	58,4	71,7	45,3	40	22:41	22:46	37,3	43,8	35,5
8	20:01	20:06	55,1	68,5	44,4	41	22:46	22:51	37,0	44,8	34,7
9	20:06	20:11	57,7	71,1	44,6	42	22:51	22:56	37,1	47,7	34,9
10	20:11	20:16	61,2	74,2	46,0	43	22:56	23:01	37,1	72,7	34,8
11	20:16	20:21	55,5	67,5	43,9	44	23:01	23:06	37,1	63,7	34,7
12	20:21	20:26	56,2	67,9	44,5	45	23:06	23:11	57,8	69,5	34,5
13	20:26	20:31	57,0	70,3	44,4	46	23:11	23:16	45,2	47,3	34,4
14	20:31	20:36	57,1	74,9	40,5	47	23:16	23:21	52,8	72,0	40,4
15	20:36	20:41	55,8	72,7	40,1	48	23:21	23:26	40,7	71,1	38,7
16	20:41	20:46	59,8	74,9	42,0	49	23:26	23:31	61,2	74,2	38,8
17	20:46	20:51	57,8	64,4	44,2	50	23:31	23:36	57,3	67,5	37,6
18	20:51	20:56	59,5	69,7	56,8	51	23:36	23:41	59,4	67,9	36,8
19	20:56	21:01	59,1	70,4	56,9	52	23:41	23:46	53,5	70,3	36,0
20	21:01	21:06	61,2	75,7	49,5	53	23:46	23:51	61,7	71,1	43,9
21	21:06	21:11	57,3	74,7	40,2	54	23:51	23:56	57,8	73,9	44,5
22	21:11	21:16	59,4	70,4	42,9	55	23:56	00:01	57,5	78,6	44,4
23	21:16	21:21	53,5	67,0	41,4	56	00:01	00:06	57,2	67,5	40,5
24	21:21	21:26	61,7	75,2	43,9	57	00:06	00:11	56,9	71,7	40,8
25	21:26	21:31	59,3	73,0	40,4	58	00:11	00:16	56,7	71,0	39,7
26	21:31	21:36	54,6	71,8	38,7	59	00:16	00:21	56,4	70,5	38,7
27	21:36	21:41	57,8	72,7	38,8	60	00:21	00:26	57,3	70,0	43,9
28	21:41	21:46	45,2	63,7	37,6	61	00:26	00:31	59,4	69,4	40,4
29	21:46	21:51	52,8	69,5	37,7	62	00:31	00:36	53,5	71,8	38,7
30	21:51	21:56	40,7	47,3	38,4	63	00:36	00:41	61,7	72,7	38,8
31	21:56	22:01	59,6	72,0	38,7	64	00:41	00:46	59,3	63,7	37,6
32	22:01	22:06	60,1	75,2	37,7	<b>Average</b>			<b>54,7</b>	<b>68,3</b>	<b>41,8</b>
33	22:06	22:11	57,9	72,9	37,9						

#### **6.3.1.4. Discussion of the Results**

Average of the noise measurement results conducted at four locations described above are given in Table 7. These four locations represent all the nearest possible residential areas along the Erbil-Altunkopri (Perdi) Highway.

**Table 7.** Measured Average Noise Levels in 4 Residential Areas Along the Erbil-Altunkopri (Perdi) Highway

Measurement Locations	Location Name	Measured Average Values (in dB(A))		
		LEQ	MAX	MIN
Grdarash Asad	ERBL 1	68,8	81,6	48,6
Murtka Ali	ERBL 2	50,1	68,7	37,0
Qushtapa	ERBL 3	57,3	72,2	46,3
Sherava Gaura	ERBL 4	54,7	68,3	41,8

The measurement result at Grdarash Asad was compared with day time limit value stated in World Bank and Exim Environmental Guidelines. The Leq value measured at Grdarash Asad was above the World Bank Limit and Exim Environmental Guidelines. The high result might be due to the existing highway next to the measurement location. Noise level measured at Grdarash Asad was higher than the other measurement locations, since it is closer to the highway than other locations.

The measurement result at Murtka Ali was compared with day time limit value stated in World Bank and Exim Environmental Guidelines. The Leq values measured around the Murtka Ali was in compliance with the maximum allowable values given by World Bank and Exim Environmental Guidelines.

The measurement result at Murtka Ali was compared with day time limit value stated in World Bank and Exim Environmental Guidelines. The Leq value measured around Qushtapa was in compliance with Exim Environmental Guidelines; however it is above the World Bank Limit. Qushtapa is the most crowded residential area along the Erbil-Altunkopri (Perdi) Highway. Therefore, high noise results might be due to the residential activities.

The measurement result at Sherava Gaura was compared with day time limit value stated in World Bank and Exim Environmental Guidelines. The Leq values measured

around the Sherava Gaura was in compliance with the maximum allowable values given by World Bank and Exim Environmental Guidelines.

It should also be remembered that during the baseline noise monitoring period, the operation of the existing highway was going on, that would result in noise levels in the area. Suggestion of a mitigation measure would require an extensive and long period noise measurement survey.

### **6.3.2. Baseline Air Quality Survey**

Baseline air quality measurement was conducted for Erbil-Altunkopri (Perdi) Highway project site and its close vicinity between 17<sup>th</sup> of January and 26<sup>th</sup> of February 2006 in order to observe the existing air quality. Measurements were conducted at totally 4 locations including the nearest receptors to the Erbil-Altunkopri (Perdi) Highway.

During activities of the Project, there will be various air pollutants released into the atmosphere in varying amounts. The magnitude of impacts of these air pollutants will depend on factors such as pollutant emission rates, source characteristics, meteorology, topography, and land use. After existing levels of air pollutants determined in order to establish a baseline for these anticipated impacts, the operational phase air pollutions would be determined.

The pollutants focused at this survey are Particulate Matter (PM<sub>10</sub>), Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), and Sulphur Dioxides (SO<sub>2</sub>).

Fractions of the suspended particulate matters with aerodynamic diameters less than 10 micrometers (µm) (PM<sub>10</sub>) are of main concern due to their relatively extended atmospheric residence times and their ability to penetrate into human respiratory system. In this survey, existing ambient PM<sub>10</sub> levels were assessed at four sampling points in the vicinity of the project area.

NO<sub>x</sub> and SO<sub>2</sub> are two of the primary air pollutants based on combustion. Therefore at four sampling points in the vicinity of the project area also were selected for NO<sub>x</sub> and SO<sub>2</sub> analysis. Passive diffusion tubes were used for sampling of these pollutants.

CO is a colourless, odourless, poisonous gas. It is a product of incomplete burning of hydrocarbon-based fuels. At four sampling points in the vicinity of the project area also were selected for CO analysis. Drager tubes were used for CO measurements.

#### **6.3.2.1. Measurement Locations**

The air quality survey was conducted at four sampling points. Measurements were conducted at totally 4 locations at nearest sensitive receptor along the Erbil-

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Altunkopri (Perdi) Highway. Name and locations of the noise and air quality measurement locations are listed in the Table 2 and Figure 3.

## 6.3.2.2. Regulatory Air Quality Levels

Air Quality Standards and Guidelines for Ground Level Concentrations listed in the USEPA Standards and Pollution Prevention and Abatement Handbook WORLD BANK GROUP are tabulated in Table 8.

Long term (LT) values in the table are maximum allowable limits and arithmetic means of all measurements.

Short term (ST) values are the maximum daily means or the values that should not be exceeded by %95 of the measurements.

**Table 8.** Air Quality Standards ( $\mu\text{g}/\text{m}^3$ )

Standard/ Guideline		World Bank Classification <sup>a</sup>	USEPA Standards <sup>d</sup>
SO <sub>2</sub>	Annual Mean	>100 (poor airshed) > 80 (moderate airshed)	80
	24 hr average value	150 (poor airshed <sup>b</sup> ) 150 (moderate airshed <sup>c</sup> )	-
NO <sub>x</sub>	Annual Mean	>100 as NO <sub>2</sub> (poor airshed)	100 as NO <sub>2</sub>
	24 hr average value	150 (poor airshed <sup>b</sup> ) 150 (moderate airshed <sup>c</sup> ) as NO <sub>2</sub>	-
PM10	Annual Mean	>50 (poor airshed)	50
	24 hr average value	150 (poor airshed <sup>b</sup> ) 150 (moderate airshed <sup>c</sup> )	-
CO	Annual Mean	-	-
	24 hr average value	-	10000 (8 hour) 40000 (1 hour)

\*The EU standards recognize the possibility that exposure to both sulphur dioxide and particulate matter may have an additive or synergistic effect on health. The EU limit value for ambient sulphur dioxide therefore varies depending on the concentration of particulate matter in the ambient air.

LT: Long-term values (A sampling period of one year is taken for long term standards)

ST: Short Term values (Short term standards represent the daily mean values)

a: World Bank Group, 'Pollution Prevention and Abatement Handbook', 1998

b: with more than 5% exceedence

c: with less than 2% exceedence

d: U.S.EPA Standards (Arithmetci Mean values) dated 1982 and the relevant addenda.

### **6.3.3. Particulate Matter Survey**

#### **6.3.3.1. Methodology**

PM<sub>10</sub> sampling was conducted at 4 sampling points by using portable low-volume sampler in compliance with TS 2361 standard.

The ambient PM<sub>10</sub> levels were surveyed by means of a filtration technique commonly employed by many regulatory agencies worldwide. A low-volume sampler was used for the current survey. The low-volume sampler pulls in air at a rate of 5 litres-per-minute (lpm) through an impactor designed to segregate SPMs larger than 10- $\mu$ m in aerodynamic diameter. SPMs smaller than 10- $\mu$ m pass through the impactor unhindered, consecutively to be retained on a 47-mm fibre-film filter.

At the beginning of the sampling, the sampler flow rate was calibrated using a transfer orifice traceable to U.S. National Institute of Standards and Technology (NIST). The sampler works on the basis of pulling ambient air through a 47-mm filter. A particle impactor with a cut-point diameter of 10 micrometer ( $\mu$ m) removes larger particles from the incoming air stream before reaching the filter. Difference in filter weight divided by the volume of collected air gives the ambient PM<sub>10</sub> concentration. The filters shall be weighed using an analytical balance with a sensitivity of 0.0001 grams (g) or better. This method will yield PM<sub>10</sub> concentrations with a sensitivity of 1 microgram/cubic meter ( $\mu$ g/m<sup>3</sup>).

#### **6.3.3.2. Result of Particulate Matter Survey**

Result of the particulate matter survey is listed in Table 9.

**Table 9.** Result of Particulate Matter Survey

<b>NO</b>	<b>DATE</b>	<b>LOCATION</b>	<b>PM 10 ACTUAL CONC. (<math>\mu</math>g/m<sup>3</sup>)</b>
1	17.01.2006	ERBL 1	115,03
2	17.01.2006	ERBL 2	42,72
3	18.01.2006	ERBL 3	122,84
4	18.01.2006	ERBL 4	37,02

#### **6.3.3.3. Discussion of Results**

Measured concentrations were compared with the short term values, because PM10 measurement was performed for 12 hours intervals. There is no short term limit value stated by World Bank and USEPA Standards, WHO guidelines stated short term limit value for PM10 as 150  $\mu$ g/m<sup>3</sup>. Therefore, measured PM10 concentrations were in compliance with the short term values in WHO guidelines.

### **6.3.4. NO<sub>x</sub> and SO<sub>2</sub> SURVEY**

#### **6.3.4.1. Methodology**

Ambient concentrations of SO<sub>2</sub> and NO<sub>x</sub> were investigated by the use of diffusion tube sampling methodology. These samplers consist of small plastic tubes, approximately 7 cm long with about 1 cm internal diameter. The storage time of the diffusion tubes is 12 weeks after preparation to analysis. At site and during transport, the storage conditions shall be kept as cool as possible without refrigeration (i.e. heat insulated boxes shall be used).

This survey was conducted at the same locations of PM<sub>10</sub> sampling points. These points were equipped with passive diffusion tubes for 40 days. Sampling was conducted for 2 periods at each sampling point for 20 days time. At the end of each 20 days period the sampling tubes were replaced with the new ones. Thus, the survey was completed in 40 days. The laboratory analysis followed that period. All tubes sent to an accredited laboratory named GRADKO (UK) for instrumental analysis of each tube.

#### **6.3.4.2. The Results of NO<sub>x</sub> and SO<sub>2</sub> Survey**

##### ***NO<sub>x</sub> Survey***

Nitrogen oxides, or NO<sub>x</sub>, are the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the nitrogen oxides are colorless and odorless. However, one common pollutant, nitrogen dioxide (NO<sub>2</sub>) along with particles in the air can often be seen as a reddish-brown layer over many urban areas.

Nitrogen oxides are formed when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NO<sub>x</sub> are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. NO<sub>x</sub> can also be formed naturally.

NO<sub>x</sub> causes a wide variety of health and environmental impacts because of various compounds and derivatives in the family of nitrogen oxides, including nitrogen dioxide, nitric acid, nitrous oxide, nitrates, and nitric oxide. Ground-level Ozone (Smog) is formed when NO<sub>x</sub> and volatile organic compounds (VOCs) react in the presence of sunlight. NO<sub>x</sub> and sulfur dioxide react with other substances in the air to form acids which fall to earth as rain, fog, snow or dry particles. NO<sub>x</sub> reacts with ammonia, moisture, and other compounds to form nitric acid and related particles. Increased nitrogen loading in water bodies, particularly coastal estuaries, upsets the chemical balance of nutrients used by aquatic plants and animals. One member of



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the NO<sub>x</sub>, nitrous oxide, is a greenhouse gas. Nitrate particles and nitrogen dioxide can block the transmission of light, reducing visibility in urban areas.

NO and NO<sub>2</sub> were sampled to determine the nitrogen oxides. Measured NO<sub>x</sub> concentrations were listed in Table 10. Short term limit values are the maximum average daily values. Tubes were exposed to ambient air for 20 days in each period.

**Table 10.** Measured NO<sub>x</sub> Concentrations

Date	Location	Order	Concentration (ug/m <sup>3</sup> )		
			NO	NO <sub>2</sub>	NO <sub>x</sub>
17.01.2006-06.02.2006	ERBL 1	1	7,20	15,36	22,55
	ERBL 2	1	<LOD	8,40	8,32
	ERBL 3	1	1,36	9,84	11,20
	ERBL 4	1	4,88	11,12	16,00
06.02.2006-26.02.2006	ERBL 1	2	N/A	17,16	N/A
	ERBL 2	2	28,79	11,06	39,85
	ERBL 3	2	5,20	10,98	16,18
	ERBL 4	2	11,47	11,87	23,34

LOD: Limit of detection (0,216 µg/m<sup>3</sup> for NO)

N/A: Analysis could not be conducted since the green liquid was inside the tube due to the environmental conditions during measurement.

Average concentrations of two periods are listed in the Table 11.

**Table 11.** Averages of two measurements

Location	Concentration (µg/m <sup>3</sup> )		
	NO	NO <sub>2</sub>	NO <sub>x</sub>
ERBL 1	7,20	16,26	22,55
ERBL 2	14,50	19,46	48,17
ERBL 3	3,28	10,41	13,69
ERBL 4	8,18	11,50	19,67

As seen in Table 10 and 11, measured NO, NO<sub>2</sub> and NO<sub>x</sub> concentrations were below the World Bank Classification and USEPA Standards.

### ***SO<sub>2</sub> Survey***

Sulphur dioxide, or SO<sub>2</sub>, belongs to the family of sulphur oxide gases (SO<sub>x</sub>). These gases dissolve easily in water. SO<sub>x</sub> gases are formed when fuel containing sulphur, such as coal and oil, is burned, and when gasoline is extracted from oil, or metals are extracted from ore. SO<sub>2</sub> dissolves in water vapour to form acid, and interacts with other gases and particles in the air to form sulphates and other products that can be harmful to people and their environment.

SO<sub>2</sub> causes a wide variety of health and environmental impacts because of the way it reacts with other substances in the air. Particularly sensitive groups include people with asthma who are active outdoors and children, the elderly, and people with heart or lung disease. Peak levels of SO<sub>2</sub> in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO<sub>2</sub> gas and particles cause respiratory illness and aggravate existing heart disease. SO<sub>2</sub> and nitrogen oxides react with other substances in the air to form acids, which fall to earth as rain, fog, snow, or dry particles. Some may be carried by the wind for hundreds of miles. Acid rain damages forests and crops, changes the makeup of soil, and makes lakes and streams acidic and unsuitable for fish. Continued exposure over a long time changes the natural variety of plants and animals in an ecosystem. SO<sub>2</sub> accelerates the decay of construction materials and paints, including irreplaceable monuments, statues, and sculptures that are part of our nation's cultural heritage.

SO<sub>2</sub> was measured at 4 sampling points around the Project site. The results of the measurements are listed in Table 12.

**Table 12.** Measured SO<sub>2</sub> Concentrations

<b>Date</b>	<b>Location</b>	<b>Order</b>	<b>Concentration (µg/m<sup>3</sup>)</b>
<b>17.01.2006-06.02.2006</b>	<b>ERBL 1</b>	1	2,79
	<b>ERBL 2</b>	1	1,27
	<b>ERBL 3</b>	1	1,01
	<b>ERBL 4</b>	1	15,48
<b>06.02.2006-26.02.2006</b>	<b>ERBL 1</b>	2	3,81
	<b>ERBL 2</b>	2	1,52
	<b>ERBL 3</b>	2	5,33
	<b>ERBL 4</b>	2	1,01

Average concentrations of two periods are listed in the Table 13.

**Table 13.** Averages of two measurements

<b>Location</b>	<b>Concentration (<math>\mu\text{g}/\text{m}^3</math>)</b>
<b>ERBL 1</b>	3,30
<b>ERBL 2</b>	1,40
<b>ERBL 3</b>	3,17
<b>ERBL 4</b>	8,25

As seen in Table 12 and 13, measured  $\text{SO}_2$  concentrations were below the World Bank Classification and USEPA Standards.

#### **6.3.4.3. Discussion of Results**

As seen in Table 10 and 11, measured  $\text{NO}$ ,  $\text{NO}_2$  and  $\text{NO}_x$  concentrations were below the World Bank Classification and, WHO Guidelines, USEPA Standards, and EU Limits.

As seen in Table 12 and 13, measured  $\text{SO}_2$  concentrations were below the World Bank Classification and, WHO Guidelines, USEPA Standards, and EU Limits.

#### **6.3.5. CO SURVEY**

##### **6.3.5.1. Methodology**

Carbon monoxide ( $\text{CO}$ ) is a colourless, odourless, poisonous gas. A product of incomplete burning of hydrocarbon-based fuels, carbon monoxide consists of a carbon atom and an oxygen atom linked together. Carbon monoxide enters the bloodstream through the lungs and forms carboxyhemoglobin, a compound that inhibits the blood's capacity to carry oxygen to organs and tissues. Persons with heart disease are especially sensitive to carbon monoxide poisoning and may experience chest pain if they breathe the gas while exercising. Infants, elderly persons, and individuals with respiratory diseases are also particularly sensitive. Carbon monoxide can affect healthy individuals, impairing exercise capacity, visual perception, manual dexterity, learning functions, and ability to perform complex tasks.

Carbon monoxide results from incomplete combustion of fuel and is emitted directly from vehicle tailpipes. Incomplete combustion is most likely to occur at low air-to-fuel ratios in the engine. These conditions are common during vehicle starting when air supply is restricted ("choked"), when cars are not tuned properly, and at altitude, where "thin" air effectively reduces the amount of oxygen available for combustion (except in cars that are designed or adjusted to compensate for altitude).

Ambient concentrations of  $\text{CO}$  were investigated by use of DRAGER tube sampling methodology. Both tips of the tube are broken in the tube opener, and then tube is

inserted tightly in the pump towards the arrow point. Air sample is sucked through the tube. Entire length of discoloration is read on the tube chart.

#### **6.3.5.2. The Results of CO Survey**

CO was measured at 4 sampling points around the Project site..The CO levels measured as zero with the DRAGER Tubes, the CO levels were below the detection limit of DRAGER Tubes (5 ppm or approximately 5700  $\mu\text{g}/\text{m}^3$ ).

#### **6.4. Landuse and Population Distribution**

The land has high latitudinal parallel mountain ranges and valleys. The population of the three northern Governorates is around 3.5 million, mainly composed of farmers as their livelihood and major source of employment. The farming population resides in thousands of villages scattered all over the mountain areas.

#### **6.5. Soil Characteristics**

The soils in mountain valleys, foothills and adjacent plains were formed by erosion. Several meters of fine textured sediment forming fertile deep soil lie at the top of a bed of gravel. Litho soil, shallow and medium chestnut soil and rendzina soils are dominant from the great soil groups in mountainous areas. Shallow to deep chestnut soils exist in the valleys, whereas the foothills have mainly brown soil. Rolling plains, found at the foot of high mountains are all suitable for large-scale farming. Most of the cultivated land around the project area is rain fed, falling in different micro-climatic zones. The land holding system is a mixture of owner/operator farming, leaseholders and sharecroppers. In the rain fed agriculture the farmers have been ignored and land was controlled by those with power.

#### **6.6. Water Quality and Hydrogeological Characteristics of the Region**

##### **6.6.1.1. Flood Areas**

The on-site studies and the information that were taken from the people living there, show that stream flow rates increase seasonally. Moreover, due to both the precipitation in the winter and spring months and the rapid melting of snow on the mountains, floods happen on the stream beds.

##### **6.6.1.2. General Hydrology**

One of the big rivers of the region is Cham-I Bastora. Its origin is the Pirmum (1887 m) and Safin (1974 m) Mountains at the east. At the origin, the terrain is very steep and rocky and the inclination is very high. But closer to the route of the highway, the inclination of the river bed decreases and after crossing the motorway the river joins Great Zab.

The biggest river is Great Zab and its origin is the Cilo Mountain in Hakkari, Turkey. It has a long river bed. Since no measurements have been made on this river, the flood flow rate as per years is not known. So the river will be crossed with a structure the dimensions of which will be chosen according to the on-site observations and measurements.

Groundwater condition with its occurrence, distribution, and movement is investigated by surface inspection. Subsurface investigation will verify and most probably will confirm that the groundwater studies at this stage are dependable.

### **6.6.1.3. General Physical Characteristics of the Catchment Areas**

The highway route elevations vary between 260-420 m. Generally the land is slightly undulated along the route. It is observed that the precipitation basins are mostly at the east (right) side of the route, but some dry stream basins are at the west (left) side. The vegetation cover is very close to none.

### **6.6.1.4. Hydrologic Studies**

The rivers and streams that cut the route was determined on 1/25000 scaled maps, then, the river and stream beds. Only some ephemeral streams could be detected along the route. For this purpose it was not possible to get water samples and analyze for basic water quality parameters to determine the baseline water quality of the region.

## **6.7. Landscape Characteristics of the Region**

The landscape pattern, tranquillity, cultural assets and land cover types were considered to define landscape characteristics of the region.

The purpose of this section is to assess the existing landscape and visual conditions of the site and its immediate surrounding and accordingly to identify the potential impacts of the proposed project and to determine the possible mitigation measures to minimize the adverse impacts. Also the advantages of the positive impacts were considered regarding the integration of the new project with its landscape.

The requirements within landscape description, landscape impact assessment and visual impact assessment are;

- Prediction of the degree of the potential adverse and positive impacts of the proposed project both during construction and operation stages,
- Development of the mitigation measures for minimizing the adverse impacts while incorporating the positive impacts with project components for improving the

landscape quality of the project area through landscape design and landscape management plans.

- Identification of residual impacts following the introduction of mitigation measures.

**Landscape Characteristic**

**Pattern:** *Landscape pattern*, the typological or morphological landscape features, formed as a result of climate, which defines the basic landscape features. These features are recognized in land use, vegetative cover and relief, which shape the basic morphological foundation with water for landscape structure. Land use or vegetative cover, which is the synthesis of climate and relief, reveals the disintegration of traditional landscape patterns.

Within the framework of that definition, the landscape pattern of the project area is defined by agricultural fields and crops with rural settlements within a steppe landscape.

**Tranquility:** Table 14 shows the approximate distance of the settlements to the closest site of the project area. Although the settlements seem to be close to the project area, due to the topographical screening, the project area is not visible from most of these settlements.

**Table 14.** The settlements at the surrounding of the project area

<b>Settlement</b>	<b>Distance* (meters)</b>
Erbil	4600
Gradash Ashad	20
Qarachnagha	500
Murtka Ali	350
Qushtapa	200
Tall Fawah	2200
Sherava Gaura	400
Seh Nala	1800
Imarawah	1250
Sch Kuchun	50
Maxh Shuma	950

*\*The closest approximate distance from settlement centers to the highway*

**Cultural:** There is no recorded cultural asset within the project area.

**Landcover:** The land cover type of the area is agricultural field at the flat plains and shrub cover over the hills.

**6.8. Cultural Heritage**

In order to determine the archaeological sensitivity of the area and minimize the impact of the Project on the possible archaeological and cultural assets it is

suggested to conduct a Cultural Heritage Survey along the highway route right before the construction activity will start.

The information and available archaeological data related to the region was determined through literature surveys. There was no significant information obtained from this study since there was no previously conducted specific archeological study. Nevertheless during the site visits conducted to the area it was determined that there was a mound at Quashtepe and there is a historical graveyard at around KP: 31+000 of the Erbil-Altunkopri Highway Project.

## **6.9. Ecology**

### **6.9.1. Flora**

According to the phytogeographical regions the area is in the borders of Irano-Turanien region of Tettis sub-kingdom of Holarctic Kingdom and connected to the Mesopotamian province of west Asian sub-region.

Mesopotamia is at the center of civilizations but also suffers from this property through time. Between 8000-7000 B.C., it is known that people got out of the caves and lived in cabins and tents like villages.

At that time, people learned to use seeds and fruits of plants, gathering especially cereals besides to store them in granaries to consume in winter or in general scarcity of food.

At 7000-6500 B.C., they saw that stored plants grow and so they learned to cultivate plants and agriculture. Settlement and civilization started at that period. Before this period, people did hunting and fishing besides the steeling by snatching and wandering.

People cultivated plants where they like till the area lost its productivity, and also destroy the forests around the area then they migrate to another place.

After the settlement of villages at Mesopotamia in 6500-5000 B.C. pottery was discovered and spreaded to near east and Anatolia in 500 years.

There were huge progresses in mining between 5000-4000 B.C. and in architecture and fine arts between 4000-3000 B.C. During these civilizations and development of different cultures vegetation was destroyed.

Because not only the demand for timber for buldings but also demand for wood to fire ceramics and work of art, to process copper, bronze, iron and valuable mines increased.

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In archaic ages thorough the getting out of the caves and settling people domesticated the animals around. Domestication of wild animal started with probably by the domestication of dog for hunting at 10000 B.C. and goat for getting milk at 7000 B.C. After that, sheep which needs more feed and has mountain origin, was domesticated for wool and milk at 6000 B.C. But at agricultural areas goat left its place to sheep which has high productivity. And sheep became a poor public animal at developing civilization. After that with the development of civilization cow was domesticated at 500 B.C.

Destruction of vegetation with grazing in Mesopotamia started in very old times and continues today.

As a result of these big changes, the area is covered with agricultural areas, where the dry farming can be done and having similar conditions as drought as deserts, and steppe which lost its floristic structure.

Both sides of the construction route of the Erbil-Altunkopri Highway Project influenced from this historical processes and today nearly all of the area is used for agricultural purposes and also increase in settlement and biotic pressure, the floristic composition destroyed and displaced by a floristic composition of agro-ecosystems. The Flora of the Erbil-Altunkopri Highway is tabulated in Table 15.

**Table 15.** Flora of the Erbil Highway (End: Endemic)

Family	Species	English names	Phytogeographic region	End	IUCN
Pteridophyta					
Equisetaceae	<i>Equisetum ramosissimum</i>	Horse tail	Wide spread		
<b>Spermatophyta</b>					
<b>Gymnospermae</b>					
Pinaceae	<i>Cedrus libani</i>	Cedar	Wide spread		
<b>Angiospermae</b>					
Acanthaceae	<i>Acanthus dioscoridis</i>	Acanthus	Irano-Turanian		
Apiaceae	<i>Astrodaucus orientalis</i>	Wild Carrot	Irano-Turanian		
Apiaceae	<i>Laser trilobum</i>	Laser	Wide spread		
Apiaceae	<i>Scandix pectin</i>	Venus Comb	Wide spread		
Apiaceae	<i>Seseli libanotis</i>		Wide spread		
Apiaceae	<i>Torilis leptophylla</i>	Torilis	Wide spread		
Apiaceae	<i>Zosimia absinthifolia</i>	Zosima	Wide spread		
Asteraceae	<i>Achillea biebersteinii</i>	Milfoil	Irano-Turanian		
Asteraceae	<i>Calendula arvensis</i>	Calendula	Wide Spread		
Asteraceae	<i>Chardinia orientalis</i>	Chardinia	Wide spread		
Asteraceae	<i>Echinops ritro</i>	Echinops	Irano-Turanian		
Asteraceae	<i>Eupatorium cannabinum</i>	Eupotarium	Euro-Siberian		



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Family	Species	English names	Phytogeographic region	End	IUCN
Asteraceae	<i>Filago pyramidata</i>	Filago	Wide spread		
Asteraceae	<i>Logfia arvensis</i>	Logfia	Wide spread		
Asteraceae	<i>Onopordum carduchorum</i>	Onoporum	Wide spread		
Asteraceae	<i>Taraxacum kurdiciforme</i>	Taraxacum	Wide spread		
Asteraceae	<i>Tragopogon longirostris</i>	Tragopogon	Wide spread		
Asteraceae	<i>Tussilago farfara</i>	Cough-Wort	Euro-Siberian.		
Asteraceae	<i>Xanthium spinosum</i>	Xanthium	Wide spread		
Asteraceae	<i>Xeranthemum annuum</i>	Immortell	Wide spread		
Berberidaceae	<i>Berberis sp.</i>	Barberry	Wide spread		
Boraginaceae	<i>Anchusa aucheri</i>	Alkanet	Wide spread		
Boraginaceae	<i>Cerinthe minor</i>	Horewort	Wide spread		
Boraginaceae	<i>Echium italicum</i>	Viper Bugloss	Mediterranean		
Brassicaceae	<i>Barbarea minor</i>	Winter Cress	Wide spread		
Brassicaceae	<i>Capsella bursa-pastoris</i>	Mother's heart	Wide spread		
Brassicaceae	<i>Fibigia eriocarpa</i>	Fibigia	Wide spread		
Brassicaceae	<i>Lepidium ruderales</i>	Cress	Wide spread		
Brassicaceae	<i>Thlaspi perfoliatum</i>	Thlaspi	Wide spread		
Caryophyllaceae	<i>Cerastium cerastoides</i>	Mouse-Weed	Wide spread		
Caryophyllaceae	<i>Silene compacta</i>	Catshfly	Wide spread		
Caryophyllaceae	<i>Silene italica</i>	Catshfly	Wide spread		
Caryophyllaceae	<i>Velezia rigida</i>	Velezia	Wide spread		
Chenopodiaceae	<i>Chenopodium foliosum</i>	Wild spinach	Wide spread		
Convolvulaceae	<i>Convolvulus lineatus</i>	Bindweed	Wide spread		
Crassulaceae	<i>Sedum album</i>	Stonecrop	Wide spread		
Datisceae	<i>Datisca cannabina</i>	False Hemp	Wide spread		
Dipsacaceae	<i>Scabiosa rotata</i>	Scabious	Irano-Turanian		
Euphorbiaceae	<i>Euphorbia sp.</i>	Spurge	Wide spread		
Fabaceae	<i>Cercis siliquastrum</i>	Judastree	Mediterranean		
Fabaceae	<i>Dorycnium sp.</i>	Dorycnium	Wide spread		
Fabaceae	<i>Lathyrus annuus</i>	Vetchling	Wide spread		
Fabaceae	<i>Lens orientalis</i>	Lentil	Wide spread		
Fabaceae	<i>Lotus corniculatus</i>	Bird's-foot	Wide spread		
Fabaceae	<i>Medicago sativa</i>	Alfalfa	Wide spread		
Fabaceae	<i>Robinia pseudoacacia</i>	False Acacia	Wide spread		
Fabaceae	<i>Trifolium arvense</i>	Clover	Wide spread		
Geraniaceae	<i>Pelargonium endlicherianum</i>	Pelargos	Wide spread		
Juglandaceae	<i>Juglans regia</i>	Walnut tree	Wide spread		
Lamiaceae	<i>Mentha longifolia</i>	Mint	Wide spread		
Lamiaceae	<i>Salvia palaestina</i>	Sage	Wide spread		
Lamiaceae	<i>Salvia sclarea</i>	Sage	Mediterranean		
Lamiaceae	<i>Stachys annua</i>	Woundwort	Wide spread		

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Family	Species	English names	Phytogeographic region	End	IUCN
Malvaceae	<i>Alcea digitata</i>	Alcea	Irano-Turanian		
Meliaceae	<i>Melia azederach</i>	Melia	Wide spread		
Moraceae	<i>Morus alba</i>	White mulberry	Wide spread		
Papaveraceae	<i>Papaver rhoeas</i>	Poppy	Wide spread		
Plantaginaceae	<i>Plantago major</i>	Waybread	Wide spread		
Polygonaceae	<i>Rumex acetosella</i>	Herb Patiense	Wide spread		
Polygonaceae	<i>Atraphaxis spinosa</i>	Atraphaxis	Wide spread		
Punicaceae	<i>Punica granatum</i>	Pomegranate	Wide spread		
Ranunculaceae	<i>Adonis aleppica</i>	Adonis	Wide spread		
Ranunculaceae	<i>Clematis orientalis</i>	Clematis	Wide spread		
Ranunculaceae	<i>Delphinium orientalis</i>	Larkspur	Wide spread		
Ranunculaceae	<i>Ranunculus repens</i>	Crowflowers	Wide spread		
Resedaceae	<i>Reseda lutea</i>	Mignonette	Wide spread		
Rhamnaceae	<i>Paliurus spina-christi</i>	Blackscrub	Wide spread		
Rosaceae	<i>Amygdalus arabica</i>	Amygdalus	Wide spread		
Rosaceae	<i>Sanguisorba minor</i>	Sanguisorba	Wide spread		
Rubiaceae	<i>Cruciata taurica</i>	Cruciata	Irano-Turanian		
Salicaceae	<i>Populus nigra</i>	Black Poplar	Wide spread		
Salicaceae	<i>Salix alba</i>	White willow	Euro-Siberian		
Scrophulariaceae	<i>Linaria chalepensis</i>	Toad-flex	Wide spread		
Scrophulariaceae	<i>Scrophularia mesopotamica</i>	Betony	Wide spread		
Scrophulariaceae	<i>Veronica anagallis</i>	Speedwell	Wide spread		
Solanaceae	<i>Hyocyamus sp.</i>	Hyocyamus	Wide spread		
Solanaceae	<i>Nicotiana tabacum</i>	Tobacco plant	Wide spread		
Tamaricaceae	<i>Tamarix sp.</i>	Manna Plant	Wide spread		
Urticaceae	<i>Parietaria judaica</i>	Lich-Worth	Wide spread		
Urticaceae	<i>Urtica dioica</i>	Nettle	Wide spread		
Zygophyllaceae	<i>Peganum harmala</i>	Harmel	Wide spread		
Monocotyledones					
Cyperaceae	<i>Carex nigra</i>	Blue-grass	Wide spread		
Juncaceae	<i>Juncus inflexus</i>	Rush	Wide spread		
Liliaceae	<i>Allium rotundum</i>	Onion	Wide spread		
Liliaceae	<i>Asparagus palaestinum</i>	Asparagus	Wide spread		
Liliaceae	<i>Muscari sp.</i>	Grape hyacinth			
Liliaceae	<i>Ornithogalum sp.</i>	Star Bethlehem	Irano-Turanian		
Poaceae	<i>Aegilops umbellulata</i>	Grass	Irano-Turanian		
Poaceae	<i>Agropyron panormitanum</i>	Wheat Grass	Wide spread		
Poaceae	<i>Agrostis stolonifera</i>	Bent Grass	Wide spread		
Poaceae	<i>Alopecurus arundinaceus</i>	Foxtail Grass	Euro-Siberian		
Poaceae	<i>Arrhenatherum palaestinum</i>	Oatgrass	Wide spread		
Poaceae	<i>Briza media</i>	Pearlgrass	Wide spread		

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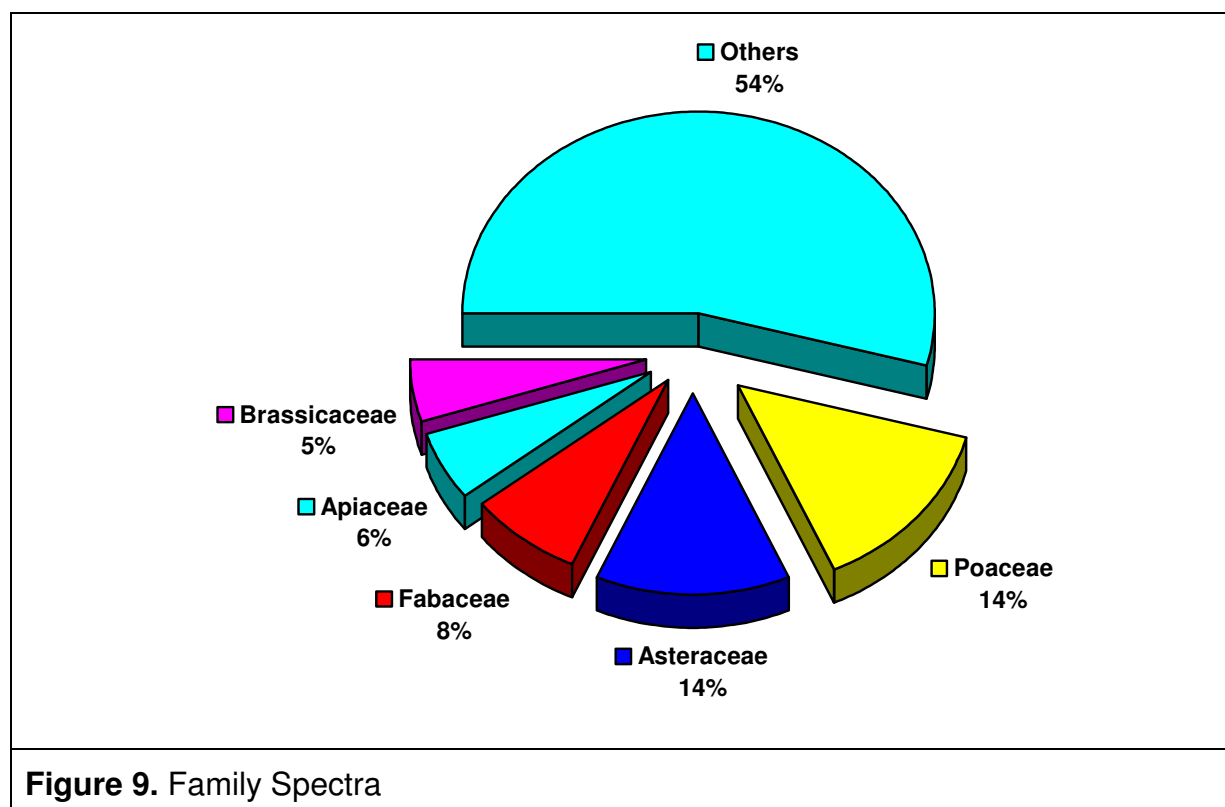
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Family	Species	English names	Phytogeographic region	End	IUCN
Poaceae	<i>Bromus sterilis</i>	Brom			
Poaceae	<i>Cynodon dactylon</i>	Bermuda-Grass	Wide spread		
Poaceae	<i>Dactylis glomerata</i>	Grass	Wide spread		
Poaceae	<i>Hordeum bulbosum</i>	Barley	Wide spread		
Poaceae	<i>Pennisetum orientale</i>	Penisetum	Irano-Turanian		
Poaceae	<i>Phragmites australis</i>	Commen Reed	Wide spread		
Poaceae	<i>Poa pratensis</i>	Grass	Wide spread		
Poaceae	<i>Stipa kurdistanica</i>	Grass	Wide spread		
Palmae	<i>Phoenix spp.</i>	Sate palm	Wide spread		

There are 105 taxa, 1 Pterydophyta and 1 Gymnospermae, were determined from highway and its environ, all these taxa belong to 40 families. The richest families according to the number of taxa are; *Poaceae* 15, *Asteraceae* 13, *Fabaceae* 8, *Apiaceae* 6, *Brassicaceae* 5.

Distribution of plant specimens according to the families is given in Figure 9.

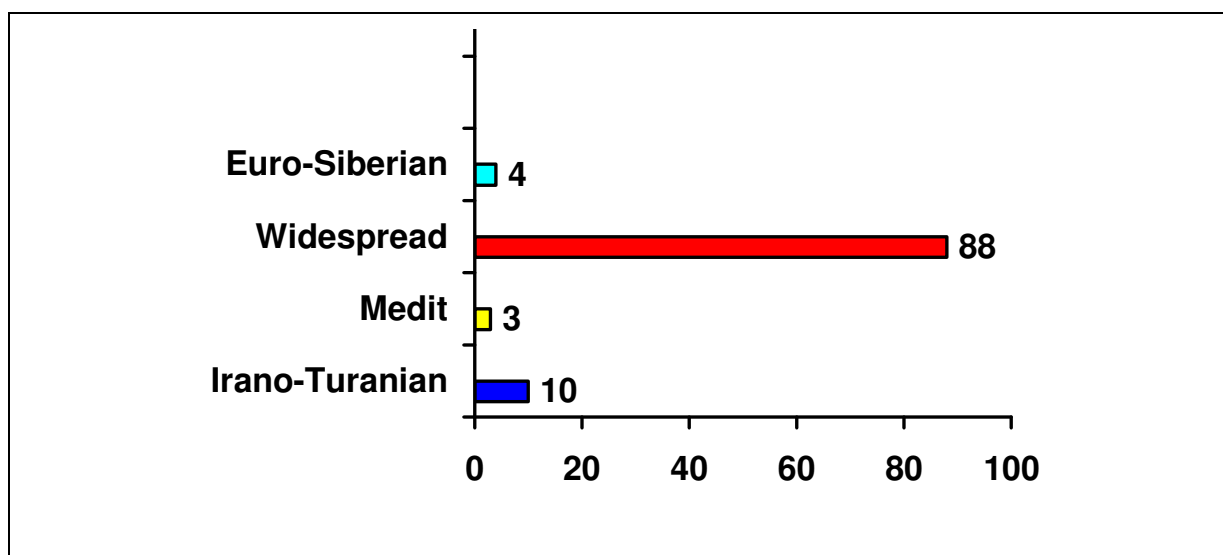


Distribution of species according to the phytogeographical regions shows that the area is under the influence of biotic factors.

88 species out of determined 105 species are widespread having high ecological tolerance. The phytogeographical distribution of these species are listed in Table 16 and shown in Figure 10.

**Table 16.** Phytogeographic distribution of species

<b>Phytogeographic Region</b>	<b>Number of Taxa</b>
Irano-Turanian	10
Mediterranean	3
Europa-Siberian	4
Endemic	-
Wide spread	88
<b>Total</b>	<b>105</b>



**Figure 10.** Spectra of the Phytogeographic Region

The area is under the influence of summer drought and this situation characterizes a vegetation type, known as step, where the cushion forming chamephytes and annual or perennial Gramineae are dominant.

Today almost all the area is covered by agricultural or residential areas. As a result of these a floristic composition of segetal associations grow in agricultural areas and plants known as ruderals grow on highwaysides and debris is dominant.

There is no any species belongs to the IUCN threat categories.

### **6.9.2. Fauna**

This report covers habitat descriptions and the brief list of vertebrate animals, impact assessment on the vertebrate fauna. Maintaining biodiversity through protection and

sustainable use of resources is both a responsibility and a necessity for any country. The inventory of fauna in Iraq is far from the certainty as well as other Arabic countries. In general Iraq can be divided three ecological regions which are important for distribution of vertebrate animals;

- Eastern part of Arabian plateau which forms the deserts of west and south,
- The valleys of Euphrates and Tigris which are located between Arabian – Iranian plateaus and the slopes from the highland of South-Eastern Turkey,
- The arc of the Zagros Mountains through which Turkish and Iranian borders run.

The highway construction between Altunkopri and Erbil is in the valleys of Euphrates and Tigris, and is located at the east of river Tigris and south of river Zapsuyu. In this area, the main type of habitat is arid steppes which are approximately at an altitude of 500–600 m. The climate of this area is characterized by a hot dry summer and a cool rainy winter; semi-arid, cold type Mediterranean climate. Under this climatic condition, the area is mostly occupied by a specific animal species being called the eremial fauna, and there is no aquatic ecosystem along the highway except for the starting point at Altunkopri. The vertebrate fauna is composed of six main classes;

- Osteichthyes- bony fishes
- Condriichthyes- cartilaginous fishes
- Amphibia- frog, toad and salamanders
- Reptilia- tortoise, lizards and snakes
- Aves- birds
- Mammalia- mammals,

In this frame, the highway construction has no specific importance on the aquatic fauna. There is only one river neighboring to the starting point of the construction; River Zapsuyu with very small branches. The steppe ecosystem in the line of Altunkopri and Erbil shelters the terrestrial fauna: Amphibia, Reptilia, Aves and Mammalia. Of these classes, first two are cold-blood animals and are usually active between spring and fall. During the winter period the activation of amphibian and reptilian species are almost absent or very rare. This area is also on the route of migratory birds. In this respect the river slopes is important for migratory birds which temporarily inhabits in the aquatic ecosystem. However there is no aquatic ecosystem which is adversely affected by the highway construction. Up to now IUCN categories are uncertain or unknown for the fauna of Iraq as well as many other countries. So the categories can not be applied to vertebrate fauna of Iraq since the population statuses of vertebrate animal are unclear. Even it is so, IUCN categories

are known for the certain species in Europe and Middle East. These species also exist in Iraq. That is why, IUCN categories which are listed in this report for vertebrate species of Northern Iraq generally belong to European and Middle East fauna. Abbreviations and explanations of IUCN categories are as follows;

**EXTINCT (EX):** A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

**EXTINCT IN THE WILD (EW):** A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

**CRITICALLY ENDANGERED (CR):** A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

**ENDANGERED (EN):** A taxon is endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

**VULNERABLE (VU):** A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

**NEAR THREATENED (NT):** A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

**LEAST CONCERN (LC):** A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

**DATA DEFICIENT (DD):** A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on

its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

**NOT EVALUATED (NE):** A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

#### **6.9.2.1. Assessment of Amphibian Fauna**

The steppe ecosystem is usually poor for Amphibian species, but the relative abundance of the certain species might be high from time to time. The species occupies in the terrestrial ecosystem, and is mostly nocturnal (night time active). These species are one of the main foods of some birds (waterfowl) and small carnivorous mammals (marten and fox). Only a few toad species live in the steppe habitat. Although the highway construction area covers the terrestrial ecosystem, frogs and salamanders which are not included to Table 17 may be very occasionally found in the route of Altınköprü–Erbil. In this case, these animals need to be handled carefully. The highway construction is expected to not to be adversely affect the toad population.

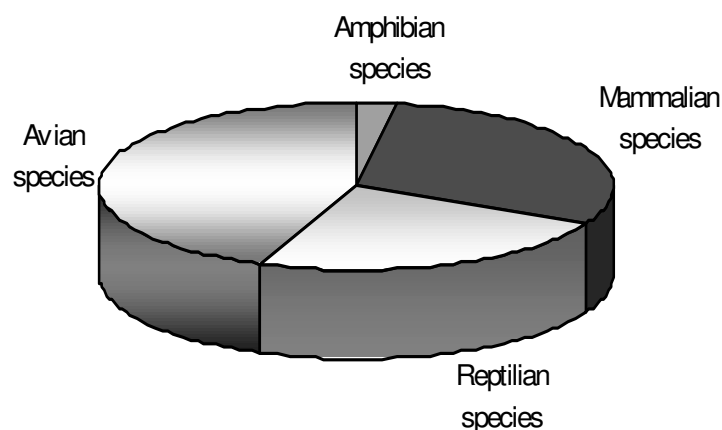
**Table 17.** Species list of classis Amphibia

Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Pelobates syriacus</i>	Syrian Spadefoot	Anura	Nocturnal-Laying and feeding in steppe	LC
<i>Bufo bufo</i>	Common Toad	Anura	Nocturnal-Laying and feeding in steppe	LC
<i>Bufo viridis</i>	Green Toad	Anura	Nocturnal-Laying and feeding in steppe	LC

#### **6.9.2.2. Assessment of Reptilian Fauna**

Classis Reptilia includes turtles ([Testudines](#)), snakes and lizards ([Lepidosauria](#)), crocodiles and their relatives ([Crocodilia](#)). Reptiles are amniote vertebrate and their eggs are protected from desiccation and other environmental problems by an extra membrane. That is way members of this classis are highly adapted to the semi-arid environments. In the route Altunkopri–Erbil, many reptile species can be occasionally seen in the steppe habitat but some of them permanently occupy in this type of

habitat and can be frequently seen around. In general arid ecosystem such as in the route of Altunkopri–Erbil is rich for reptilian species. However reptile are cold–blooded animals (poikilotherm) and do not show activation during winter period. Reptile play critical role in the ecosystem, they eat invertebrate species and some harmful rodents, and controls their population density. They are also primer foods of raptors and carnivorous mammals. The route between Altunkopri and Erbil almost covers 37 reptilian species; 4 turtles, 14 lizards and 19 snake species (Table 18) (Figure 11). It is also impossible to see all of these species at the same time. They are mobile vertebrate and can be randomly seen any time of the suitable season. It is though that the highway construction will not destroy the majority of steppe habitat around and will not cause habitat fragmentation. In this respect, highway construction does not adversely affect the reptilian population around. However, the highway workers should be informed about reptile incase they randomly encounter these animals. They should also be warned that some snake species is venomous. Apart from this the most important member of reptilian fauna is *Rafetus euphraticus* (Euphrates turtle) (Figure 12), and this species only lives in the river Euphrates and Tigris and their branches. This turtle is listed as EN according to IUCN criteria. Since the starting point of highway construction will not reach to River Zab, it is not necessary to take some mitigation measures for *Rafetus euphraticus*.



**Figure 11.** Distribution of Vertebrate classes (Amphibian 2 %, Reptilian 24 %, Avian 44 % and Mammals 30 %)





**Figure 12.** Rafetus euphraticus (Euphrates turtle)

**Table 18.** Species list of classis Reptilia

Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Testudo graeca</i>	Spur- thighed tortoise	Chelonia	Laying and feeding in steppe	VU
<i>Mauremys caspica</i>	Caspian turtle	Chelonia	Laying and feeding in river side	DD
<i>Emys orbicularis</i>	European pond turtle	Chelonia	Laying and feeding in river side	LR/nt
<i>Rafetus euphraticus</i>	Euphrates soft shell turtle	Chelonia	Laying and feeding in river side	EN
<i>Laudakia stellio</i>	Starred agama	Squamata	Laying and feeding in rocky steppe	DD
<i>Agama ruderala</i>	Azerbaijan agama	Squamata	Laying and feeding in steppe	DD
<i>Blanus strauchi</i>	Worm lizard	Squamata	Laying and feeding in steppe	DD
<i>Cyrtopodion heterocercus</i>	Mardin gecko	Squamata	Laying and feeding in rocky steppe	DD
<i>Asaccus elisae</i>	Asaccus gecko	Squamata	Laying and feeding in rocky steppe	DD
<i>Cyrtopodion scaber</i>	Scaber's gecko	Squamata	Laying and feeding in rocky steppe	DD
<i>Cyrtopodion kotschy</i>	Kotschy's gecko	Squamata	Laying and feeding in rocky steppe	DD
<i>Hemidactylus turcicus</i>	Turkish gecko	Squamata	Laying and feeding in rural building	DD
<i>Stenodactylus grandiceps</i>	Gecko	Squamata	Laying and feeding in rocky steppe	DD
<i>Meselina brevirostris</i>	Short-nosed desert snake	Squamata	Laying and feeding in rocky steppe	DD
<i>Eumeces schneideri</i>	Schneider's skink	Squamata	Laying and feeding in rocky steppe	DD
<i>Lacerta princeps</i>	Zagros lacertid	Squamata	Laying and feeding in steppe	DD
<i>Chalcides ocellatus</i>	Ocellated skink	Squamata	Laying and feeding in steppe	DD
<i>Ophisops elegans</i>	Snake-eyed lacertid	Squamata	Laying and feeding in steppe	DD
<i>Eryx jaculus</i>	Javelin sand boa	Squamata	Laying and feeding in steppe	DD
<i>Coluber najadum</i>	Dahl's whip snake	Squamata	Laying and feeding in steppe	DD

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Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Coluber jugularis</i>	Black whip snake	Squamata	Laying and feeding in steppe	DD
<i>Coluber ravergieri</i>	Ravergier's whip snake	Squamata	Laying and feeding in steppe	DD
<i>Coluber nummifer</i>	Coin snake	Squamata	Laying and feeding in steppe	DD
<i>Coluber schmidtii</i>	Schmidt's whip snake	Squamata	Laying and feeding in steppe	DD
<i>Coluber collaris</i>	Collared dwarf racer	Squamata	Laying and feeding in steppe	DD
<i>Coluber ventromaculatus</i>	Glossy-bellied racer	Squamata	Laying and feeding in steppe	DD
<i>Eirenis coronella</i>	Crowned dwarf racer	Squamata	Laying and feeding in steppe	DD
<i>Eirenis collaris</i>	Collared dwarf racer	Squamata	Laying and feeding in steppe	DD
<i>Eirenis lineomaculatus</i>	Dwarf snake	Squamata	Laying and feeding in steppe	DD
<i>Eirenis puntatolineatus</i>		Squamata	Laying and feeding in steppe	DD
<i>Eirenis modestus</i>	Asia Minor Dwarf racer	Squamata	Laying and feeding in steppe	DD
<i>Pseudocyclophis persicus</i>	Dwarf racer	Squamata	Laying and feeding in steppe	DD
<i>Spalerosophis diadema</i>	Diadem snake	Squamata	Laying and feeding in steppe	DD
<i>Rhynchocalamus melanocephalusus</i>	Palestine Kukri snake	Squamata	Laying and feeding in steppe	DD
<i>Telescopus fallax</i>	European cat snake	Squamata	Laying and feeding in steppe	DD
<i>Leptotyphlops macrorhynchus</i>	Slender blind snake	Squamata	Laying and feeding in steppe	DD
<i>Macrovipera lebetina</i>	Blunt-nosed viper	Squamata	Laying and feeding in steppe	DD
<i>Vipera raddei</i>	Armenian viper	Squamata	Laying and feeding in steppe	DD

### 6.9.2.3. Assessment of Avian Fauna

Birds are warm-blooded vertebrates and have unique ability to fly. They occupy certain habitats and have certain characteristic behaviors. Birds are also principle component of food-chain and play role in habitat as a prey and predator interacting with other birds, food sources, predators, and other plants and animals which share their habitat. Another unique peculiarity of birds is their breeding at a certain location and then spending its non-breeding season on the certain migration route; such a bird is called migratory bird, other is known as resident birds. In this respect, the steppe habitat such as the route of Altunkopri–Erbil covers both migratory and resident birds. Migratory birds can be divided into two groups such as summer migratory and winter migratory. Bird fauna of the environs of highway construction were evaluated under the above stated principle.

During the brief studies conducted, bird fauna represented with 54 species belonging to 12 orders as follows: Ciconiformes, Accipitiformes, Falconiformes, Guiliformes Charadriiformes, Columbiformes, Cuculiformes, Strigiformes, Caprimugiliformes, Coraciiformes, Piciformes, and Passeriformes (Table 19). The biggest one in these

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orders is Passeriformes with 33 bird species. Bird fauna also cover the 44 % of total vertebrate species around Altunkopri–Erbil highway. The resident birds have special importance among these bird species, most of them use the steppe habitat for nesting, and the laying occurs during spring and summer months. Also migrant breeding comes to this area after winter period is over. The small rocky hills around have also importance for raptor species. In general, there is no endemic bird around, and the affect of highway construction is minor to bird fauna. However it is necessary to prevent excessive noise and dust formations. Apart from this, the natural steppes and rocky hills around should not be destroyed during the highway construction.

**Table 19.** Species list of classis Aves

Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Ciconia ciconia</i>	White stork	Ciconiiformes	Migrant breeding	LC
<i>Milvus migrans</i>	Black kite	Accipitriformes	Winter visitor	LC
<i>Buteo rufinus</i>	Long-legged buzzard	Accipitriformes	Resident breeding	LC
<i>Falco tinnunculus</i>	Kestrel	Falconiformes	Resident breeding	LC
<i>Alectoris chukar</i>	Chukar	Galliformes	Resident breeding	LC
<i>Coturnix coturnix</i>	Quail	Galliformes	Migrant breeding	LC
<i>Burchinus oediconemus</i>	Stone curlew	Charadriiformes	Migrant breeding	LC
<i>Columba livia</i>	Rock dove	Columbiformes	Resident breeding	LC
<i>Columba palumbus</i>	Woodpigeon	Columbiformes	Resident breeding	LC
<i>Streptopelia decaocto</i>	Collared dove	Columbiformes	Resident breeding	LC
<i>Streptopelia turtur</i>	Turtle dove	Columbiformes	Resident breeding	LC
<i>Clamator glandarius</i>	Great spotted cuckoo	Cuculiformes	Migrant breeding	LC
<i>Cuculus canorus</i>	Cuckoo	Cuculiformes	Migrant breeding	LC
<i>Bubo bubo</i>	Eagle owl	Strigiformes	Resident breeding	LC
<i>Athene noctua</i>	Little owl	Strigiformes	Resident breeding	LC
<i>Caprimulgus europaeus</i>	Nightjar	Caprimulgiformes	Migrant breeding	LC
<i>Merops apiaster</i>	Bee-eater	Coraciiformes	Migrant breeding	LC
<i>Coracias garrulus</i>	Roller	Coraciiformes	Migrant breeding	LC
<i>Upupa epops</i>	Hoopoe	Coraciiformes	Migrant breeding	LC
<i>Picus viridis</i>	Green woodpecker	Piciformes	Resident breeding	LC
<i>Dendrocopos syriacus</i>	Syrian woodpecker	Piciformes	Resident breeding	LC
<i>Ammomanes deserti</i>	Desert lark	Passeriformes	Resident breeding	LC
<i>Calandrella rufescens</i>	Lesser short-toed lark	Passeriformes	Winter visitor	LC
<i>Calandrella cristata</i>	Crested lark	Passeriformes	Resident breeding	LC

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Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Lullula arborea</i>	Woodlark	Passeriformes	Migrant breeding	LC
<i>Hirundo rupestris</i>	Crag martin	Passeriformes	Migrant breeding	LC
<i>Hirundo daurica</i>	Red-rumped swallow	Passeriformes	Migrant breeding	LC
<i>Delichon urbica</i>	House martin	Passeriformes	Migrant breeding	LC
<i>Motacilla cinerea</i>	Grey wagtail	Passeriformes	Migrant breeding	LC
<i>Motacilla alba</i>	White wagtail	Passeriformes	Winter visitor	LC
<i>Cinclus cinclus</i>	Dipper	Passeriformes	Resident breeding	LC
<i>Troglodytes troglodytes</i>	Wren	Passeriformes	Winter distribution	LC
<i>Prunella modularis</i>	Dunnock	Passeriformes	Winter distribution	LC
<i>Prunella collaris</i>	Alpine accentor	Passeriformes	Resident breeding	LC
<i>Cercotrichas galactotes</i>	Rufous bush robin	Passeriformes	Migrant breeding	LC
<i>Erithacus rubecula</i>	Robin	Passeriformes	Winter visitor	LC
<i>Phoenicurus achrurus</i>	Black redstart	Passeriformes	Migrant breeding	LC
<i>Phoenicurus phoenicurus</i>	Redstart	Passeriformes	Migrant breeding	LC
<i>Oenanthe hispanica</i>	Black-eared wheatear	Passeriformes	Migrant breeding	LC
<i>Oenanthe fischii</i>	Finsch's wheatear	Passeriformes	Winter visitor	LC
<i>Monticola saxatilis</i>	Rock thrush	Passeriformes	Migrant breeding	LC
<i>Monticola solitarius</i>	Blue rock thrush	Passeriformes	Migrant breeding	LC
<i>Turdus merula</i>	Blackbird	Passeriformes	Resident breeding	LC
<i>Turdus viscivorus</i>	Mistle thrush	Passeriformes	Resident breeding	LC
<i>Hippolais pallida</i>	Olivaceous warbler	Passeriformes	Migrant breeding	LC
<i>Remiz pendulinus</i>	Penduline tit	Passeriformes	Winter visitor	LC
<i>Pica pica</i>	Magpie	Passeriformes	Resident breeding	LC
<i>Corvus monedula</i>	Jackdaw	Passeriformes	Winter visitor	LC
<i>Corvus corone</i>	Hooded crow	Passeriformes	Resident breeding	LC
<i>Sturnus vulgaris</i>	Starling	Passeriformes	Winter visitor	LC
<i>Passer domesticus</i>	House sparrow	Passeriformes	Resident breeding	LC
<i>Passer hispaniolensis</i>	Spanish sparrow	Passeriformes	Winter visitor	LC
<i>Emberiza melanocephala</i>	Black-headed bunting	Passeriformes	Migrant breeding	LC
<i>Miliaria calandra</i>	Corn bunting	Passeriformes	Resident breeding	LC

## 6.9.2.4. Assessment of Mammalian Fauna

Mammals are vertebrate animals with hair, they are warm-blooded, and nurse their young with milk. Mammals that live in Middle East are placental mammals. These are

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advanced mammals whose young are born at a relatively advanced stage. Before birth, the young are nourished through a placenta. The placenta is a specialized embryonic organ that is attached to the mother's uterus and delivers oxygen and nutrients to the young. The feeding habit of mammals show great varieties; Herbivores (plant eaters), Carnivores (meat eaters), Omnivores (eat plants and meat) and Insectivores (eat insects). They also occupy every kind of habitats; they live in polar region, desert, water etc. It is possible to live approximately 27 mammalian species belong to five different orders around the route of Altunkopri–Erbil (Table 20) (Figure 11). The mammalian fauna covers 30 % of total vertebrate species listed in Table 20. These mammals prefer steppe habitat to live, and only rodent, hedgehog and hare use this habitat for nesting, other species such as bat and carnivores randomly visit the construction area for seeking the food. The biggest one among Mammalian order is Chiroptera and Rodentia. Members of Chiroptera do not use the highway construction area for roosting. They need to roost old construction, castle, caves or rock crevices. Rodent species usually burrow the natural steppe and the edge of grain field around the highway construction. However rodent population in the steppe is under the control of predator animals such as snakes, raptors and carnivores. In general the highway construction does not cause habitat fragmentation and population decline of mammalian species. Thus it can be concluded that the impact of highway project has a minor affect on the terrestrial mammals in this steppe ecosystem.

**Table 20.** Species list of classis Mammals

Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Erinaceus concolor</i>	East European hedgehog	Insectivora	Nesting and feeding	DD
<i>Hemiechinus auritus</i>	Long-eared hedgehog	Insectivora	Nesting and feeding	DD
<i>Rhinopoma muscatellum</i>	Muscat Mouse-tailed bat	Chiroptera	Prefers the crevice around	DD
<i>Rhinolophus ferrumequinum</i>	Greater Horseshoe bat	Chiroptera	Prefers the crevice around	LR
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe bat	Chiroptera	Prefers the crevice around	DD
<i>Rhinolophus euryale</i>	Mediterranean Horseshoe bat	Chiroptera	Prefers the crevice around	VU
<i>Myotis blythii</i>	Lesser Mouse-eared bat	Chiroptera	Prefers the crevice around	DD
<i>Myotis emarginatus</i>	Geffroy's bat	Chiroptera	Prefers the crevice around	DD
<i>Myotis nattereri</i>	Natterer's bat	Chiroptera	Prefers the crevice around	DD
<i>Eptesicus bottae</i>	Botta's Serotine bat	Chiroptera	Prefers the crevice around	DD
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	Chiroptera	Prefers rural facilities	DD
<i>Pipistrellus kuhlii</i>	Kuhl's Pipistrelle	Chiroptera	Prefers rural facilities	DD

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Scientific name	English name	Order	Eco-biological notes	IUCN criteria
<i>Pipistrellus savii</i>	Savi's Pipistrelle	Chiroptera	Prefers rural facilities	DD
<i>Miniopterus schreibersii</i>	Schreiber's bat	Chiroptera	Prefers the caves	DD
<i>Canis aureus</i>	Asiatic Jackal	Carnivora	Nesting and feeding in steppe	DD
<i>Vulpes vulpes</i>	Red Fox	Carnivora	Nesting and feeding in steppe	DD
<i>Vormela peregusna</i>	Marbled Polecat	Carnivora	Nesting and feeding in steppe	DD
<i>Mustela nivalis</i>	Weasel	Carnivora	Nesting and feeding in steppe	DD
<i>Lepus capensis</i>	Cape Hare	Lagomorpha	Nesting and feeding in steppe	DD
<i>Allactaga euphratica</i>	Euphrates Jerboa	Rodentia	Nesting and feeding in steppe	LR
<i>Rattus rattus</i>	Black Rat	Rodentia	Lives in rustic places	DD
<i>Rattus norvegicus</i>	Norway Rat	Rodentia	Lives in rustic places	DD
<i>Mus macedonicus</i>	Macedonian mouse	Rodentia	Lives in rustic places	DD
<i>Cricetulus migratorius</i>	Grey Hamster	Rodentia	Nesting and feeding in steppe	DD
<i>Meriones tristrami</i>	Tristram's Jird	Rodentia	Nesting and feeding in steppe	DD
<i>Meriones crassus</i>	Sundevall's Jird	Rodentia	Nesting and feeding in steppe	DD
<i>Microtus socialis</i>	Social Vole	Rodentia	Nesting and feeding in steppe	DD

## 7. SIGNIFICANT ENVIRONMENTAL AND SOCIAL IMPACTS

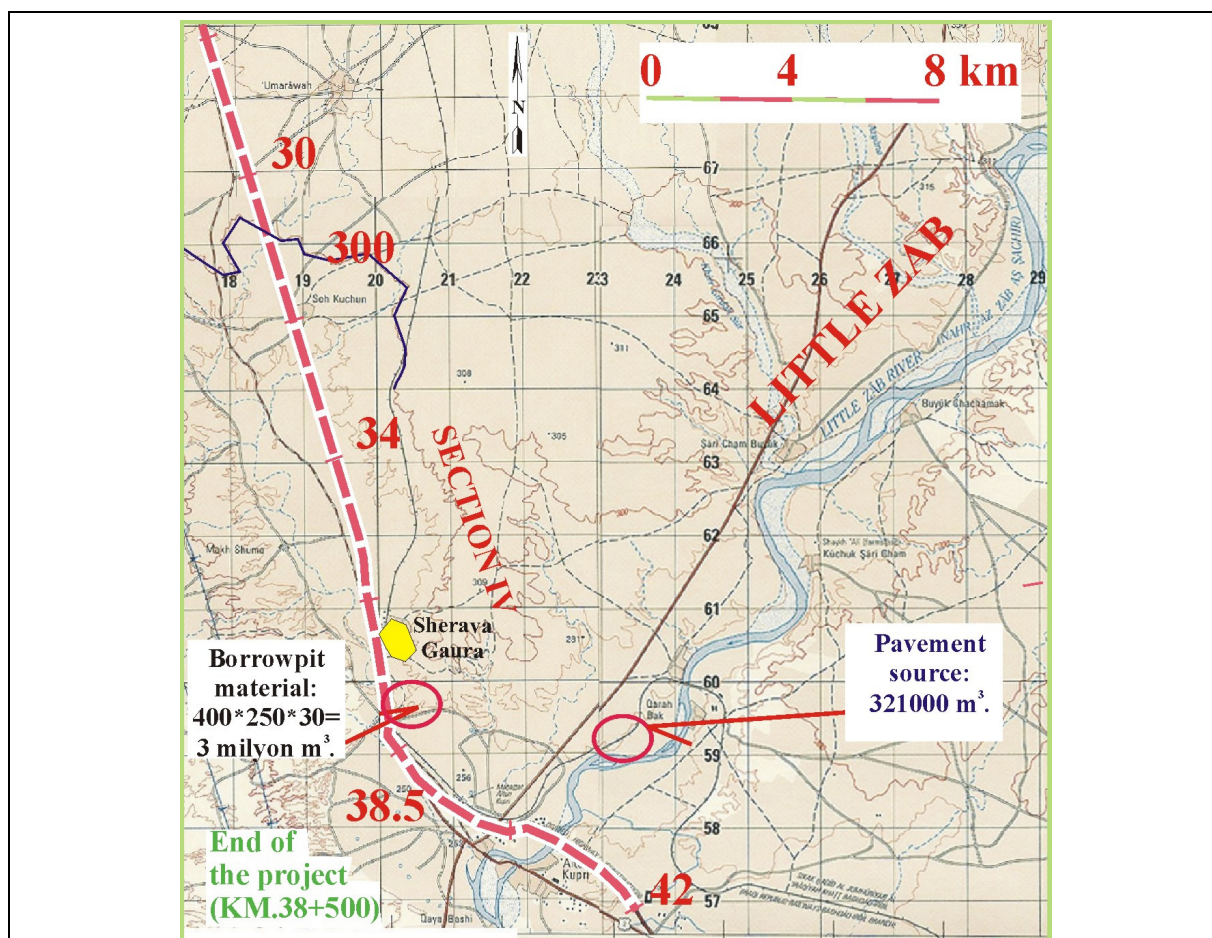
### 7.1. Noise Levels

#### 7.1.1. Purpose and Scope of the Study

The purpose of the study is to determine the noise levels for the construction and operation phases of the project. During construction phase, noise will be generated by the operation of construction machinery as well as from auxiliary equipment and various man-camp activities. During the operation phase vehicle induced noise emissions will be the case.

#### 7.1.2. Construction Noise Levels

Noise will be generated at three different stages of the construction works and at three different locations which can be listed as the borrowpit area, pavement source and the road construction area. The source of noise will be fixed in location for the former ones while it will be mobile for the latter one with the road alignment. The locations of the noise sources mentioned can be seen in Figure 13.



**Figure 13.** Locations of Borrowpit Area and Pavement Source

For calculation of the average maximum construction noise level, TEM Construction and Noise Control Report of Turkey is used. The typical construction machine composition to be employed during the project activities is given in the following sections and used for calculation of noise levels.

### **7.1.3. Methodology for Calculation of the Noise Levels**

Noise to be generated is calculated for three stages of the construction works.

#### **Borrowpit Area**

The typical machine composition to be employed at the borrowpit and the corresponding noise levels for these machines are listed in Table 21.

**Table 21.** Typical Noise Levels of the Construction Machines to be employed at the Borrowpit

<b>No</b>	<b>Source Type</b>	<b>Construction Machine (Number)</b>	<b>Noise Level at 15 meters (dBA)</b>
1	Point	Compressor (1)	80
2	Point	Breaker (1)	85
3	Point	Loader (1)	81
4	Line	Truck (3)	84
5	Line	Tractor with Dozer (1)	86

The formulation used for the estimation of the noise level for each source is given below. A sample calculation is given for the estimation of the noise levels created by each source at a distance of 200 meters.

#### **Point Sources**

$$Leq(n) = L_{max} + 10 \log (t/T) + 20 \log (d_0/d)$$

Leq(n) : Equivalent noise level of each source (dBA)

Lmax : Maximum noise level (dBA)

t : The working period of each machine within T hour (50 minutes)

T : Averaging time for noise (60 minutes)

d<sub>0</sub> : The distance from the noise source where primary noise levels were recorded (15 m)

d : Distance from the source where noise levels were to be calculated (200 m.)



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## 1<sup>st</sup> Source (Compressor)

$$L_{\max} = 80 \text{ dBA}$$

$$Leq(2) = 80 + 10 \log(50/60) + 20 \log(15/200)$$

$$Leq(2) = 56.7 \text{ dBA}$$

## 2<sup>nd</sup> Source (Breaker)

$$L_{\max} = 85 \text{ dBA}$$

$$Leq(2) = 85 + 10 \log(50/60) + 20 \log(15/200)$$

$$Leq(2) = 61.7 \text{ dBA}$$

## 3<sup>rd</sup> Source (Loader)

$$L_{\max} = 81 \text{ dBA}$$

$$Leq(2) = 81 + 10 \log(50/60) + 20 \log(15/200)$$

$$Leq(2) = 57.7 \text{ dBA}$$

## Line Sources

$$Leq(n) = L_{\max} + 10 \log (d_0^2 \times 3.14 \times Q \times B / (d \times 180 \times V))$$

Q : The number of machines passing by at a certain time period (12 machines/hour)

B : The angle between the receptor and the source (90 degrees)

V : Average speed of the machine (30 km/hr)

## 4<sup>th</sup> Source (Truck)

$$L_{\max} = 84 \text{ dBA}$$

$$Leq(3) = 84 + 10 \log ((15^2 \times 3.14 \times 12 \times 90)/(200 \times 180 \times 30000))$$

$$Leq(3) = 52.5 \text{ dBA}$$

## 5<sup>th</sup> Source (Trucktor with Dozer)

$$L_{\max} = 86 \text{ dBA}$$

$$Leq(3) = 86 + 10 \log ((15^2 \times 3.14 \times 12 \times 90 \times 1/3600)/(200 \times 180 \times 8.3))$$

$$Leq(3) = 54.5 \text{ dBA}$$

The overall noise level of the combination of those machines could be summed up according to the method specified in TEM Traffic and Construction Noise Control Report.

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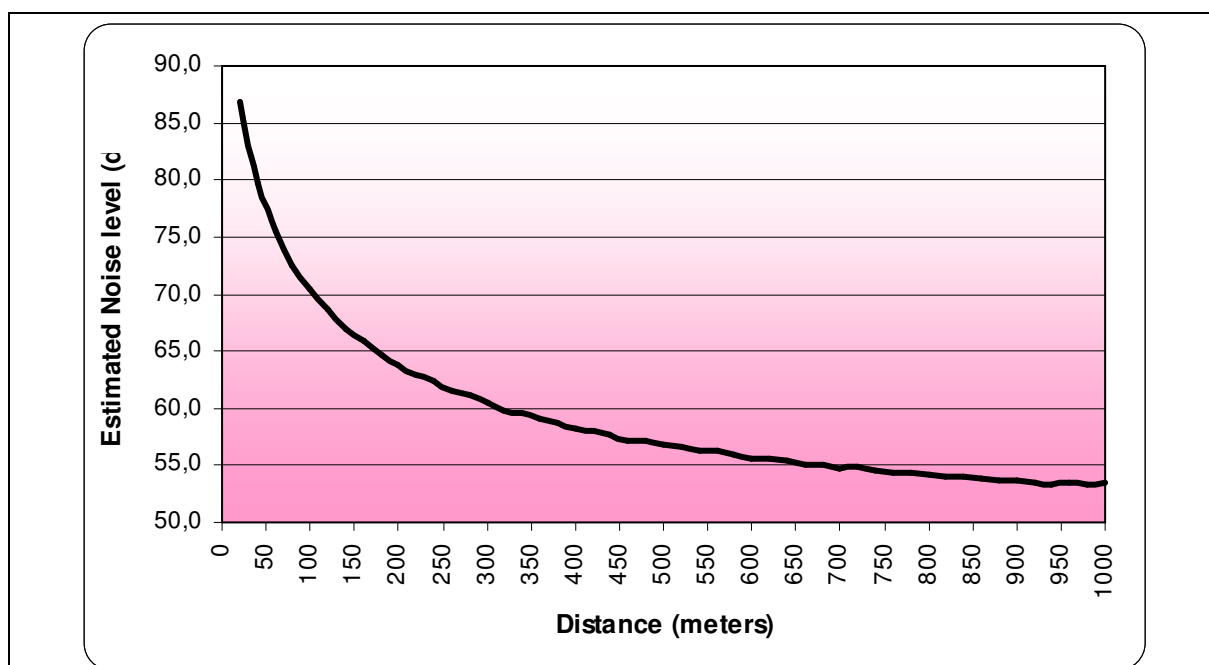
C1 : Propagation Term, contributing to ground effect and propagations

$$C1 = 5 \text{ Log } (d_0/d)$$

**Table 22.** Noise Levels of Each Source from the Borrowpit at the Specified Distance

Distance (meters)	Noise Levels of Each Source at the Specified Distance					C1	TOTAL
	Loader	Compressor	Breaker	Truck	T. w/ Dozer		
20	77.71	76.71	81.71	62.51	64.51	-0.62	86.78
100	63.73	62.73	67.73	55.52	57.52	-4.12	70.51
200	57.71	56.71	61.71	52.51	54.51	-5.62	63.88
300	54.19	53.19	58.19	50.75	52.75	-6.51	60.48
400	51.69	50.69	55.69	49.50	51.50	-7.13	58.26
500	49.75	48.75	53.75	48.53	50.53	-7.61	56.74
600	48.17	47.17	52.17	47.74	49.74	-8.01	55.66
700	46.83	45.83	50.83	47.07	49.07	-8.35	54.78
800	45.67	44.67	49.67	46.49	48.49	-8.63	54.23
900	44.65	43.65	48.65	45.98	47.98	-8.89	53.75
1000	43.73	42.73	47.73	45.52	47.52	-9.12	53.41

With the assumption of all of the 7 sources are working together at the same time in the same area, the cumulative noise level is at 200 meters is calculated as 63.88 dBA. The graphical representation of the cumulative noise levels for the above specified construction machines is given in Figure 14.



**Figure 14.** The Graphical Representation of the Estimated Noise Levels for Borrowpit

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## Pavement Material Source

The typical machine composition to be employed at the pavement source and the corresponding noise levels for these machines are listed in Table 23.

**Table 23.** Typical Noise Levels of the Construction Machines to be employed at the Pavement Material Source

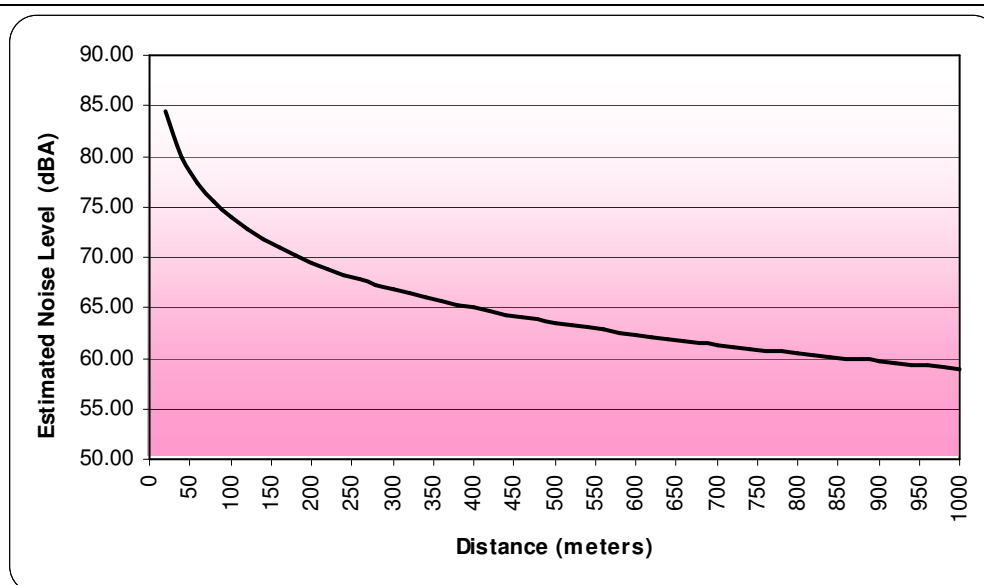
No	Source Type	Construction Machine (Number)	Noise Level at 15 meters (dBA)
1	Line	Scraper (1)	86
2	Line	Compactor (1)	87
3	Line	Asphalt Paver (1)	82
4	Line	Asphalt Spreader (1)	82
5	Line	Truck (3)	84
6	Line	Tractor with Dozer (2)	86

The noise levels to be generated at the pavement source is calculated with the use of the machine composition given above and the result of these calculation is presented in Table 24.

**Table 24.** Noise Levels of Each Source from the Pavement Source at the Specified Distance

Distance (meters)	Noise Levels of Each Source at the Specified Distance						C1	TOTAL
	Asphalt Spreader	Asphalt Paver	Compactor	Truck	Scraper	T. with Dozer		
20	64.51	60.51	65.51	62.51	64.51	64.51	-0.62	84.48
100	57.52	53.52	58.52	55.52	57.52	57.52	-4.12	74.00
200	54.51	50.51	55.51	52.51	54.51	54.51	-5.62	69.48
300	52.75	48.75	53.75	50.75	52.75	52.75	-6.51	66.84
400	51.50	47.50	52.50	49.50	51.50	51.50	-7.13	64.97
500	50.53	46.53	51.53	48.53	50.53	50.53	-7.61	63.51
600	49.74	45.74	50.74	47.74	49.74	49.74	-8.01	62.33
700	49.07	45.07	50.07	47.07	49.07	49.07	-8.35	61.32
800	48.49	44.49	49.49	46.49	48.49	48.49	-8.63	60.45
900	47.98	43.98	48.98	45.98	47.98	47.98	-8.89	59.69
1000	47.52	43.52	48.52	45.52	47.52	47.52	-9.12	59.00

With the assumption of all of the 9 sources are working together at the same time in the same area, the cumulative noise level is at 200 meters is calculated as 69.48 dBA. The graphical representation of the cumulative noise levels for the above specified construction machines is given in Figure 15.



**Figure 15.** The Graphical Representation of the Estimated Noise Levels for Pavement Source

**Road Construction**

The typical machine composition to be employed during the road construction and the corresponding noise levels for these machines are listed in Table 25.

**Table 25.** Typical Noise Levels of the Construction Machines to be employed During Road Construction

No	Source Type	Construction Machine (Number)	Noise Level at 15 meters (dBA)
1	Point	Loader (1)	81
2	Point	Compressor (1)	80
3	Line	Buldozer (1)	87
4	Line	Grader (1)	82
5	Line	Scraper (1)	86
6	Line	Truck (3)	84
7	Line	Tractor with Dozer (2)	86

The noise levels to be generated at construction of road is calculated with the use of the machine composition given above and the result of these calculation is presented in Table 26.

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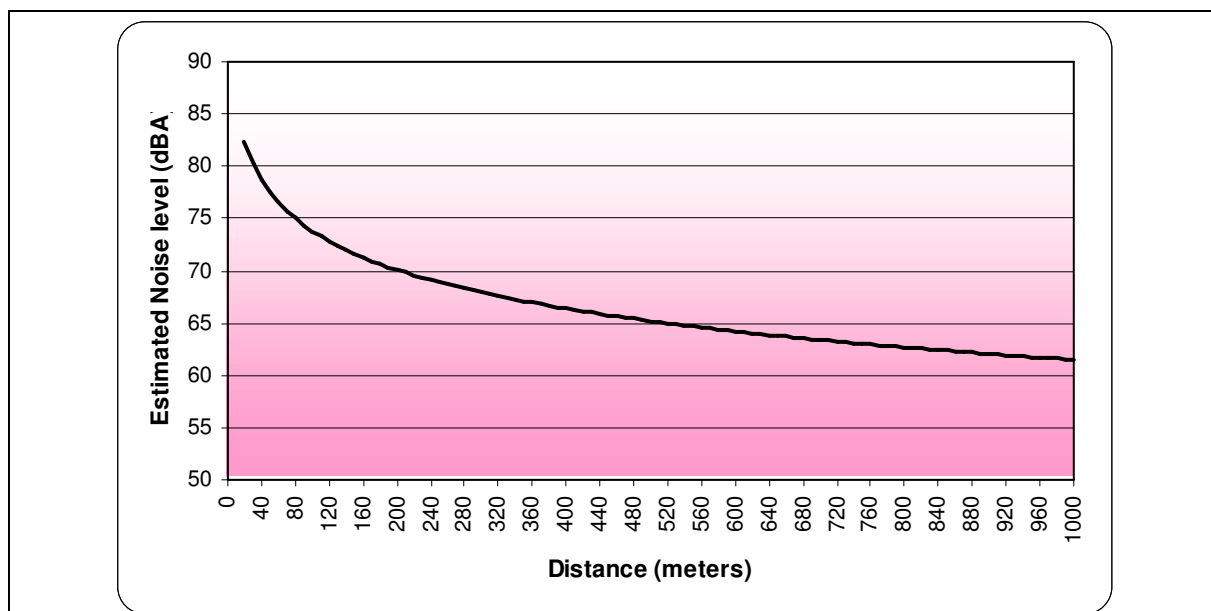
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**Table 26.** Noise Levels of Each Source from the Road Construction at the Specified Distance

Distance (meters)	Noise Levels of Each Source at the Specified Distance							C1	TOTAL
	Loader	Compressor	Buldozer	Grader	Truck	Scraper	T. with Dozer		
20	77.71	76.71	65.51	60.51	62.51	64.51	64.51	-0.62	83.98
100	63.73	62.73	58.52	53.52	55.52	57.52	57.52	-4.12	71.51
200	57.71	56.71	55.51	50.51	52.51	54.51	54.51	-5.62	69.48
300	54.19	53.19	53.75	48.75	50.75	52.75	52.75	-6.51	70.18
400	51.69	50.69	52.50	47.50	49.50	51.50	51.50	-7.13	68.47
500	49.75	48.75	51.53	46.53	48.53	50.53	50.53	-7.61	66.21
600	48.17	47.17	50.74	45.74	47.74	49.74	49.74	-8.01	64.53
700	46.83	45.83	50.07	45.07	47.07	49.07	49.07	-8.35	63.12
800	45.67	44.67	49.49	44.49	46.49	48.49	48.49	-8.63	61.85
900	44.65	43.65	48.98	43.98	45.98	47.98	47.98	-8.89	60.89
1000	43.73	42.73	48.52	43.52	45.52	47.52	47.52	-9.12	59.90

With the assumption of all of the 10 sources are working together at the same time in the same area, the cumulative noise level is at 200 meters is calculated as 69.48 dBA. The graphical representation of the cumulative noise levels for the above specified construction machines is given in Figure 16.



**Figure 16.** The Graphical Representation of the Estimated Noise Levels for Road Construction

### 7.1.4. Operational Noise Levels

In order to estimate the noise levels for the surrounding of the Highway, noise modelling studies were performed. During the studies, the projected number of road

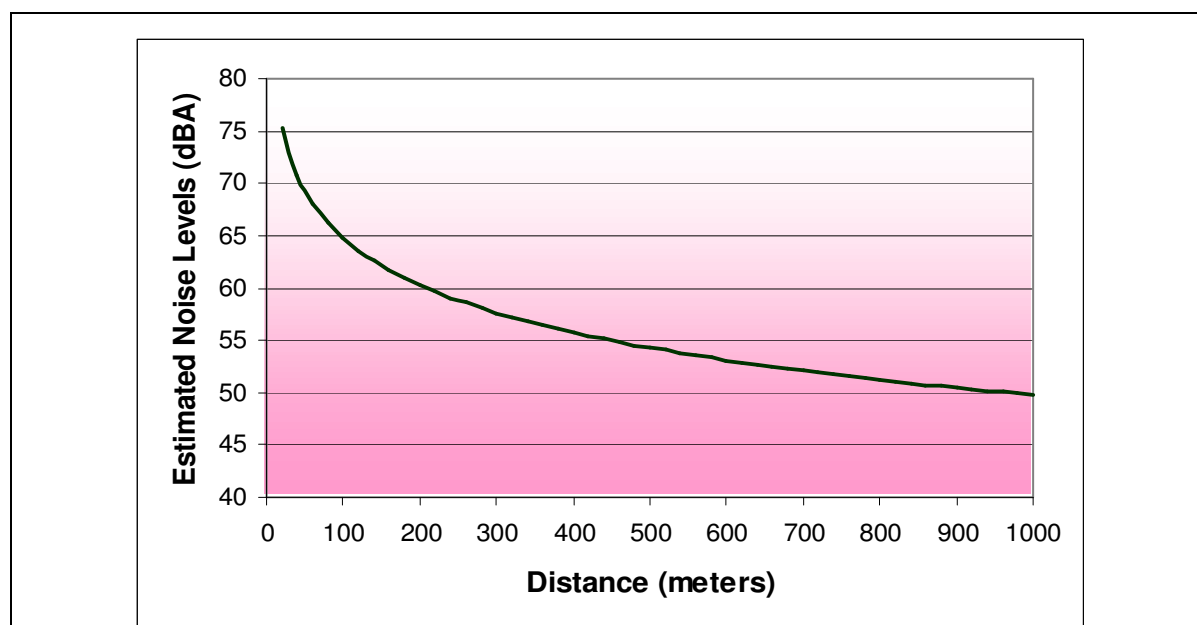
vehicles for the year 2025 (Table 31) are considered and probable noise levels around the road is estimated. TEM Construction and Operation Noise Control Report developed by General Directorate of Highways of Turkey are used for the prediction of noise created by road vehicles.

The calculations are conducted for all types of vehicles for 2025 and the methodology defined in Section 8.1.3 is used. The results are given in Table 27.

**Table 27.** Noise Level Distribution with respect to the Distance from Road

<b>Distance from Road (m)</b>	<b>Noise Level (dBA)</b>
100	64.8
200	60.3
300	57.6
400	55.8
500	54.3
600	53.1
700	52.1
800	51.2
900	50.5
1000	49.8

The graphical representation of the cumulative noise levels for the operation phase is given in Figure 17.



**Figure 17.** Average Traffic Noise Levels At the Project Area

### 7.1.5. Discussion of the Results and Suggested Mitigation Measures

#### **Construction Stage:**

Noise level estimation studies are performed considering three different stages of the project namely, activities at the borrowpit area and pavement source, and the road construction works. Estimated noise levels are compared with the regulatory noise levels.

**Table 28.** Noise Levels Created by Various Construction Activities

Distance (meters)	Noise Levels (dBA)		
	Borrow Pit	Pavement Material Source	Road Construction
20	86.78	84.48	83.98
100	70.51	74.00	71.51
200	63.88	69.48	69.48
300	60.48	66.84	70.18
400	58.26	64.97	68.47
500	56.74	63.51	66.21
600	55.66	62.33	64.53
700	54.78	61.32	63.12
800	54.23	60.45	61.85
900	53.75	59.69	60.89
1000	53.41	59.00	59.90

During the activities at the borrowpit, pavement material source and road construction activities the World Bank Noise Limit of 55 dBA for residential areas are exceeded until 600 meters distance from the borrow pit, more than a kilometer for pavement material source due to the breaker addition and more than a kilometer for construction activities.

According to exim environmental guidelines of 60 dBA for daytime limit for residential areas are exceeded till 300 meters from the borrow pit area, 800 meters from the pavement material source and 900 meters from the road construction activity.

For Health and Safety purposes the workers working at the noise levels above 80 dBA should use earflaps, since high noise levels cause ear damage, loss of consciousness and imbalance which may result in work place accidents. To prevent those hazards, earflaps should be used when working at each type of construction activity with a distance less than 100 meters.

**Operation Stage:** According to the calculations results, noise levels are found to be in the range of 55-70 dBA for distances 100 meters to a kilometer distance from the road. The Exim Noise Guideline level of 60 dBA is achieved at a distance of 500

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meters from the road. While the World Bank Noise levels of 55 dBA is achieved at a distance of 900 meters away from the road.

According to the World Bank, noise abatement handbook an operating facility should achieve either the levels specified in the above table or if the baseline noise levels are already above those limits in the above table a maximum increase in the ambient noise level of 3 dBA is acceptable.

In this respect the measured noise levels of the villages that are within the 500 meter corridor of the existing highway are, the residential areas that the baseline noise survey was conducted. The following table is interpreted for comparison of measured and calculated noise levels at those locations.

**Table 29.** Noise Level Distribution at the residential areas in the vicinity of Project Area

<b>The Resident</b>	<b>Distance from Road (m)</b>	<b>Measured Noise Level (dBA)</b>	<b>Estimated Future Noise Level (dBA)</b>
Grdarash Asad	20	68.8	75.3
Murtka Ali	350	50.1	56.6
Qushtapa	200	57.3	60.3
Sherava Gaura	400	54.7	55.8

The World Bank Noise Guideline Level of 55 dBA is not achieved for the existing situation at Grdarash Asad and Quashtepe villages while compliance is achieved for Murtka Ali and Sherava Gaura. The estimated future noise levels only take into account the traffic values and it could be concluded that no compliance could be achieved for World Bank Noise Guideline levels.

The EXIM Bank Noise Level of 60 dBA is complied for existing case at Murtka Ali, Quashtepe and Sherava Gaura while exceedence was observed at Grdarash Asad. The estimated future noise levels has in compliance with the EXIM Bank Noise Guideline levels for Murtka Ali and Sherava Gaura. There is a slight exceedence of the noise guideline level at Quashtapa, while huge exceedence for Grdarash Asad. The real noise levels observed in the future will be higher since only traffic noise was taken into consideration for the calculations.

The high noise levels detected for construction works could be stated as negligible since they are temporary. The disturbance could be minimized by the suggested mitigation measures specified in the ESMP.

The noise levels associated with operation stage should be given high priority since they will be permanent. For this reason the following mitigation measures are suggested to minimize the noise levels at the residential areas:



- Implementation of an appropriate landscape plan and noise emitting plantation will serve to reduce the associated noise levels around the residential areas.
- Construction of the highway around the residential areas with cut slopes greater than 2.0 m in order to minimize the noise pollution or implementation of noise walls (mechanical or plant walls).
- Level crossings should be avoided as much as possible to reduce the exhaust emissions and noise levels due to horns and motor noises. Underpasses and overpasses could replace the level crossings around the residential areas.

## **7.2. Air Quality**

### **7.2.1. Methodology**

The air quality assessment performed for Erbil-Altunkopri (Perdi) Highway Rehabilitation Project is focused on the estimation of emissions due to construction and operation activities and their contributions to the local air quality.

For the construction phase of the project, emissions from construction activities, equipments and trucks are considered, and dust emissions as the most probable air pollutant is assessed.

On the other hand, for the operation phase the pollutants under investigation are particulate matter (PM), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO) and volatile organic carbons (VOC) which are the possible air pollutants resulting from the road transportation.

### **7.2.2. Construction Phase**

Dust is the major pollutant to be produced during excavation, cut-fill and land preparation works. In order to determine dust emissions to be produced due to abovementioned activities, dust emission factors determined by USEPA are used. These emission factors and the corresponding calculation methods are given below.

**Table 30.** Emission Factors for Construction Works

<b>Activity</b>	<b>Emission Factor</b>
Loading debris into trucks	0.01 kg/ton
Truck transport of debris	0.7 kg/km-vehicle
Truck unloading of debris	0.01 kg/ton
Storage of debris	0.165 kg/ton

Source : USEPA, 1990.

Amount of fill material used during construction of Erbil-Altunkopri (Perdi) Highway is about 3.321.000 m<sup>3</sup> as implied in Figure 13. Dust produced during the loading, unloading, transportation and storage were considered for the calculation of dust. Construction period is assumed to be 24 months, and the working period is 24 day per month and 16 hour in a day.

**Total Excavation Amount :**

$$3,321,000 \text{ m}^3 / 24 \text{ month} = 138,375 \text{ m}^3/\text{month}$$

$$138,375 \text{ m}^3/\text{month} * 1.6 \text{ ton}/\text{m}^3 = 221,400 \text{ ton}/\text{month} = 576.6 \text{ ton}/\text{hour}$$

**a- Loading of the Materials :**

$$0.01 \text{ kg}/\text{ton} * 576.6 \text{ ton}/\text{hour} = 5.8 \text{ kg}/\text{hour} \text{ dust will be produced.}$$

**b- Transportation of the materials:**

Materials from excavation and appropriate for compression control and stability will be used as a fill material. Assuming that on the average storage areas are 5 km away from the construction site.

$$(576.6 \text{ ton}/\text{hour} * 0.7 \text{ kg}/\text{km-truck} * 5 \text{ km}) / 20 \text{ ton}/\text{truck} = 100.9 \text{ kg}/\text{hour}$$

dust will be produced.

**c- Unloading of the Materials:**

$$0.01 \text{ kg}/\text{ton} * 576.6 \text{ ton}/\text{hour} = 5.8 \text{ kg}/\text{hour}$$

dust will be produced.

Total amount of dust produced as a result of excavation (cuts and fills):

$$\underline{576.6 \text{ ton}/\text{hour} + 5.8 \text{ ton}/\text{hour} + 100.9 \text{ ton}/\text{hour} + 5.8 \text{ ton}/\text{hour} = 689.1 \text{ ton}/\text{hour}}$$

**7.2.3. Operation Phase**

Industrial Source Complex Short Term Version 3 (ISCST3) computer model developed by U.S. EPA is used to model the air pollution dispersion of the study area. The basis of the model is the steady-state Gaussian plume equation, which is used with some modifications to calculate the dispersion of various air pollutants from several kinds of sources. Emission sources are categorized into four basic types, i.e., point sources, volume sources, line sources and area sources. The volume source option and the area source option may also be used to simulate line sources.

ISC model developed by the U.S. EPA is one of the most widely used model in the world and accepted worldwide by the regulatory authorities, researchers and

decision-makers for estimating concentrations of non-reacting air pollutants up to 50 kilometers away from the source.

### **Inputs of ISCST3 Model**

There are three types of inputs that are needed to run the ISC models. They are;

- The topographical map,
- The meteorological information, and
- Input run stream file.

The run stream setup file contains the selected modeling options (rural or urban, flat or elevated terrain), as well as source location and parameter data like: pollutant emission rate, averaging time, concentration and/or deposition estimates etc. Receptor data provides the location where a predicted concentration is desired.

### **Topographical Map**

The representative topographical map of the study area is given in Figure 18. Topographical map is included in the modeling calculations and served for the following purposes:

- Terrain data input to the ISCST3 model, and
- Location of exact positions of emission sources.

### **Meteorological Data**

The ISC Short Term model accepts hourly meteorological data records for wind speed, wind direction, temperature, and stability class, urban and rural mixing layer heights for modeling pollutants with no deposition. Model uses these data to define the conditions for plume rise, transport and diffusion. The model estimates the concentration value for each source and receptor combination for each hour of input meteorological data. Drainage design does not allow overflowing the road.

### ***An Overview of Meteorology of the Region***

Meteorology is the basic factor governing the dispersion of air pollutants. Therefore, for the modeling studies due attention is given for processing of the meteorological data. Since no meteorological data could be obtained for the project area, records of the nearest meteorological station to the project area, which is Cizre Meteorological Station in Şırnak in Turkey, are used. The State Department of Meteorology (DMİ) of Turkey operates a measurement station in Cizre, where several meteorological parameters such as ambient temperature, atmospheric pressure, wind speed, wind velocity, relative humidity etc. are recorded on hourly basis. In order to get an idea of the meteorology of the region for the past 10 years, meteorological data for the

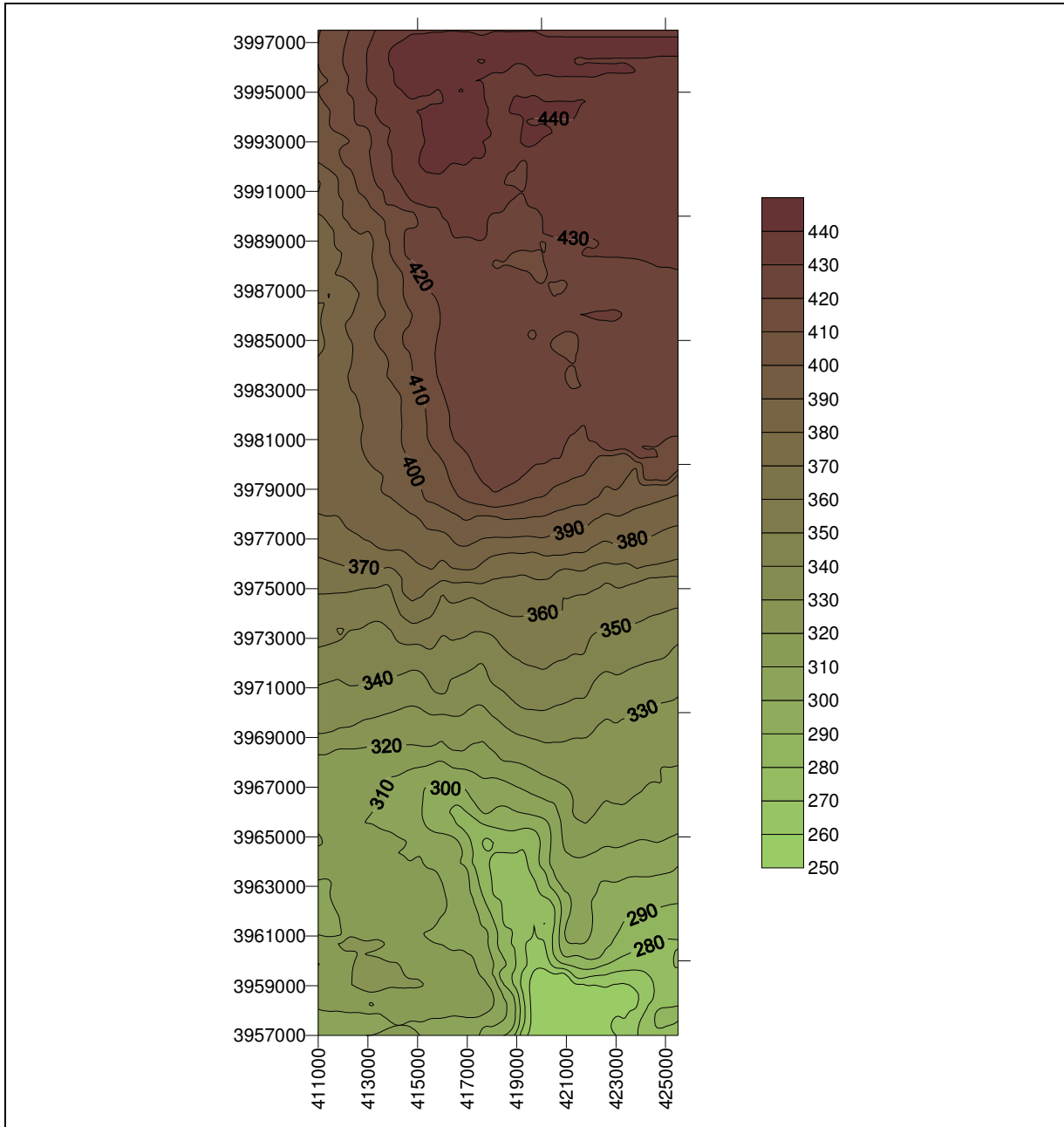
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period from 1995-2004 was obtained from the State Department of Meteorology and is analyzed to understand the average meteorological conditions in the region.

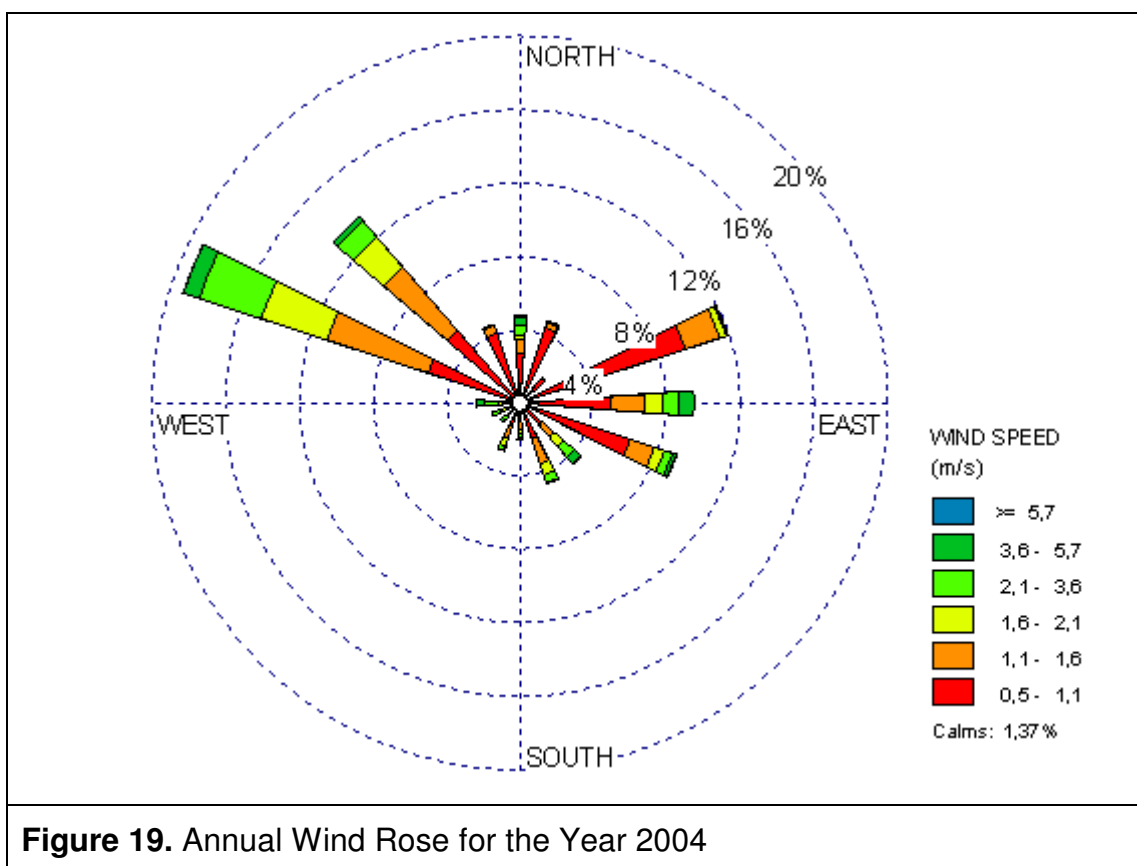


**Figure 18.** Topographical Map of the Area

Moreover, the meteorological data for the year 2004 was found to represent the characteristic meteorological conditions in the region. However, the upper air observations are not conducted at this meteorological station. In fact, there exist seven synoptic stations in Turkey that calculate upper air data in addition to surface meteorological observations. Therefore, the mixing layer height data for Diyarbakır, which is the closest synoptic station to project site, for the year 2004 is used. The

meteorological data is processed by PCRAMMET in order to identify hourly atmospheric stability constants and the hourly mixing layer heights to be used in ISCST3.

The annual wind rose is plotted in order to show the prevailing wind directions in the study area. Figure 19 shows the prevailing wind direction on annual basis. According to the wind rose plotted for 2004, the prevailing wind direction is North-north-west (NNW). About 19 % of the time wind blows from this direction.



**Figure 19.** Annual Wind Rose for the Year 2004

## Sources

Unlimited point, line, area and volume sources may be entered and modeled with ISCST3. In this study, the traffic emissions are modeled as a line source including a total distance of 38.5 km along the project. The highway is divided into 482 segments each representing an area source with 25 m of width and approximately 80 m of length.

The results are generated for each type of pollutant, namely PM, SO<sub>2</sub>, NO<sub>x</sub>, CO and VOC in separate runs.

## Receptors

The study area selected as the highway and 2 km from both sides of the highway as shown in Figure 18. The reason for this selection is to examine the air quality around the highway and at the closest residential centers and to be able to observe the ground level concentrations of pollutants at the region clearly.

The local terrain is simple along with a flat land of totally 784 receptor points in cartesian coordinates (each of them is 500 meters apart from each other).

### 7.2.4. Traffic Induced Emissions

The vehicle count data on the highway is obtained from Hewler-Prde Highway–Preliminary Design Report. According to the trends in the number of automobiles, buses, trucks and trailers, the road traffic projection is performed for the year 2025 in the report and the projected numbers for vehicles are given in Table 31. The numbers in this table indicates annual average daily number of vehicles passing through the highway.

**Table 31.** Estimated Number of Road Vehicles in 2025

<b>Years</b>	<b>Automobiles</b>	<b>Buses</b>	<b>Trucks</b>	<b>Trailers</b>	<b>TOTAL</b>
<b>2005</b>	2600	390	1590	1950	6500
<b>2025</b>	4696	704	2818	3522	11740

Five major pollutants resulting from traffic exhaust emissions, namely, PM, SO<sub>2</sub>, NO<sub>x</sub>, CO and VOCs are studied. Internationally recognized emission factors are preferred to determine the emission factors for traffic sources. Internationally accepted emission factors developed by CORINAIR are used for the estimation of emissions from road traffic. Emissions from traffic sources are calculated for driving conditions on highways. The appropriate emission factors used for gasoline automobiles, diesel automobiles and diesel buses, trucks and trailers are given in Table 32, 33 and 34, respectively (CORINAIR Emission Inventory Guide Book).

**Table 32.** Speed dependent emission factors for gasoline automobiles

<b>Pollutant</b>	<b>Speed Range (km/h)</b>	<b>Emission Factor (g/km)</b>
CO	10 –100	$281V^{-0.630}$
NO <sub>x</sub>	10 –130	$1.360 + 0.0217V - 0.00004V^2$
VOC	10 –100	$30.34V^{-0.693}$
PM	-	-
Fuel consumption	60 – 80	67

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**Table 33.** Speed dependent emission factors for diesel automobiles

Pollutant	Speed Range (km/h)	Emission Factor (g/km)
CO	10 –130	$5.41301V^{-0.574}$
NO <sub>x</sub>	10 –130	$0.918 - 0.014V + 0.000101V^2$
VOC	10 –130	$4.61V^{-0.937}$
PM	10 –130	$0.45 - 0.0086V + 0.000058 V^2$
Fuel consumption	10 –130	$118.489 - 2.084V + 0.014 V^2$

**Table 34.** Speed dependent emission factors for diesel heavy duty vehicles & buses

Pollutant	Speed Range (km/h)	Emission Factor (g/km)
CO	10 –120	$63.791V^{-0.8393}$
NO <sub>x</sub>	58.8 – 120	$0.0010V^2 - 0.1608V + 14.308$
VOC	0 – 120	$44.217V^{-0.8870}$
PM	0 – 120	$9.2934V^{-0.7373}$
Fuel consumption	59 – 120	$0,0447V^2 - 7.072V + 478$

The emissions of SO<sub>2</sub> are estimated by assuming that all sulphur in the fuel is transformed completely into SO<sub>2</sub> using the formula: (CORINAIR Emission Inventory Guide Book)

$$E = 2 \times k_{S,m} \times FC_m$$

where,

E : emission (g/km)

k<sub>S,m</sub> : weight related sulphur content in fuel of type m (g/g of fuel),

FC<sub>m</sub> : total consumption of fuel type m, (g/km)

- Sulphur in Gasoline = 165 ppm = 165 g Sulphur/1,000,000 g Gasoline,
- Sulphur in Diesel = 400 ppm = 400 g Sulphur/1,000,000 g Diesel.

SO<sub>2</sub> Emissions from gasoline automobiles:

Fuel consumption factor = 67 g/km

$$2 \times (165 \text{ g} / 1,000,000 \text{ g}) \times 67\text{g/km} = \mathbf{0.022 \text{ g} / \text{km}}$$

SO<sub>2</sub> Emissions from diesel automobiles:

For V= 59-100 km/hr

$$\text{Fuel consumption factor} = 118.489 - 2.084V + 0.014V^2$$

Average velocity for passenger cars is taken as 80 km/hr.

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Fuel consumption factor =  $118.489 - (2.084 \times 80) + (0.014 \times 80^2) = 41.37 \text{ g/km}$

$2 \times (400 \text{ g} / 1,000,000 \text{ g}) \times 41.37 \text{ g} / \text{km} = \mathbf{0.033 \text{ g} / \text{km}}$

### SO<sub>2</sub> Emissions from Heavy-Duty Diesel Vehicles:

For V= 59-100 km/hr

Fuel consumption factor =  $0.0447V^2 - 7.072V + 478$

Average velocity for buses and trucks are taken as 80 km/hr.

Fuel consumption factor for buses and trucks =  $(0.0447 \times 80^2) - (7.072 \times 80) + 478$   
= 198.32 g/km

Average velocity for trailer is taken as 70 km/hr.

Fuel consumption factor for treys =  $(0.0447 \times 70^2) - (7.072 \times 70) + 478$   
= 201.99 g/km

Buses and trucks  $2 \times (400 \text{ g} / 1,000,000 \text{ g}) \times 198.32 \text{ g} / \text{km} = \mathbf{0.159 \text{ g/km}}$

Trailers  $2 \times (400 \text{ g} / 1,000,000 \text{ g}) \times 201.99 \text{ g} / \text{km} = \mathbf{0.162 \text{ g/km}}$

The number of vehicles for road vehicles is calculated for 2025. The vehicles using diesel /gasoline as fuels and average speeds for these vehicles are estimated and are given in Table 35.

**Table 35.** Vehicle percentages for each category

Vehicles	Fuel Use	Percent (%)	Number of Vehicles	Speed (km/h)
Automobiles	Gasoline	30	3522	90
Automobiles	Diesel	10	1174	90
Buses	Diesel	6	704	80
Trucks	Diesel	24	2818	80
Trailers	Diesel	30	3522	70
<b>TOTAL</b>		100	11740	

The emissions of PM, SO<sub>2</sub>, NO<sub>x</sub>, CO and VOCs for vehicles are determined in terms of grams per distance traveled, km and given in Table 36.

**Table 36.** Pollutant emissions per vehicle

Vehicles	CO (g/km)	NO <sub>x</sub> (g/km)	VOC (g/km)	PM (g/km)	SO <sub>2</sub> (g/km)
Automobiles (Gasoline)	16.50	2.99	1.34	0.002	0.022
Automobiles (Diesel)	0.41	0.48	0.07	0.146	0.033
Buses	1.61	7.84	0.91	0.367	0.159
Trucks	1.61	7.84	0.91	0.367	0.159
Trailers	1.80	7.95	1.02	0.405	0.162



The emissions of PM, SO<sub>2</sub>, NO<sub>x</sub>, CO and VOCs for road vehicles are calculated for the year 2025 by using the speed dependent emission factors given above and multiplied with the number of vehicles in that category. The road vehicle emissions are assessed within a distance of 38.5 km. Therefore, total emissions (g/km) are multiplied with the distance traveled. In addition, the emission per unit area is calculated by dividing the emission by total area (25 m x 38.5 km). The model emission inputs are listed in Table 37. The amount of emissions per square meter was calculated as follows:

$$\text{Amount of Emission (g/m}^2\text{sec)} = \# \text{ of vehicles (no./sec)} \times \text{Emission Factor (g/km)} \\ \times \text{Length of Road (km)} / \text{Area of the Road (m}^2\text{)}$$

**Table 37.** The model inputs for road vehicle exhaust emissions

UNIT	CO	NO <sub>x</sub>	VOC	PM	SO <sub>2</sub>
g/m <sup>2</sup> sec	3.27E-05	3.09E-05	5.37E-06	1.34E-06	5.77E-07

### 7.2.5. Regulations on Air Quality

The results of the ISCST3 modeling study are compared with the World Bank Standards and USEPA Standards. Limit values are listed in Table 8.

### 7.2.6. Modeling Results

With the use of air dispersion modeling, the dispersion profiles for PM, SO<sub>2</sub>, NO<sub>x</sub>, CO and VOC are formed including the local meteorological and topographical conditions. Probable pollution levels of traffic exhaust emissions within the investigation area are examined and the results are calculated in terms of ground level concentration (µg/m<sup>3</sup>). Finally the results are compared with the short and long term limit values of the international regulatory agencies. As a result of this comparison, the effect of traffic emissions on the existing air quality is determined.

The Model run considering the worst scenario that no dry/wet deposition or depletion (removal) of particulate or gaseous mass from the plume occurs.

“The annual average ground level concentrations” and “the maximum of the daily average ground level concentrations” for each pollutant is calculated by ISCST3 and given in Table 38. In addition, the dispersion profile of the pollutants and the outputs of the model are presented in Appendix 2.

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**Table 38.** Maximum of Annual and Daily Average Ground Level Concentrations (GLC)

Pollutant	Averaging Period	Maximum GLCs ( $\mu\text{g}/\text{m}^3$ )	Exceedances (%)	Allowance of Exceedances According to World Bank Guidelines (%)
SO <sub>2</sub>	Annual	1.74	0	-
	Daily	8.13	0	5% for poor airsheds 2% for moderate airsheds
NO <sub>x</sub> (as NO <sub>2</sub> )	Annual	78.5	0	-
	Daily	379	0.04	5% for poor airsheds 2% for moderate airsheds
VOC	Annual	16.1	0	-
	Daily	75.0	0	5% for poor airsheds 2% for moderate airsheds
PM	Annual	4.0	0	-
	Daily	18.7	0	5% for poor airsheds 2% for moderate airsheds
CO	Annual	97.9	0	-
	Daily	457	0	-

As can be seen from the dispersion profiles given in Appendix 2, the pollutants are concentrated along the highway as expected.

### **Dispersion of SO<sub>2</sub>**

The maximum annual average ground level concentration of SO<sub>2</sub> is found as 1.74  $\mu\text{g}/\text{m}^3$  while the maximum daily average ground level concentration is 8.13  $\mu\text{g}/\text{m}^3$ .

The long-term limit set by World Bank is 100  $\mu\text{g}/\text{m}^3$  and 80  $\mu\text{g}/\text{m}^3$  for poor and moderate airsheds respectively. While it is 80  $\mu\text{g}/\text{m}^3$  set by USEPA. The short-term limit set by World Bank is 150  $\mu\text{g}/\text{m}^3$ . The calculated SO<sub>2</sub> concentrations from the dispersion model are below these limits.

### **Dispersion of NO<sub>x</sub>**

The maximum annual average ground level concentration of NO<sub>x</sub> is found as 78.5  $\mu\text{g}/\text{m}^3$  while the maximum daily average ground level concentration is 379  $\mu\text{g}/\text{m}^3$ .

The long-term limit set by World Bank and USEPA are 100  $\mu\text{g}/\text{m}^3$  for NO<sub>x</sub> emissions. The short term limit set by World Bank is 150  $\mu\text{g}/\text{m}^3$ . The allowance set for this limit in the World Bank Guidelines is 2% for moderate airsheds while it is 5% for poor airsheds. The exceedances of this limit by the model results over the whole modeling

area is 0.04%. This indicates that the air quality of the area complies with moderate airshed quality. The calculated NO<sub>x</sub> concentrations from the dispersion model are below this limit.

### **Dispersion of VOC**

The maximum annual average ground level concentration of VOC is found as 16.1 µg/m<sup>3</sup> while the maximum daily average ground level concentration is 75 µg/m<sup>3</sup>.

There is no limit value set for total VOCs by World Bank and USEPA Guidelines. There are some specific limits set for BTEX which is not comparable with the model results.

### **Dispersion of PM10**

The maximum annual average ground level concentration of PM is found as 4 µg/m<sup>3</sup> while the maximum daily average ground level concentration is 18.7 µg/m<sup>3</sup>.

The short-term limit set by World Bank is 150 µg/m<sup>3</sup>. The long-term limit set by World Bank and USEPA is 50 µg/m<sup>3</sup> for PM10. The calculated PM10 concentrations from the dispersion model are below these limits.

### **Dispersion of CO**

The maximum annual average ground level concentration of CO is found as 97.9 µg/m<sup>3</sup> while the maximum daily average ground level concentration is 457 µg/m<sup>3</sup>.

The short-term limit set by USEPA Standards for 8 hour average is 10,000 µg/m<sup>3</sup> and for 1 hour average is 40,000 µg/m<sup>3</sup> for CO emissions. The calculated CO concentrations from the dispersion model are below these limits.

## **7.2.7. Discussion of the Results and Suggested Mitigation Measures**

**Construction stage**, the main pollutant from construction activities is the dust produced by cut and fills. During the construction activities, it is recommended to apply water spraying over the unpaved roads to minimize dust formation during spring and summer months and keeping the stock piles humid that are open to wind or either covering to minimize dust formation.

**Operational stage**, road vehicle exhaust emissions namely, CO, NO<sub>x</sub>, PM, SO<sub>2</sub> and VOC are investigated as potential pollutants resulting from the road transport activities. The annual average and highest 24 hours average ground level concentrations of the above-mentioned pollutants due to all sources are modeled with ISCST3. The outputs of the model and the results for dispersion Modelling calculations are given in Appendix 2.

The modeling results indicate that the ground level concentrations of SO<sub>2</sub>, CO, NO<sub>x</sub>, PM<sub>10</sub>, VOC are below the guideline limit values set by World Bank and USEPA.

### **7.3. Water Quality**

The project site has no direct relationship with the surface water sources and or ground water sources. For this reason, no direct impact on the water quality due to the project is expected. The project is not a new highway construction process; it is only the improvement of the existing highway project for this reason for all the environmental factors the degree of impact will not be more than the level of the existing impact.

In order to minimize the possible future impact on the water sources around the project site, it is suggested that incase there will be a leakage of fuel from the highway traffic or accidental fuel or chemical leakages, the polluted soil should be removed from the area and it should be either remediated or incinerated before the pollutant reaches to the groundwater sources or surface water sources.

### **7.4. Landscape and Visual Impacts**

The area is not within the boundaries of any natural protection area as it was determined by site surveys.

The following landscape and visual impacts should be considered during both construction and operation stages of the project. The mitigation measures should also be considered within a Plantation Plan suggested to be presented as a part of Landscape Project.

The landscaping specifications are required to implement plantation plan defining the role of the parties involved into landscaping works, quality of the landscaping materials, implementation techniques, landscape management (maintenance) and project acceptance criteria.

The impacts over the landscape pattern were defined in accordance with the value of the agricultural landscape pattern. The area as a whole is considered as agricultural field. The construction activities might have adverse effects on the soil. In order to avoid this adverse impact the fertile topsoil should be stripped before construction activity and stockpiled properly, and then the topsoil should be used for landscaping.

Upper 15-30 cm of the natural topsoil support growth for the grass and other vegetation cover. The stripped topsoil should directly be stockpiled. The topsoil stockpile should be deposited to a height of at most 2 meters and it should be slightly compacted to avoid erosion and permit the circulation of oxygen. If the degree of

compaction could not be adjusted well, then anaerobic conditions might prevail, which will result in lower fertility.

Topsoil should never be handled under wet conditions. Topsoil will not be placed on a sub-grade that is excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or proposed planting.

Since the project is an highway construction project, the selection of the plant species for the Plantation Plan should be conducted with extreme care and interaction of species with traffic and animals around the project site should be carefully considered. The existing plant species that would be cut or moved from the area should also be considered within this context.

The existing landscape pattern of the area would not expected to change at a significant level if the Landscape Project preparation and Plantation Plan Development was established with adequate care, there will have no residual impact expected at and around the project area.

## **7.5. Cultural Heritage**

There are no specific cultural heritage detected around the project site except the Quashtepe mound and graveyard around KP: 33+000. The highway project will have no harm to the mound and graveyard. The project route was aligned to skip those cultural heritages with an adequate safe distance.

## **7.6. Ecology**

### **7.6.1. Impact on Flora**

Distribution of species according to the phytogeographical regions shows that the area is under the influence of biotic factors.

88 species out of determined a total of 105 species are widespread having high ecological tolerance.

The area is under the influence of summer drought and this situation characterizes a vegetation type, known as step, where the cushion forming chamephytes and annual or perennial Gramineae are dominant.

Today almost all the area is covered by agricultural or residential areas. There is no species belongs to the IUCN threat categories.

There is no endemic plant at the project site and its environs. In addition to flora, the construction area does not consist of any endemic and threatened species.

In this respect, the construction activities do not have harmful affect on the populations of flora both at the project site and its environs.

### **7.6.2. Impact on Fauna**

After the assessments conducted in the previous section for fauna, the highway construction has no specific significant impact on the aquatic fauna since there is only one river neighboring to the route called River Zapsuyu with very small branches.

The ecosystem of the project area is specified as steppe and it is usually poor for Amphibian species, having a high relative abundance, terrestrial and is mostly nocturnal (night time active). Only a few toad species live in the steppe habitat. Although the project site covers terrestrial ecosystem, frogs and salamanders are very occasionally found along the route. These animals need to be handled carefully and removed from the construction area. The highway construction is not expected to adversely affect the toad population.

In the route Altunkopri–Erbil, many reptile species can be occasionally seen in the steppe habitat but some of them permanently occupy in this type of habitat and can be frequently seen around. In general arid ecosystem such as in the route of Altunkopri–Erbil is rich for reptilian species. They are mobile vertebrate and can be randomly seen any time of the suitable season. It is though that the highway construction will not destroy the majority of steppe habitat around and will not cause habitat fragmentation. In this respect, highway construction does not adversely affect to the reptilian population around. However, the highway workers should be informed about reptile incase they randomly encounter these animals. They should also be warned that some snake species is venomous. Apart from this the most important member of reptilian fauna is *Rafetus euphraticus* (Euphrates turtle) (Figure 12), and this species only lives in the river Euphrates and Tigris and theirs branches. This turtle is listed as EN according to IUCN criteria. But since the highway construction will not reach to the river Zab, it is not necessary to take some mitigation measures for *Rafetus euphraticus*.

The steppe habitat of the route of Altunkopri–Erbil covers both migratory and resident birds. Migratory birds can be also be grouped as summer migratory and winter migratory birds. Bird fauna of the environs of highway construction were evaluated under this principle above. There is no endemic bird around the project site and the affect of highway construction is minor to bird fauna. However it is necessary to prevent excessive noise and dust formation. Apart from this, the natural steppes and rocky hills around should not be destroyed during the highway construction.

Mammals are vertebrate animals with hair, they are warm-blooded, and nurse their young with milk. Mammals that live in Middle East are placental mammals. The biggest one among Mammalian order is Chiroptera and Rodentia. Members of Chiroptera do not use around the highway construction area for roosting. Rodent species usually burrow the natural steppe and the edge of grain field around the highway construction. In general the highway construction does not cause habitat fragmentation and population decline of mammalian species. Thus it can be concluded that the impact of highway project has a minor affect on the terrestrial mammals in this steppe ecosystem.

The activations of fauna species would not be expected to be confined to the construction area of highway. In this respect, the construction activities do not expected to have harmful affect on the populations of mammalian species both at the highway and its environs.

#### **7.7. Impact on Soil Quality**

The project is not a new highway construction process; it is only the improvement of the existing highway project for this reason for all the environmental factors the degree of impact will not be more than the level of the existing impact.

The surrounding of the project site is suitable for agricultural landscape, but nevertheless the land is not widely used for agricultural applications for the time being. In the future the area would possibly be used for common agricultural activities at a bigger extend.

In order to minimize the possible future impact on the soil quality around the project site, it is suggested that incase there will be a leakage of fuel from the highway traffic or accidental fuel or chemical leakages, the polluted soil should be removed from the area and it should be either remediated or incinerated.

## **8. ANALYSIS OF ALTERNATIVES**

The Highway connecting Erbil and Kirkuk has a strategic significance for the country. It was monitored that there is already a heavy traffic on the single carriageway with two directions. Besides that; the area is fertile and it has quite high groundwater potential to enhance agricultural activities for the future.

The pollution levels such as noise and exhaust gases caused by the existing traffic are high while it will be higher for future with increased traffic levels. The increased traffic levels are expected since;

- Hewler International airport will be used in the future by people flying to and from Kirkuk.
- The petroleum industry of Kirkuk is expected to be developed more and it will be connected in the future to Northeastern part of the country.

For the above stated reasons there is a certain need to improve the existing Erbil-Altunkopri highway to achieve a new highway having higher geometrical standards to serve higher traffic loads. For this reason the alternatives to improve the existing highway have been studied by the Iraq GDRB together with the consultants Protek Project and Yilmazer. The following results have been achieved as a result of the alternative selection studies conducted by these two consultants.

The area is very flat to gently sloping in character. Hence, there is found only one alternative which runs beside the existing highway with improved standard.

In order to achieve the main objectives the alternatives are evaluated in terms of;

- Timing (including investigation, design, construction, and economic life),
- Environment & social impacts,
- Safety & security, and
- Cost (including investigation, design, construction, operation, and maintenance).

These are abbreviated as TESC that is used in the text in this sense.

Based upon the engineering models and priorities, all possible alternatives are tested to have acceptable geometrical standards in computer aided design medium.

Two main alternatives are found. Both are parallel to the existing highway. Hence, it can be called a unique alternative.

In order to reach a more reliable construction route the four phases have to be studied in the given order as:



- Corridor,
- Route,
- Alignment, and
- Construction route.

There is only one alternative which runs almost parallel to the existing highway. This alternative is suggested since it will be parallel to the existing route at most of the sections and hence will have the least possible environmental effect.

Since the area is flat and the dominating geotechnical condition remains almost the same the survey and geotechnical investigation can be completed at a shorter period.

The route is subdivided into four sections. These are;

- The first section (KM.0+000 – 3+000)
- The second section (KM.3+000 – 14+000)
- The third section (KM.14+000 – 30+000)
- The fourth section (KM.30+000 – 38+500)

#### **The first section (KP:0+000 – 3+000)**

This is the first section of the alignment. It will be the continuation of the double carriageway coming out from the Erbil city center. The area has high percentage of clayey soil. Thickness of the top soil in places exceeds 0.40 m. In hydrogeological sense there is no problem.

The main structures are underpasses and culverts. Joining local highways to the main highway, level crossings, and interchanges have vital significance to enhance the driving comfort and to reduce the traffic accidents and pollution load.

#### **The second section (KP:3+000 – 14+000)**

This section is characterized by basically granular soils. There some dry creeks which work as linear sources recharging the groundwater through the sandy and/or gravelly soils.

The granular soils dominate at this region. Hydrogeologically there is no problem. All the creeks, are seasonal and very small. They do not have large catchments area which are limited with a few km<sup>2</sup>.

The main structures are bridges, underpasses, and culverts.

**The third section (KP.14+000 – 30+000)**

This is the longest section. The main geological units are alluvium, colluviums, slope-wash deposits. Thickness of the topsoil in places exceeds 0.40 m. Hydrogeologically there is no problem. The main structures are underpasses, culverts, and overpasses.

**The fourth section (KP:30+000 – 38+500)**

This is the last section without any large scale engineering structure. Earthworks will dominate. There is only one interchange and its underpasses at the end. The geological units are detrital sedimentary rocks and alternation of the conglomerate, sandstone, and siltstone dominates.

Hydrogeologically there is no problem. All the creeks are seasonal and very small. They do not have large water catchments area. Bedrock crops out over the hills at western and eastern part this last section.

The main structures are Underpasses up to the end of the project (KM.38+500).

Based upon the corridor and route selection studies two alternatives are found. However both are parallel to the existing highway. Hence they are assessed as one alternative.

As it is well known, the highways have very high impact to the environment. It is strictly recommended to design the highway with cut slopes greater than 2.0 m in order to minimize the scenery and noise pollution. Level crossing should be avoided to reduce the exhaust appreciably. Underpasses and overpasses should replace the level crossings.

## **9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

The Environmental and Social Management Plan is presented in detail in the Appendix 3 of this report. In this section a summary of the Environmental and Social Management Plan is presented.

An Environmental and Social Management Plan (ESMP) has been developed to consider both the needs of road safety and environmental conservation throughout the construction and the operation phases of Erbil-Altunkopri (Perdi) Highway Improvement Project. It establishes a five-year plan for managing the environmental issues arising from the construction and the operation activities at 38.5 km section of Erbil-Altunkopri (Perdi) Highway. After the first 5 years of operation, the monitoring results should be evaluated and considered for development of the life time ESMP.

The overall objective of ESMP is to eliminate potential environmental and social impacts, or to reduce them to acceptable levels, comply with regulatory requirements, and continuously improve the environmental management at Erbil-Altunkopri (Perdi) Highway.

The plan consists of mitigation, management, monitoring and institutional measures to be taken during construction and operation stages. The plan also includes the actions needed to implement these measures.

The components of the current ESMP are summarized below;

- identification of feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels,
- identification of monitoring objectives and specification of the type of monitoring, with links to the impacts assessed in the ESA Report and the mitigation measures described in the ESMP,
- implementation of the project components and mitigation measures timely and effectively,
- assignment of the responsible bodies for implementation of the environmental plan,
- formation of an implementation schedule for measures to be carried out as a part of the project.

Within the context of the ESMP, the construction stage and road operations were studied including the following subject areas:

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- Cultural heritage, ecology, solid and hazardous wastes, liquid discharges, water quality, soil quality, air emissions, noise impact, natural resources and energy, landscape and visual impacts, social impacts.

In addition, EMS (Environmental Management System) includes organizational structure, planning activities, responsibilities, practices, procedures and processes for developing, implementing, reviewing and maintaining the environmental policy. This environmental policy covers all the environmental issues under the responsibility of PROTEK, GDRB and Construction Contractor.

EMS procedures will cover issues such as staff training, elements of the environmental monitoring of the construction and road operation phases such as air quality and, noise level measurements etc., and the emergency response planning. For further consultation, related consultancy will be supplied from appropriate consultancy firms whenever needed. Routine environmental auditing of the contractor activities will be provided by the HSER (Health, Safety and Environmental Representative).

In ESMP, some of the mitigation measures should be considered under the responsibility of PROTEK while some of them should be governed by GDRB. These mitigations are indicated in related sections of ESMP.

Finally, an overall environmental management and monitoring plan have been developed and presented as an Environmental Matrix in ESMP.

## **10. SUMMARY OF THE RESULTS OF THE CONSULTATION PROCESS**

The (1x2) undivided existing Erbil-Altun Kopri (Perdi) Highway, which is 38.5 km of length, connects the biggest cities of Northern Iraq, Erbil and Kirkuk. The existing Erbil-Altunkopri Highway has been inadequate for current traffic load. As the importance of Erbil is considered for future improvements, then it would be understood that it is irresistible to rehabilitate the existing highway by improving the capacity and physical standards.

The environmental and social assessment of the Erbil–Altun Kopri (Perdi) Highway rehabilitation project is conducted to describe the baseline environmental conditions, to identify both the positive and negative potential environmental impacts during construction stage and road operation, and to describe the proposed mitigation measures to reduce the potential impacts associated with these stages.

Due to the proposed funding arrangements for the Erbil–Altun Kopri (Perdi) Highway project, World Bank Environmental Guidelines which apply to the international funding institutions were considered. The World Bank requires environmental and social assessment (ESA) for projects proposed for Bank financing to ensure that the project will be conducted in environmentally sound and sustainable, and thus to improve decision making. ESA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the project. In this respect the Erbil–Altun Kopri (Perdi) Highway project is considered to be a Category B project for which an Environmental and Social Assessment is required.

A baseline environmental assessment has been conducted at Erbil-Altunkopri (Perdi) Highway Improvement Project Site and its close vicinity in order to analyze the baseline conditions before the project commences.

Surveys were undertaken for Erbil-Altunkopri (Perdi) Highway Improvement Project area and its close vicinity between 17<sup>th</sup>-18<sup>th</sup> of February 2006 to record existing baseline environmental conditions.

These environmental surveys covered baseline noise survey, and baseline air quality survey. Baseline surface and groundwater quality could not be determined along the project site since no ground water and/or surface water could be found for sampling.

The purpose of the Baseline Noise Survey was to determine the baseline noise levels in the vicinity of the project site. The baseline noise levels were measured at the nearest residential areas along the Erbil-Altunkopri (Perdi) Highway.

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Four Baseline Noise Survey and Air Quality Measurement locations were selected in the vicinity of Erbil-Altunkopri (Perdi) Highway which are the main receptors. The stations were located at the residential areas named; Grdarash Asad, Murtkali, Qushtapa and Sherava Gaura.

Most of the baseline noise measurement results were in compliance with the Guideline Noise Levels of World Bank and Exim Bank while there were slight exceedances detected.

During the baseline noise monitoring period, the existing highway was operating and the noise levels measured in the area are due to the highway and activities of residents in the area.

The pollutants focused at Baseline Air Quality survey are Particulate Matter (PM<sub>10</sub>), Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), and Sulphur Dioxides (SO<sub>2</sub>).

Measured concentrations of PM<sub>10</sub> were compared with the short term limit values of WHO guidelines. The measured PM<sub>10</sub> concentrations were in compliance with the short term values in WHO guidelines.

The measured NO, NO<sub>2</sub> and NO<sub>x</sub> concentrations were below the World Bank Classification and USEPA Standards.

The measured SO<sub>2</sub> concentrations were below the World Bank Classification and USEPA Standards.

The CO levels measured as below the detection limit (5 ppm or 5700 µg/m<sup>3</sup>) of the tubes at each sampling point with the DRAGER tubes.

The landscape pattern, tranquillity, cultural assets and land cover types were considered to define landscape characteristics of the region.

The landscape and visual impacts should be considered during both construction and operation stages of the project. The mitigation measures should also be considered within a Plantation Plan suggested to be presented as a part of Landscape Project.

The existing landscape pattern of the area would not be expected to change at a significant level if the Landscape Project preparation and Plantation Plan Development was established with adequate care, there will have no residual impact expected at and around the project area.

In order to determine the archaeological sensitivity of the area and minimize the impact of the Project on the possible archaeological and cultural assets it is suggested to conduct a Cultural Heritage Survey along the highway route right before the construction activity will start.

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The information and available archaeological data related to the region was determined through literature surveys. There was no significant information obtained from this study since there was no previously conducted specific archeological study. Nevertheless during the site visits conducted, it was determined that there was a mound at Quashtepe and there is a historical graveyard at around KP: 31+000 of the Erbil-Altunkopri Highway Project.

Distribution of flora species according to the phytogeographical regions shows that the area is under the influence of biotic factors. 88 species out of determined a total of 105 species are widespread having high ecological tolerance.

There is no flora species detected around the project site that belongs to the IUCN threat categories. There is no endemic plant at the project site and its environs. In addition, the construction area does not consist of any endemic and threatened species. In this respect, the construction activities do not have harmful affect on the populations of flora both at the project site and its environs.

The highway construction has no specific significant impact on the aquatic fauna. The ecosystem of the project area is specified as steppe and it is usually poor for Amphibian species, having a high relative abundance, terrestrial and is mostly nocturnal (night time active). The highway construction is not expected to adversely affect the toad population.

It is though that the highway construction will not destroy the majority of steppe habitat around and will not cause habitat fragmentation. In this respect, highway construction does not adversely affect to the reptilian population around.

There is no endemic bird around the project site and the affect of highway construction is minor to bird fauna. The activations of fauna species would not be expected to be confined to the construction area of highway. In this respect, the construction activities do not expected to have harmful affect on the populations of mammalian species both at the highway and its environs.

After the completion of baseline environmental assessments for noise and air quality, the future noise levels by the projection of future traffic levels and air quality levels were conducted by the implementation of specific calculation methods.

Noise to be generated is calculated for three stages of the construction works as Borrowpit Area, Pavement Material Source and Road Construction.

The operational noise levels for the surrounding of the Highway were estimated by noise modelling studies. During the studies, the projected number of road vehicles for

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the year 2025 are considered and probable noise levels around the road is estimated.

Noise level estimation studies are performed considering three different stages of the project namely, activities at the borrowpit area and pavement source, and the road construction works. Estimated noise levels are compared with the regulatory noise levels.

The high noise levels detected for construction works could be stated as negligible since they are temporary. The disturbance could be minimized by the suggested mitigation measures specified in the ESMP.

The noise levels associated with operation stage should be given high priority since they will be permanent. These noise levels are mostly not compliance with the regulatory noise levels. For this reason necessary mitigation measures are suggested to minimize the noise levels at the residential areas.

The air quality assessment performed for Erbil-Altunkopri (Perdi) Highway Rehabilitation Project is focused on the estimation of emissions due to construction and operation activities and their contributions to the local air quality.

For the construction phase of the project, emissions from construction activities, equipments and trucks are considered, and dust emissions as the most probable air pollutant is assessed.

On the other hand, for the operation phase the pollutants under investigation are particulate matter (PM), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO) and volatile organic carbons (VOC) which are the possible air pollutants resulting from the road transportation.

As can be seen from the dispersion profiles, the pollutants are concentrated along the highway as expected. The calculated concentrations of SO<sub>2</sub>, PM, NO<sub>x</sub>, VOC and PM10 all complies with the guideline air quality limits of the World Bank and US EPA.

The project site has no direct relationship with the surface water sources and or ground water sources. For this reason, no direct impact on the water quality due to the project is expected.

The surrounding of the project site is suitable for agricultural landscape, but nevertheless the land is not widely used for agricultural applications for the time being. In the future the area would possibly be used for common agricultural activities at a bigger extend.



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In order to minimize the possible future impact on the soil quality around the project site, it is suggested that in case there will be a leakage of fuel from the highway traffic or accidental fuel or chemical leakages, the polluted soil should be removed from the area and it should be either remediated or incinerated.

The project is not a new highway construction process; it is only the improvement of the existing highway project for this reason for all the environmental factors the degree of impact will not be more than the level of the existing impact.

## **11. LIST OF REFERENCES**

### **Herpetofauna (Amphibia & Reptila)**

- Baran, İ. 1976. Türkiye Yılanlarının Taksonomik Revizyonu ve Coğrafi Dağılımları. Tübitak Yayınları No.309, T.B.A.G.Seri No:9,177 pp., Ankara
- Baran, İ. 1987. Türkiye'nin Biyolojik Zenginlikleri, Kurbağa ve Sürüngenler. Türkiye Çevre Sorunları Vakfı Yayını, 181 pp., Ankara
- Baran, İ. 2005. Türkiye Amfibi ve Sürüngenleri. Tübitak Bilim Kitapları. Pelin Matbaası, Ankara.
- Bird, C.G. 1936. The Distribution of Reptiles and Amphibians in Asiatic Turkey. The Annals and Magazine of Natural History. Seri 10,18; 257-281
- Bodenheimer, F.S. 1944. Introduction into the Knowledge of the Amphibia and Reptilia of Turkey. İstanbul Üniversitesi Fen Fakültesi Mecmuası. Seri B.1(9); 1-78
- Demirsoy, A. 1996. Sürüngenler. Meteksan, 205 pp., Ankara
- Demirsoy, A. 1997. Amfibiler. Meteksan, 69 pp., Ankara
- Eiselt, J. 1965. Einege Amphibien und Reptilien aus der Nord-Östlichen Türkei, Gesammelt von Hern H. Steiner. Ann. Naturhist. Mus., 68; 387-399
- Eiselt, J. 1965. Einege Amphibien und Reptilien aus der Nord-Östlichen Türkei, Gesammelt von Hern H. Steiner. Ann. Naturhist. Mus., 68; 387-399
- Kosswig, C. 1950. Herpetologisches aus der Türkei. Mitt. Naturkde., 3; 13-23
- Kosswig, C. 1950. Herpetologisches aus der Türkei. Mitt. Naturkde., 3; 13-23
- Mertens, R. 1952. Amphibien und Reptilien aus der Türkei. İstanbul Üniversitesi Fen Fakültesi Mecmuası. Seri B. 1(17); 41-75
- Venzmer, G. 1922. Neues Verzeichnis der Amphibien und Reptilien von Kleinasien. Zool. Jb. Syst., 46; 43-60

### **Avian fauna**

- Cottridge, D. M. and Porter, R., 2001. A photographic guide to Birds of Egypt and Middle East. New Holland Publisher (UK) Ltd. London.
- Heinzel H., Fitter R., Parslow J., 1995. Pocket Guide to Birds of Britain & Europe with North Africa & Middle East. Herman Heinzel, R S R Fitter & John Parslow, Rotolito Lombarda, Italy.

Snow D. W. and Perrins C. M., 1998: The Birds of the Western Palearctic. Volume 1: Non-Passerine, Volume -2: Passerines. Oxford University Press, New York.

Flint, V. E., Boehme, R. L., Kostin, Y. V., Kuznetsov, A. A., 1984. A field Guide to Birds of Russia and Adjacent Territories. Princeton University Press, Chichester, West Sussex, UK.

Porter, R. F., Christensen, S., Schiermacher – Hansen, P., 2004. Birds of Middle East. A & C Black Publishers Ltd, London.

### **Mammalian fauna**

Cheesman, R. E. and Hinton, M. A. C., 1924. On the Mammals collected in the Desert of Central Arabia by Major R. E. Cheesman between November 1923 and March 1924. Annals Mag. Nat. Hist., 9 (14): 548 – 558.

Corbet, G. B., 1978. The Mammals of the Palaearctic Region: A Taxonomic Review, British Museum (Nat. Hist.), Cornell Univ. Press, London & Ithaca, 314 pp.

Çolak, E., Kivanç, E. and Yiğit, N., 1994. A study on taxonomic status of *Allactaga euphratica* Thomas, 1881 and *Allactaga williamsi* Thomas, 1897 (Rodentia: Dipodidae) in Turkey. Mammalia, 58 (4): 591-600.

Ellerman, J. R. and Morrison-Scott, T. C. S., 1951. Checklist of Palaearctic and Indian Mammals 1758 to 1946. Brit. Mus. Nat. Hist. London, 810 pp.

Harrison, D. L. and Bates, P. J. J., 1991. The Mammals of Arabia, 2nd edition, Harrison Zoological Museum Publication, Sevenoaks (Kent), 354 pp.

Hatt, R. T., 1959. The mammals of Iraq. Misc. Publ. Mus. Zool., Univ. Michigan, No. 106: 1-113 plus 6 plates.

Kock, D. and Nader, I. A., 1983. Pygmy shrew and rodents from the Near East (Mammalia: Soricidae, Rodentia), Senckenbergiana biol., 64 (1-3): 13-23.

Kryštufek, B. and Vohralík, V., 2001b. Mammals of Turkey and Cyprus: Introduction, Checklist, Insectivora, Knjiznica Annales Majora, Koper, Slovenia, 140 pp.

Misonne, X., 1957. Mammifères de la Turquie Sud-Orientale et du nord de la Syrie. Mammalia, 21 (1): 53-67.

Wilson, D. E., and Reeder, D. M., 1993. Mammal Species of the World 2nd ed. Smithsonian, Washington.

### **Flora**

BOISSIER, E., 1867-1888. Flora orientalis, 1-6. Geneva et Basel.

Davis, P.H., 1965-1985. "Flora of Turkey and The East Aegean Islands". Vol: I-IX, Edinburgh Univ. Press. UK.

E. Guest 1980. Flora of Iraq: Vol.I-IX

EIG, A., 1931-32. Les éléments et les groupes phytogéographiques auxiliaires dans la flore palestinienne 2 pts. Feddes Repert. Beic. 63: 1-201.

Rechinger, K. H., 1998. "Flora Iranica". Akademische Druck-u Verlagsonstalt, Graz, Austria.

TAKHTAJAN, A., 1986. Floristic region of the World. Univ.of California press. Los Angeles.

Zohary, M., 1966. "Flora Palaestina". Jerusalem Academic Pres.

ZOHARY,M.,1973. Geobotanical foundations of the Middle East. Vol: 1-2. Stuttgart.

### **Other**

The report Hewler - Kirkuk Highway Hewler - Prde Section (KM.0+000–38+500) General Characteristics, October 2005, Yilmazer Education and Engineering Ltd.

Trans European Motorway Project (TEM) Traffic and Construction Noise Control Report, presented in TEM Group of Experts, Ninth Session, March 1990, Belgrade Yugoslavia.

EEA-EMEP/CORINAIR, 2002. Emission Inventory Guidebook – Snap codes 070100-070500, Road Traffic, EEA (European Environment Agency). Copenhagen.

U.S. Environmental Protection Agency, 1995c. Compilation of Air Pollutant Emission Factors, Stationary Point and Area Sources, AP-42, Volume I. Research Triangle park, NC; AP-42 team.

U.S. Environmental Protection Agency, 1995a. User's Guide for the Industrial Source Complex (ISC3) Dispersion Model, Volume I., Research Triangle Park, North Carolina: Office of Air Quality Planning and Standards Emission, Monitoring and Analysis Division.

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## 12. APPENDICES

1. Geological Map of the Project Area
2. Outputs of the ISCST 3 Air Quality Dispersion Model
3. Environmental and Social management Plan

### **13. PUBLIC CONSULTATION AND DISCLOSURE PLAN FOR THE IMPLEMENTATION PERIOD**

The first phase of public consultation meetings was organized by ÇINAR with the support of YILMAZER at the beginning of the Environmental Assessment Phase of the Project.

The purpose of these meetings was to inform public about the project activities, and to obtain their opinions and suggestions about the project.

These meetings were conducted within the first week of February at 4 villages (Baghamra Afandi, Murtkali, Qushtapa and Sherava Gaura) where residents of these villages attended. Public was invited to these meetings through announcements. Brochure attached to this section including general information about the project was distributed to the participants.

These meetings were not very successful to obtain the opinion about the project since only a very limited number of villagers attend to the meeting and no body would like to present opinions. In addition to that it was not possible to make local women to attend meetings either only women were to attend such meetings.

For this purpose the public consultation job within this project is suggested to be implemented as a stepwise study to be conducted all through the project implementation phases.

Second set of meetings should be conducted at the same villages right before the construction operation will be started. These meetings should be organized by a team of sociologists a man and a women scientist. The men sociologist will organize the meetings with men villagers in the common place of the village. The women sociologist will organize women meetings in one of the village houses by the attendance of only women villagers. The women meetings should be organized by a certain attendance of a respectful woman of each village so that other women will have no doubt to attend to the meeting. There is no need to a formal organization of the meetings since villagers would feel uncomfortable to join to the meetings if there are announcements or previously organized applications such as photograph machines or cameras etc. For this reason it is suggested to conduct the meetings right after the Friday noon pray at the mosque of the village.

A third set of meetings should again be organized by the same sociologist experts at the same villages during the construction to understand the possible complaints about the construction activities.

The reports of these meetings should be prepared by the sociologists without taking

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notes during the meetings and submitted to the construction contractor, GDRB and World Bank experts so that the construction contractor would have a chance to minimize the unfavourable operations and minimize the environmental and social impact.

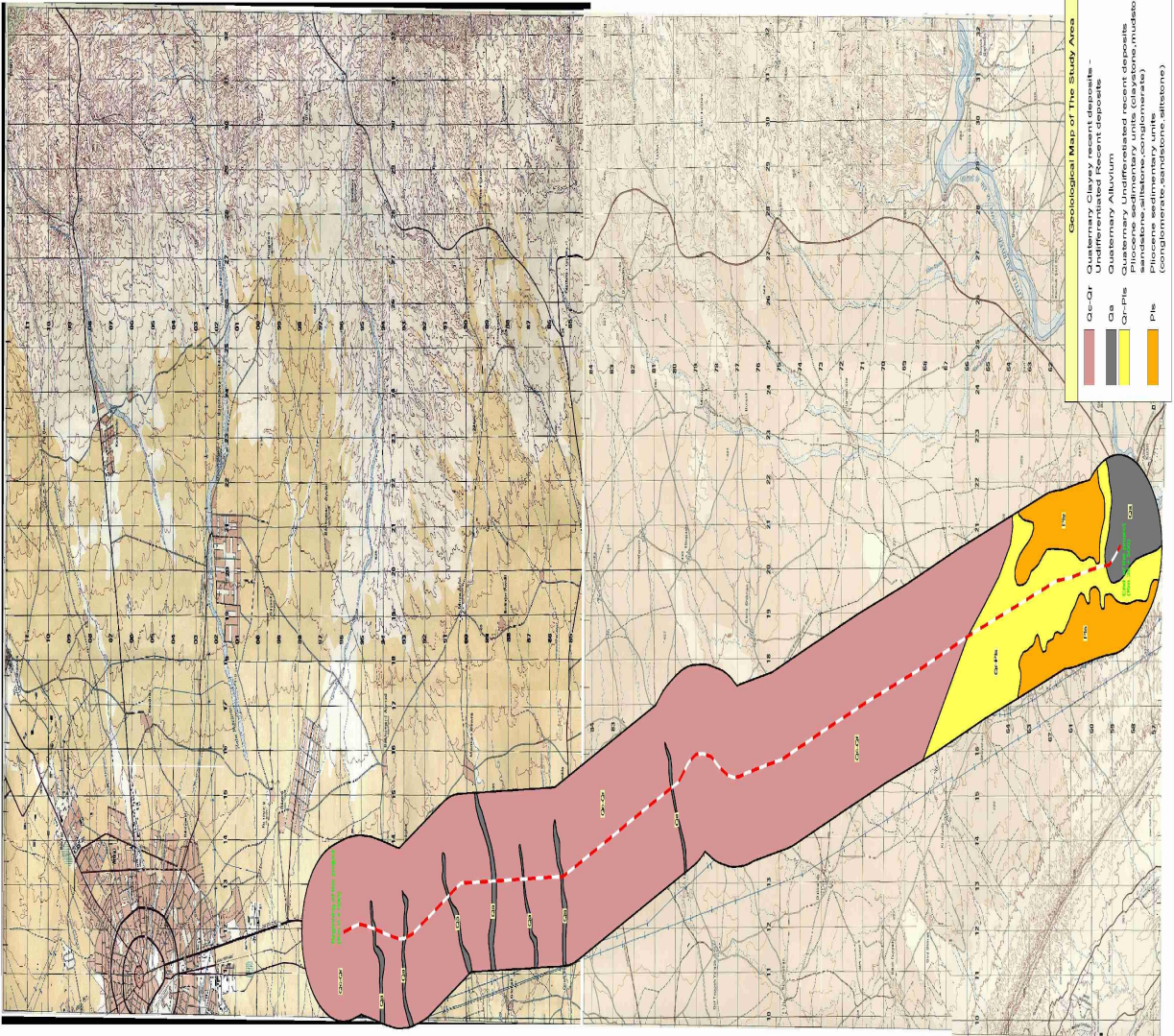
It should be remembered that public consultation business is very new for Iraq people and it will take some time for this people to feel themselves comfortable to present their opinions in such meetings. So a stepwise and mild approach should be applied and at the first applications it would be possible to get no valuable outcome of the public consultation.

The disclosure of the Environmental Impact Assessment work would be the acceptance of the Environmental Impact Assessment report by the GDRB and World Bank as the final report.

## **APPENDIX 1.**

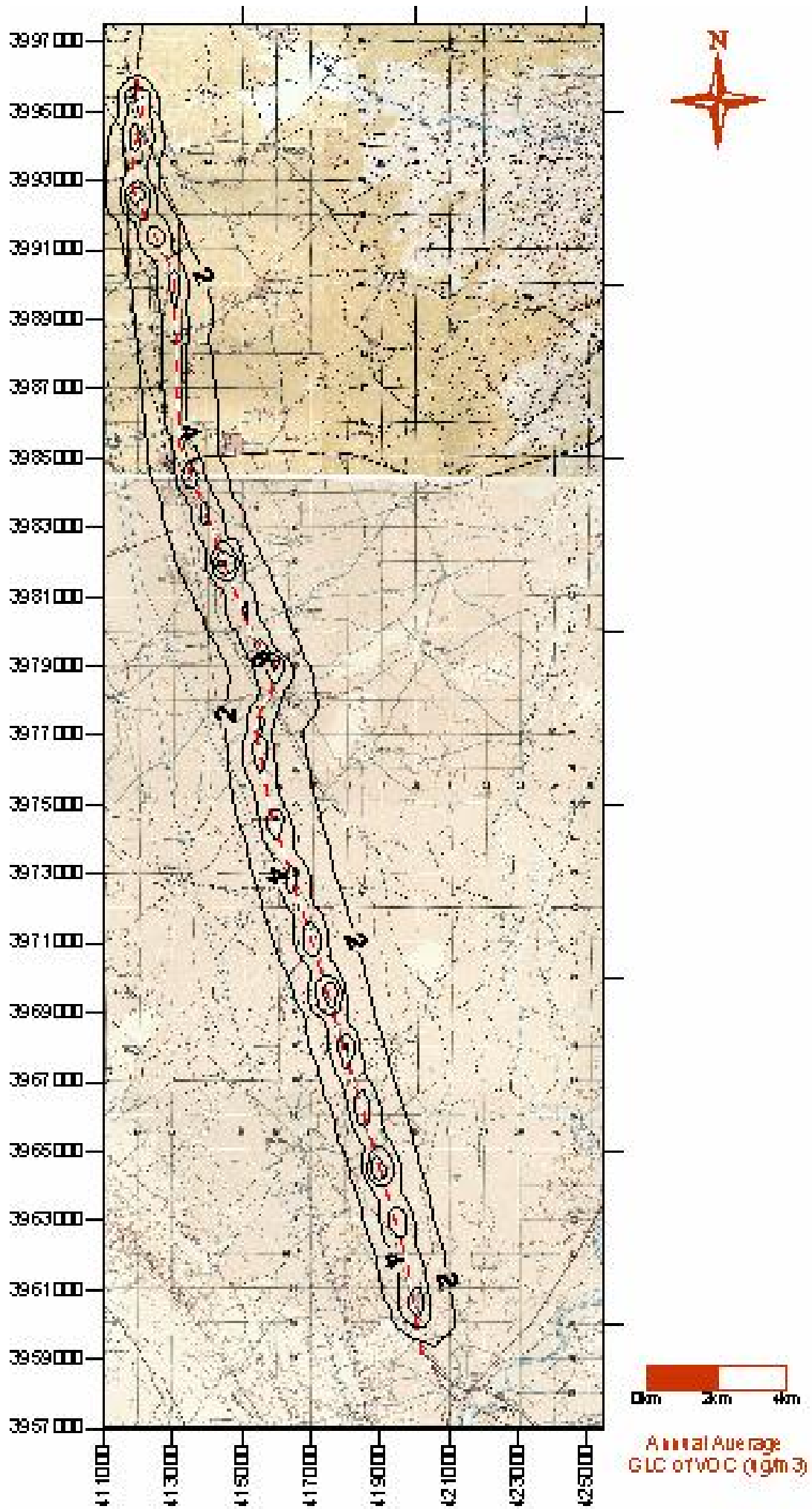
**GEOLOGICAL MAP OF THE STUDY AREA**

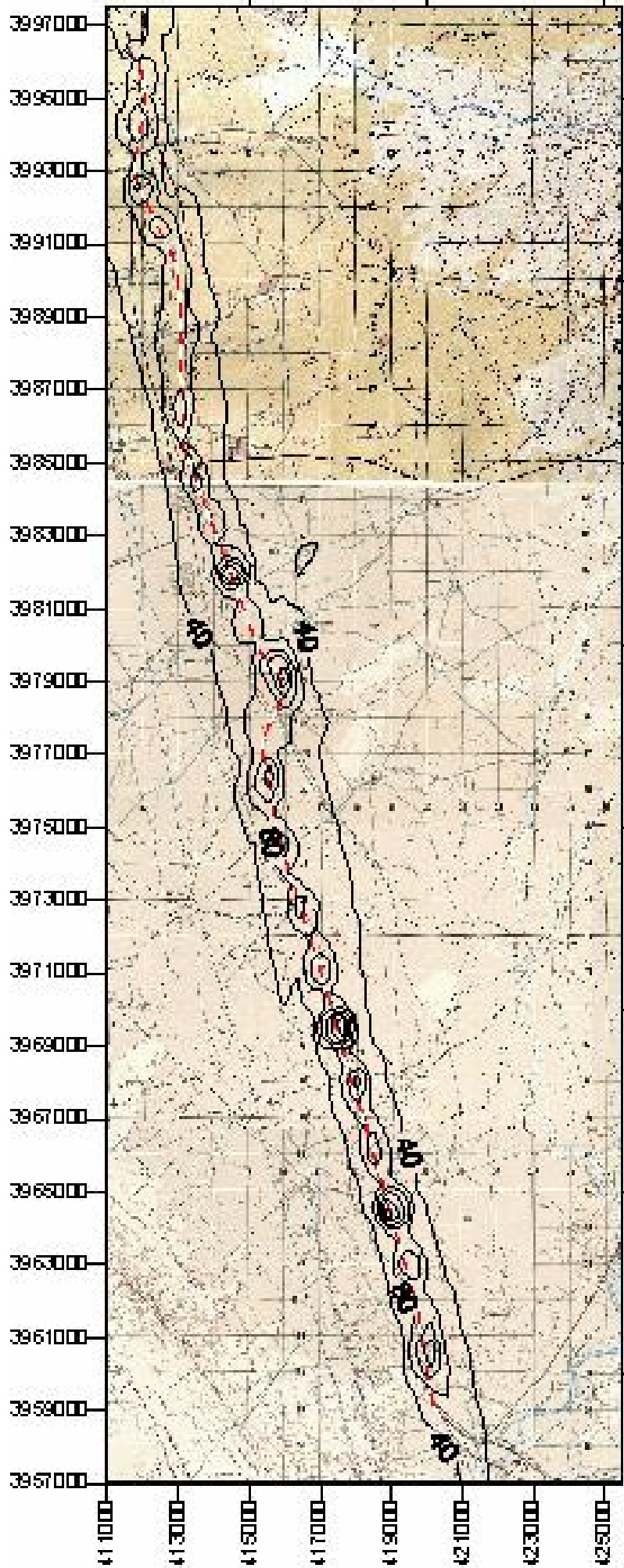




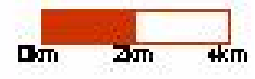
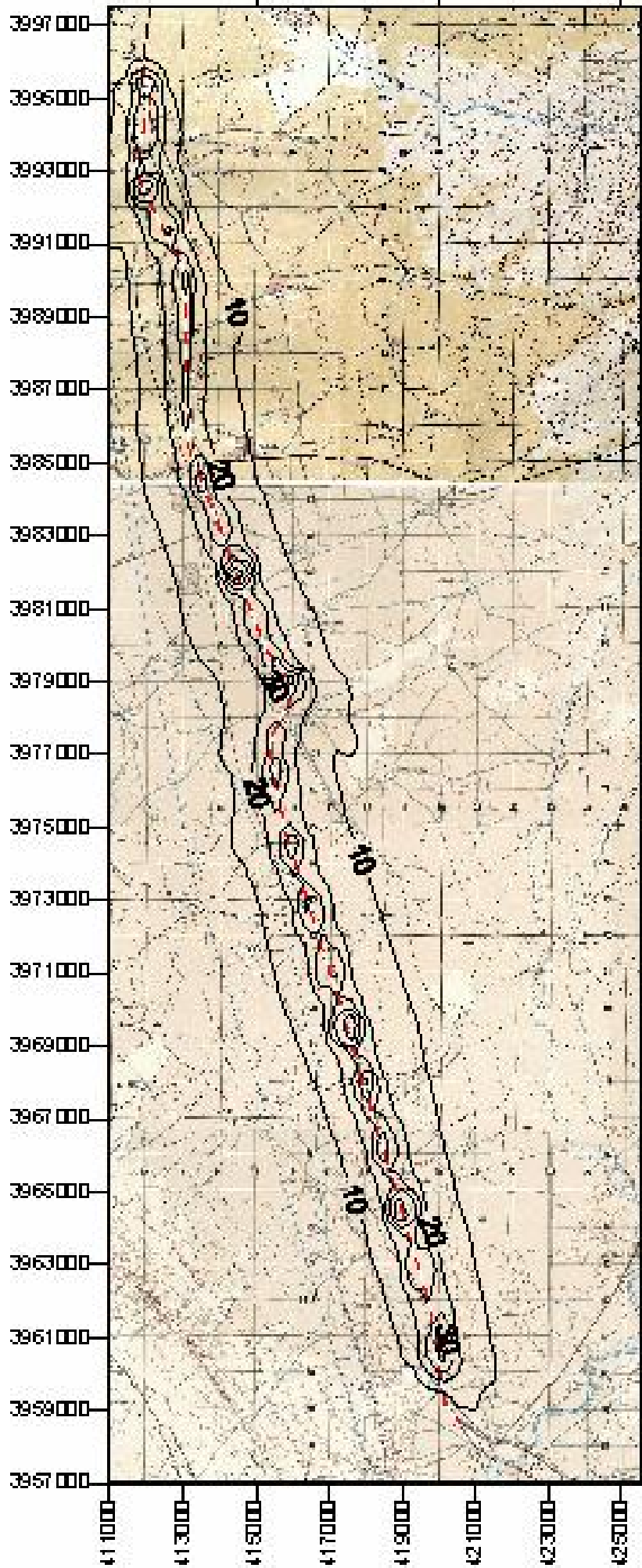
## **APPENDIX 2.**

### **RESULTS OF THE AIR QUALITY MODELING**

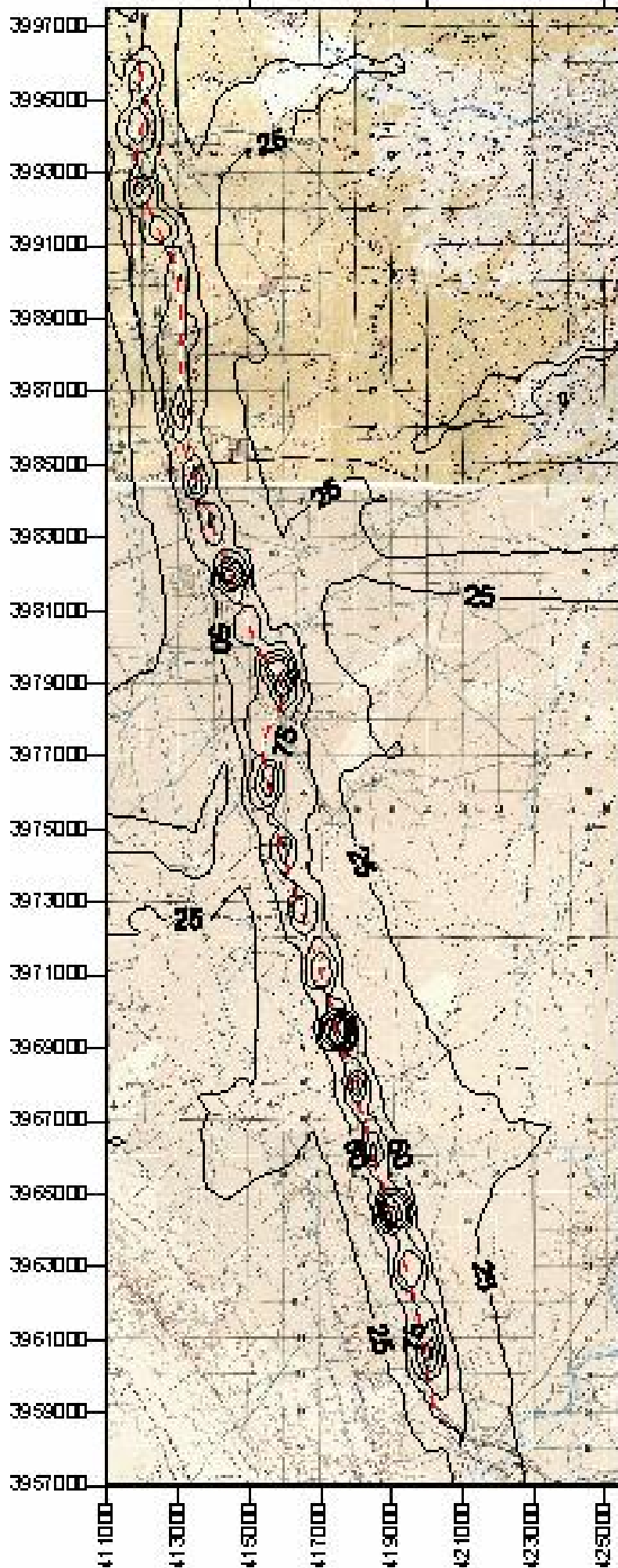




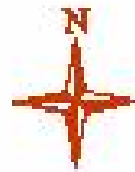
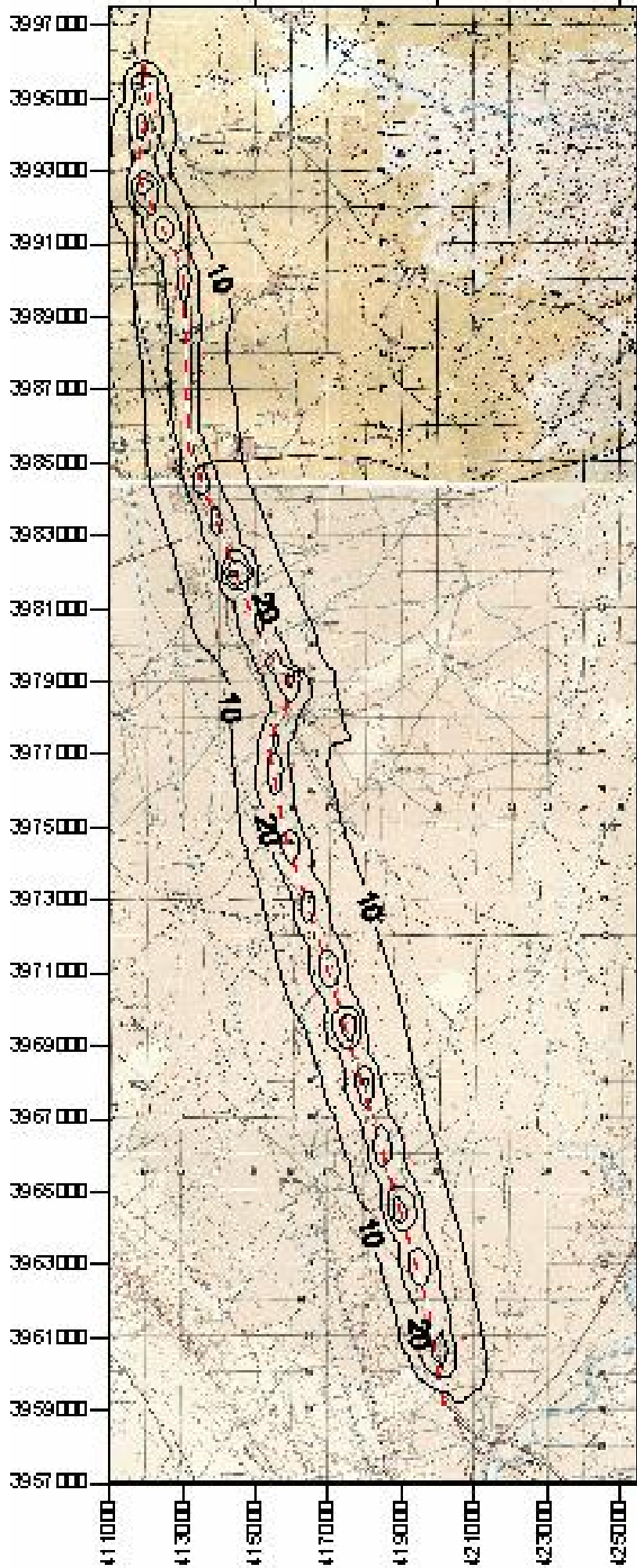
Maximum Daily Average  
GLC of CO (ug/m<sup>3</sup>)



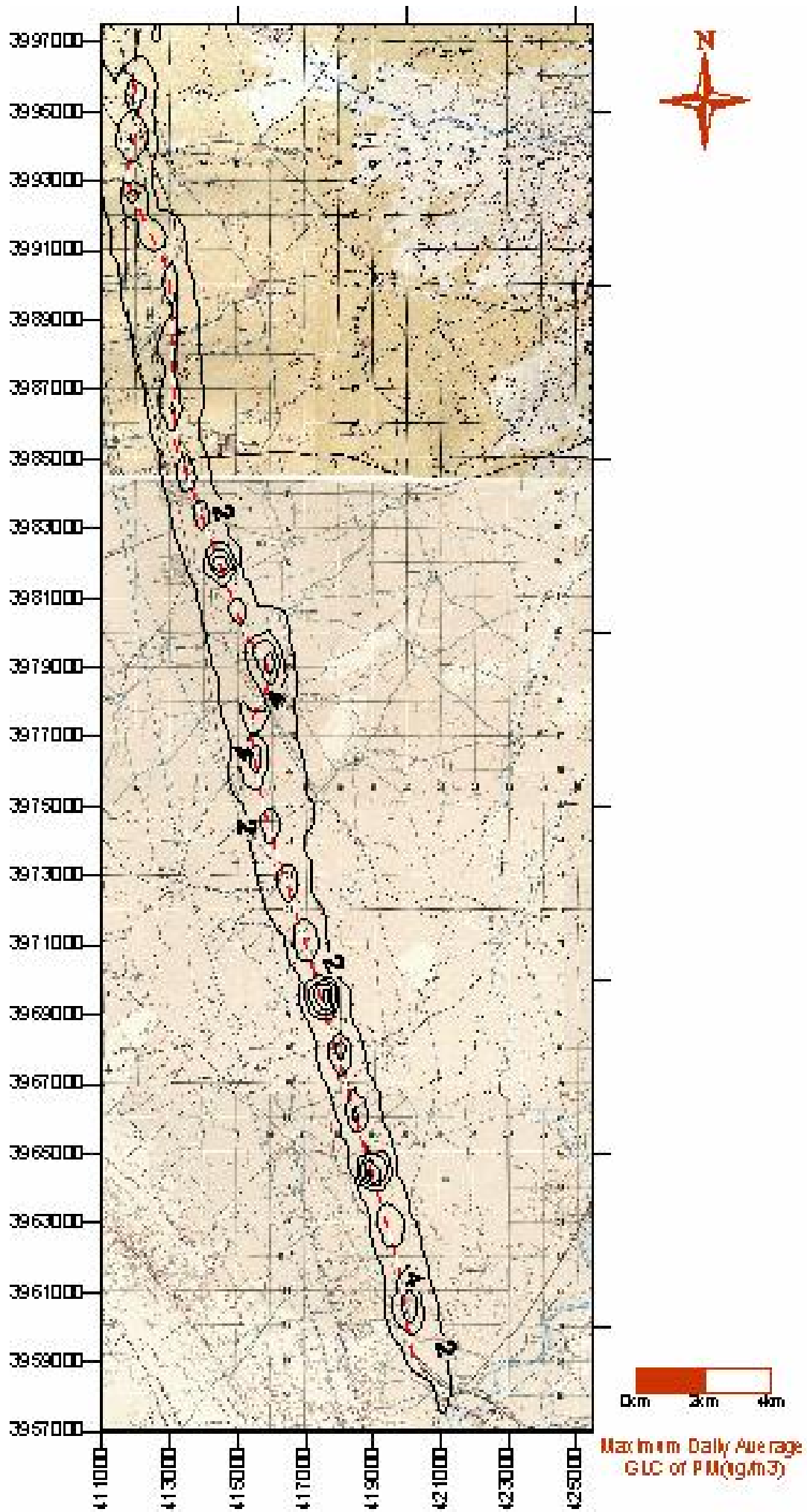
Annual Average  
G LC of CO ( $\mu\text{g}/\text{m}^3$ )



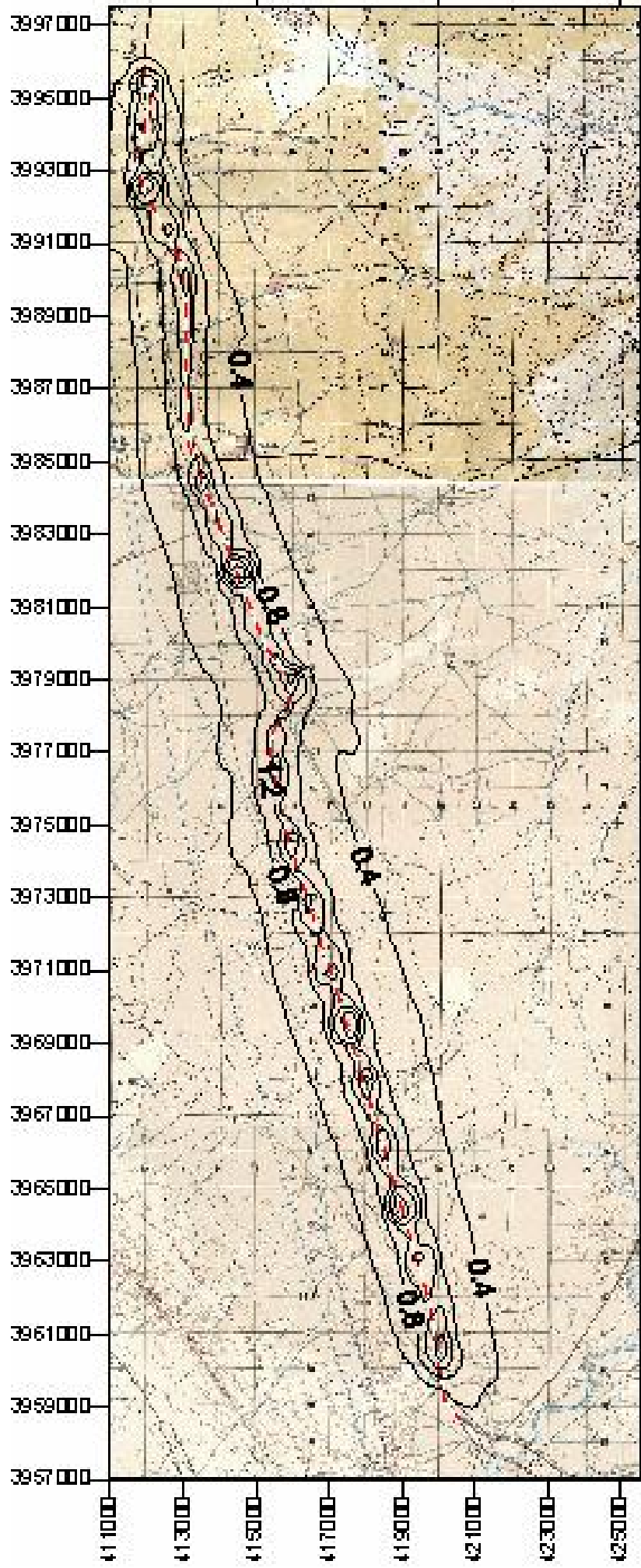
Maximum Daily Average  
G/LC of NOx (µg/m³)



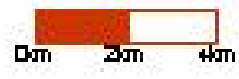
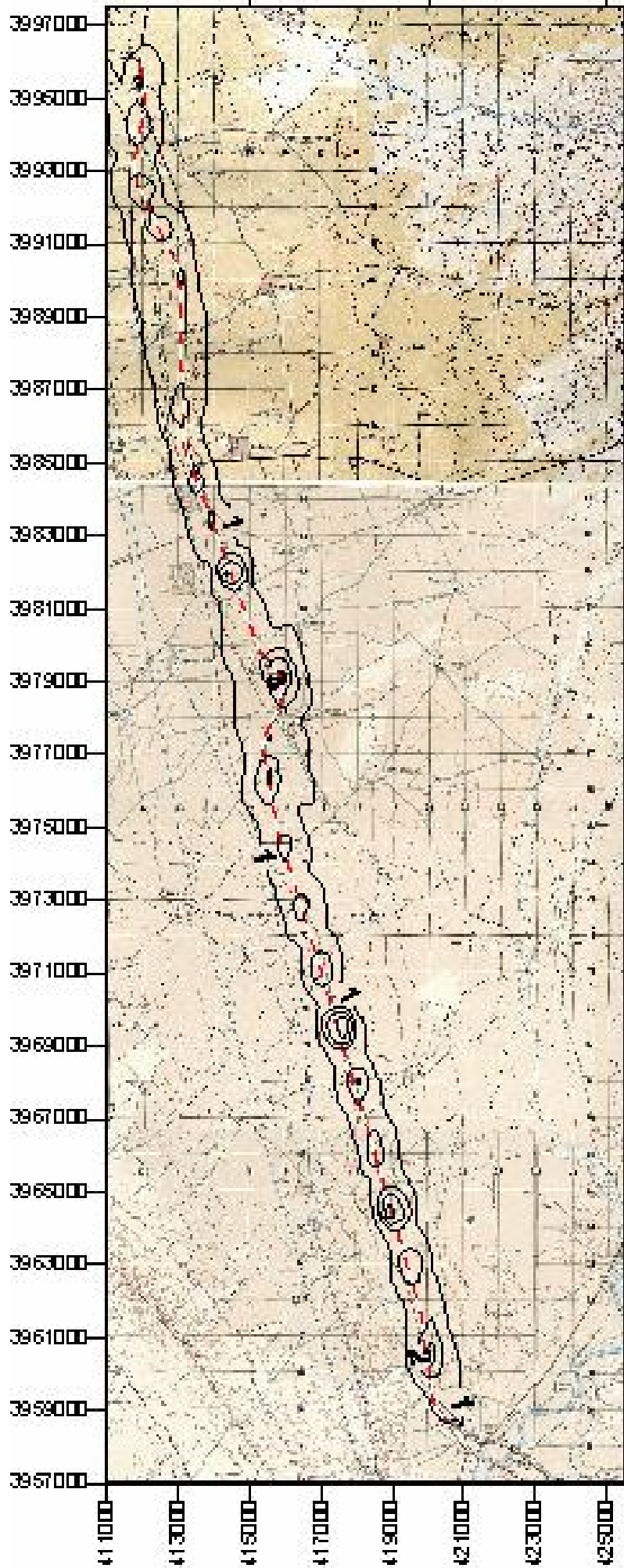
Annual Average  
GLC of NOx ( $\mu\text{g}/\text{m}^3$ )



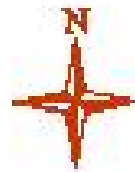
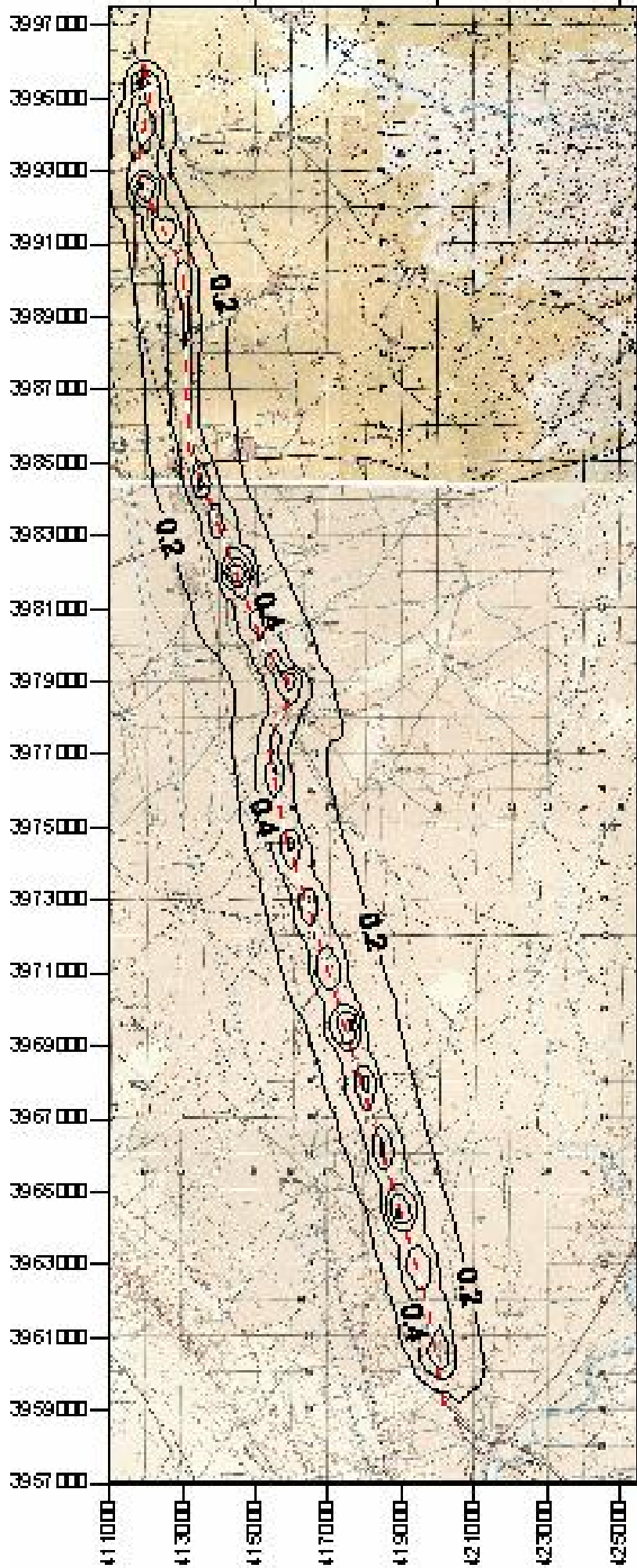




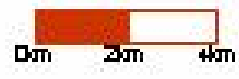
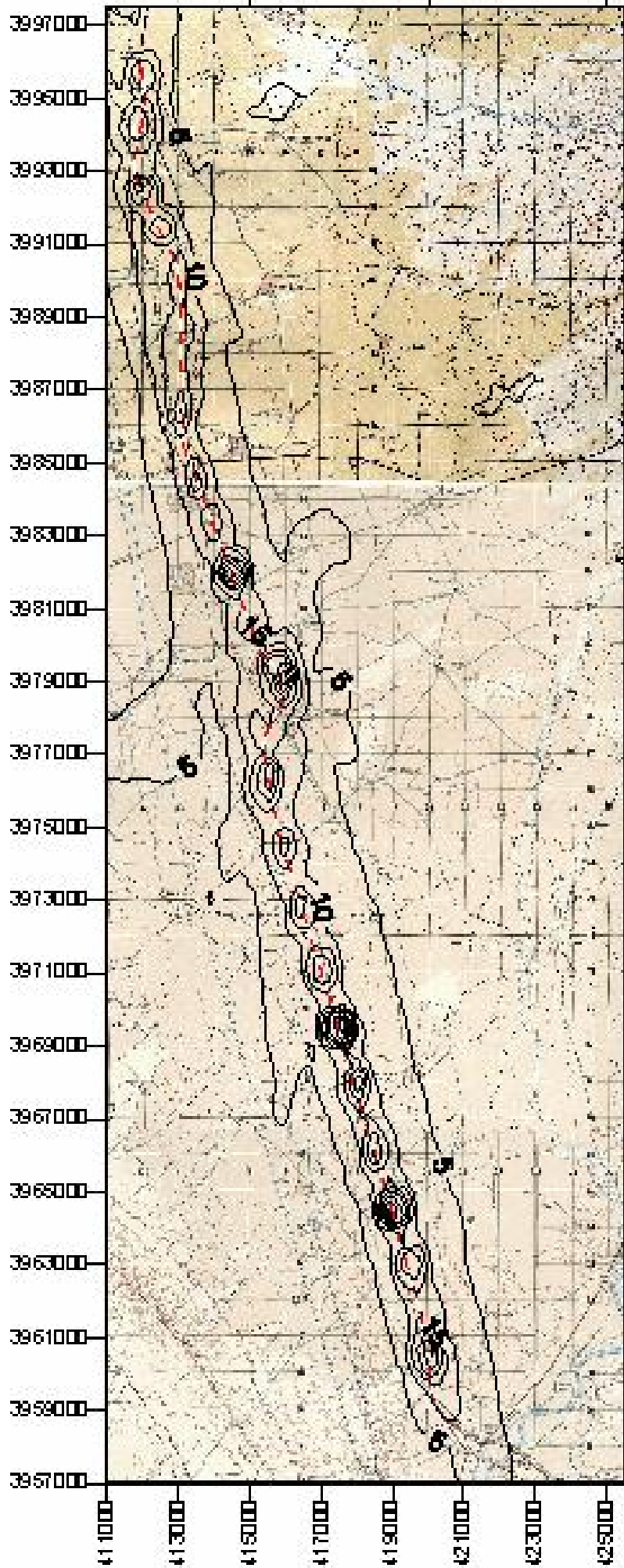
Annual Average G LC of PM ( $\mu\text{g}/\text{m}^3$ )



Maximum Daily Average  
GLC or SO<sub>2</sub> (µg/m<sup>3</sup>)



Annual Average  
GLC of SO<sub>2</sub> (µg/m<sup>3</sup>)



Maximum Daily Average  
GIC or VOC ( $\mu\text{g}/\text{m}^3$ )

**IRAQ ERBIL-ALTUNKOPRI (PERDI) ROAD IMPROVEMENT PROJECT  
AIR DISPERSION MODELING**

**Model Setup Options Summary**

\*\*Intermediate Terrain Processing is Selected  
\*\*Model Is Setup For Calculation of Average CONCentration Values.  
-- SCAVENGING/DEPOSITION LOGIC --  
\*\*Model Uses NO DRY DEPLETION. DDPLETE = F  
\*\*Model Uses NO WET DEPLETION. WDPLETE = F  
\*\*NO WET SCAVENGING Data Provided.  
\*\*NO GAS DRY DEPOSITION Data Provided.  
\*\*Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations  
\*\*Model Uses RURAL Dispersion.  
\*\*Model Uses Regulatory DEFAULT Options:  
    1. Final Plume Rise.  
    2. Stack-tip Downwash.  
    3. Buoyancy-induced Dispersion.  
    4. Use Calms Processing Routine.  
    5. Not Use Missing Data Processing Routine.  
    6. Default Wind Profile Exponents.  
    7. Default Vertical Potential Temperature Gradients.  
    8. "Upper Bound" Values for Supersquat Buildings.  
    9. No Exponential Decay for RURAL Mode  
\*\*Model Accepts Receptors on ELEV Terrain.  
\*\*Model Assumes No FLAGPOLE Receptor Heights.  
\*\*Model Calculates 1 Short Term Average(s) of: 24-HR and Calculates ANNUAL Averages  
\*\*This Run Includes: 482 Source(s); 1 Source Group(s); and 784 Receptor(s)  
\*\*The Model Assumes A Pollutant Type of: CO  
\*\*Model Set To Continue RUNning After the Setup Testing.  
\*\*Output Options Selected:  
    Model Outputs Tables of ANNUAL Averages by Receptor  
    Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE  
Keyword)  
    Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)  
\*\*NOTE: The Following Flags May Appear Following CONC Values:  
    c for Calm Hours  
    m for Missing Hours  
    b for Both Calm and Missing Hours

Output Data for Carbon Monoxide (CO)

\*\*\* THE ANNUAL ( 1 YRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

** CONC OF CO		IN MICROGRAMS/M**3		**	
X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
411000.00	3997500.00	1.58621	411000.00	3997000.00	2.43332
411000.00	3996500.00	2.97592	411000.00	3996000.00	5.25374
411000.00	3995500.00	8.91093	411000.00	3995000.00	9.62121
411000.00	3994500.00	9.06005	411000.00	3994000.00	9.80188
411000.00	3993500.00	10.82367	411000.00	3993000.00	11.71372
411000.00	3992500.00	11.02021	411000.00	3992000.00	10.83159
411000.00	3991500.00	11.07744	411000.00	3991000.00	10.46811
411000.00	3990500.00	8.84526	411000.00	3990000.00	7.59619
411000.00	3989500.00	6.92666	411000.00	3989000.00	6.72959
411000.00	3988500.00	6.66483	411000.00	3988000.00	6.75679
411000.00	3987500.00	6.83588	411000.00	3987000.00	6.85005
411000.00	3986500.00	6.86835	411000.00	3986000.00	6.85439
411000.00	3985500.00	6.80048	411000.00	3985000.00	6.71992
411500.00	3997500.00	1.20440	411500.00	3997000.00	2.18642
411500.00	3996500.00	2.30343	411500.00	3996000.00	5.88038
411500.00	3995500.00	11.96937	411500.00	3995000.00	12.03578
411500.00	3994500.00	15.63482	411500.00	3994000.00	18.45165
411500.00	3993500.00	17.91745	411500.00	3993000.00	21.31124
411500.00	3992500.00	19.64479	411500.00	3992000.00	14.26926
411500.00	3991500.00	11.69107	411500.00	3991000.00	10.74200
411500.00	3990500.00	10.03436	411500.00	3990000.00	9.75981
411500.00	3989500.00	9.55310	411500.00	3989000.00	9.21989
411500.00	3988500.00	8.80991	411500.00	3988000.00	8.54261
411500.00	3987500.00	8.50251	411500.00	3987000.00	8.56352
411500.00	3986500.00	8.63778	411500.00	3986000.00	8.67105
411500.00	3985500.00	8.81545	411500.00	3985000.00	8.62055
411500.00	3984500.00	8.36707	411500.00	3984000.00	8.06047
411500.00	3983500.00	7.35765	412000.00	3997500.00	1.38888
412000.00	3997000.00	1.84748	412000.00	3996500.00	2.80895
412000.00	3996000.00	7.25058	412000.00	3995500.00	51.11951
412000.00	3995000.00	34.23392	412000.00	3994500.00	50.31726
412000.00	3994000.00	48.02734	412000.00	3993500.00	35.12477
412000.00	3993000.00	31.11630	412000.00	3992500.00	86.48380
412000.00	3992000.00	29.79166	412000.00	3991500.00	22.33493
412000.00	3991000.00	18.09064	412000.00	3990500.00	15.99352
412000.00	3990000.00	14.43939	412000.00	3989500.00	13.77341
412000.00	3989000.00	13.40112	412000.00	3988500.00	13.00708
412000.00	3988000.00	12.27793	412000.00	3987500.00	11.53146
412000.00	3987000.00	11.26923	412000.00	3986500.00	11.36767
412000.00	3986000.00	11.29377	412000.00	3985500.00	11.09044
412000.00	3985000.00	10.71210	412000.00	3984500.00	10.44166
412000.00	3984000.00	9.98885	412000.00	3983500.00	9.28556
412000.00	3983000.00	8.41917	412000.00	3982500.00	7.97060
412000.00	3982000.00	7.44692	412500.00	3997500.00	1.24235
412500.00	3997000.00	1.65947	412500.00	3996500.00	1.87565
412500.00	3996000.00	3.04731	412500.00	3995500.00	8.64435
412500.00	3995000.00	15.83373	412500.00	3994500.00	14.68929
412500.00	3994000.00	15.91474	412500.00	3993500.00	13.89935
412500.00	3993000.00	12.95522	412500.00	3992500.00	15.09950
412500.00	3992000.00	24.77437	412500.00	3991500.00	56.93976
412500.00	3991000.00	32.50875	412500.00	3990500.00	20.94496
412500.00	3990000.00	16.94534	412500.00	3989500.00	16.44039
412500.00	3989000.00	16.38818	412500.00	3988500.00	16.96663
412500.00	3988000.00	17.59823	412500.00	3987500.00	17.59999
412500.00	3987000.00	17.01033	412500.00	3986500.00	15.58473
412500.00	3986000.00	14.97892	412500.00	3985500.00	14.14397
412500.00	3985000.00	13.61129	412500.00	3984500.00	13.04357
412500.00	3984000.00	12.02858	412500.00	3983500.00	11.24464
412500.00	3983000.00	10.38646	412500.00	3982500.00	9.40386
412500.00	3982000.00	8.76520	412500.00	3981500.00	8.30313
412500.00	3981000.00	8.22173	412500.00	3980500.00	7.89241
413000.00	3997500.00	1.47293	413000.00	3997000.00	1.56798
413000.00	3996500.00	1.60506	413000.00	3996000.00	1.70074
413000.00	3995500.00	4.18225	413000.00	3995000.00	5.82890
413000.00	3994500.00	9.11225	413000.00	3994000.00	9.53183
413000.00	3993500.00	8.97067	413000.00	3993000.00	10.24381
413000.00	3992500.00	11.45548	413000.00	3992000.00	12.60807
413000.00	3991500.00	17.09344	413000.00	3991000.00	24.91046
413000.00	3990500.00	36.04024	413000.00	3990000.00	51.59335
413000.00	3989500.00	40.89533	413000.00	3989000.00	38.37769
413000.00	3988500.00	36.34415	413000.00	3988000.00	34.76791
413000.00	3987500.00	34.09206	413000.00	3987000.00	33.75914
413000.00	3986500.00	34.48500	413000.00	3986000.00	32.81044
413000.00	3985500.00	26.24549	413000.00	3985000.00	22.69220
413000.00	3984500.00	18.50555	413000.00	3984000.00	15.18068

413000.00	3983500.00	15.18132	413000.00	3983000.00	13.75630
413000.00	3982500.00	12.67800	413000.00	3982000.00	11.63831
413000.00	3981500.00	10.84562	413000.00	3981000.00	10.26254
413000.00	3980500.00	9.85752	413000.00	3980000.00	8.99032
413000.00	3979500.00	8.49279	413500.00	3997500.00	1.10495
413500.00	3997000.00	1.11296	413500.00	3996500.00	1.14620
413500.00	3996000.00	1.33770	413500.00	3995500.00	1.80285
413500.00	3995000.00	4.59613	413500.00	3994500.00	4.54453
413500.00	3994000.00	6.45152	413500.00	3993500.00	7.71472
413500.00	3993000.00	6.84170	413500.00	3992500.00	7.16573
413500.00	3992000.00	8.81048	413500.00	3991500.00	9.83443
413500.00	3991000.00	12.57857	413500.00	3990500.00	16.33655
413500.00	3990000.00	20.02703	413500.00	3989500.00	18.54856
413500.00	3989000.00	22.83846	413500.00	3988500.00	22.86706
413500.00	3988000.00	21.48733	413500.00	3987500.00	20.71995
413500.00	3987000.00	20.42038	413500.00	3986500.00	20.77349
413500.00	3986000.00	21.81846	413500.00	3985500.00	26.37105
413500.00	3985000.00	35.07578	413500.00	3984500.00	55.45737
413500.00	3984000.00	32.31726	413500.00	3983500.00	22.05893
413500.00	3983000.00	18.01407	413500.00	3982500.00	16.18554
413500.00	3982000.00	14.75469	413500.00	3981500.00	13.21677
413500.00	3981000.00	12.26994	413500.00	3980500.00	11.85633
413500.00	3980000.00	10.86980	413500.00	3979500.00	9.94339
413500.00	3979000.00	9.36769	413500.00	3978000.00	8.71676
413500.00	3977500.00	8.82925	413500.00	3977000.00	8.84547
413500.00	3976500.00	8.66910	413500.00	3976000.00	8.10995
413500.00	3975500.00	7.85589	413500.00	3975000.00	7.43250
413500.00	3974500.00	7.18418	414000.00	3997500.00	0.88297
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414000.00	3996000.00	1.15279	414000.00	3995500.00	1.33414
414000.00	3995000.00	3.41449	414000.00	3994500.00	3.89879
414000.00	3994000.00	3.63511	414000.00	3993500.00	5.05869
414000.00	3993000.00	6.38360	414000.00	3992500.00	6.14893
414000.00	3992000.00	6.65782	414000.00	3991500.00	7.11568
414000.00	3991000.00	7.99829	414000.00	3990500.00	9.59207
414000.00	3990000.00	12.16847	414000.00	3989500.00	13.51032
414000.00	3989000.00	13.19170	414000.00	3988500.00	10.91398
414000.00	3988000.00	13.32472	414000.00	3987500.00	14.55168
414000.00	3987000.00	14.46376	414000.00	3986500.00	14.30302
414000.00	3986000.00	14.15304	414000.00	3985500.00	14.44584
414000.00	3985000.00	15.55528	414000.00	3984500.00	18.36464
414000.00	3984000.00	29.47277	414000.00	3983500.00	45.05847
414000.00	3983000.00	41.94043	414000.00	3982500.00	23.99866
414000.00	3982000.00	18.58562	414000.00	3981500.00	16.09899
414000.00	3981000.00	13.63256	414000.00	3980500.00	12.81182
414000.00	3980000.00	12.16424	414000.00	3979500.00	10.78753
414000.00	3979000.00	10.08363	414000.00	3978500.00	9.68520
414000.00	3978000.00	9.57189	414000.00	3977500.00	9.71444
414000.00	3977000.00	9.98076	414000.00	3976500.00	9.55175
414000.00	3976000.00	8.92551	414000.00	3975500.00	8.42725
414000.00	3975000.00	8.17252	414000.00	3974500.00	8.24325
414000.00	3974000.00	8.56280	414000.00	3973500.00	8.60370
414000.00	3973000.00	8.43076	414500.00	3992500.00	5.57300
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414500.00	3991000.00	6.43238	414500.00	3990500.00	6.76916
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414500.00	3989000.00	10.68092	414500.00	3988500.00	10.76973
414500.00	3988000.00	8.81926	414500.00	3987500.00	8.65806
414500.00	3987000.00	9.94713	414500.00	3986500.00	11.08801
414500.00	3986000.00	11.27846	414500.00	3985500.00	11.46729
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414500.00	3980000.00	15.62319	414500.00	3979500.00	13.36618
414500.00	3979000.00	12.05562	414500.00	3978500.00	11.46144
414500.00	3978000.00	11.69663	414500.00	3977500.00	11.73099
414500.00	3977000.00	11.80850	414500.00	3976500.00	10.98756
414500.00	3976000.00	10.19425	414500.00	3975500.00	10.37821
414500.00	3975000.00	11.19904	414500.00	3974500.00	11.05842
414500.00	3974000.00	10.23157	414500.00	3973500.00	9.08037
414500.00	3973000.00	8.28625	414500.00	3972500.00	7.84777
414500.00	3972000.00	7.55493	414500.00	3971500.00	7.26216
415000.00	3991000.00	5.83521	415000.00	3990500.00	5.93906
415000.00	3990000.00	5.95289	415000.00	3989500.00	6.62190
415000.00	3989000.00	7.45488	415000.00	3988500.00	8.88246
415000.00	3988000.00	9.33320	415000.00	3987500.00	8.06428
415000.00	3987000.00	7.36896	415000.00	3986500.00	7.57574
415000.00	3986000.00	8.38205	415000.00	3985500.00	9.26257
415000.00	3985000.00	9.86623	415000.00	3984500.00	10.21694

415000.00	3984000.00	11.03221	415000.00	3983500.00	12.35049
415000.00	3983000.00	13.68390	415000.00	3982500.00	16.30420
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415000.00	3981000.00	40.41934	415000.00	3980500.00	46.57255
415000.00	3980000.00	28.49551	415000.00	3979500.00	19.71659
415000.00	3979000.00	14.83953	415000.00	3978500.00	15.07841
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415000.00	3977000.00	18.52662	415000.00	3976500.00	16.99913
415000.00	3976000.00	18.75075	415000.00	3975500.00	15.94071
415000.00	3975000.00	13.14435	415000.00	3974500.00	11.81699
415000.00	3974000.00	10.90519	415000.00	3973500.00	10.22917
415000.00	3973000.00	9.51683	415000.00	3972500.00	8.82069
415000.00	3972000.00	8.39867	415000.00	3971500.00	8.11297
415000.00	3971000.00	7.82879	415000.00	3970500.00	7.59010
415000.00	3970000.00	7.39125	415500.00	3985500.00	6.90813
415500.00	3985000.00	7.55976	415500.00	3984500.00	8.38490
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415500.00	3980000.00	30.85803	415500.00	3979500.00	49.09078
415500.00	3979000.00	27.48329	415500.00	3978500.00	24.26455
415500.00	3978000.00	26.26339	415500.00	3977500.00	41.10578
415500.00	3977000.00	37.02539	415500.00	3976500.00	56.94526
415500.00	3976000.00	39.00512	415500.00	3975500.00	31.20763
415500.00	3975000.00	25.96124	415500.00	3974500.00	21.40282
415500.00	3974000.00	17.87496	415500.00	3973500.00	15.63208
415500.00	3973000.00	13.97982	415500.00	3972500.00	12.66813
415500.00	3972000.00	11.53707	415500.00	3971500.00	10.72546
415500.00	3971000.00	10.03912	415500.00	3970500.00	9.42064
415500.00	3970000.00	8.89499	415500.00	3969500.00	8.46975
415500.00	3969000.00	8.14252	415500.00	3968500.00	7.86377
415500.00	3968000.00	7.60965	416000.00	3984500.00	6.50638
416000.00	3984000.00	7.14490	416000.00	3983500.00	7.75918
416000.00	3983000.00	8.74274	416000.00	3982500.00	9.27374
416000.00	3982000.00	10.24383	416000.00	3981500.00	11.56190
416000.00	3981000.00	12.91359	416000.00	3980500.00	14.17934
416000.00	3980000.00	16.05474	416000.00	3979500.00	21.51784
416000.00	3979000.00	63.39233	416000.00	3978500.00	34.55835
416000.00	3978000.00	28.57747	416000.00	3977500.00	22.88242
416000.00	3977000.00	19.16238	416000.00	3976500.00	18.55330
416000.00	3976000.00	22.14770	416000.00	3975500.00	24.81786
416000.00	3975000.00	30.96420	416000.00	3974500.00	56.51912
416000.00	3974000.00	37.79740	416000.00	3973500.00	26.16832
416000.00	3973000.00	20.98839	416000.00	3972500.00	17.87338
416000.00	3972000.00	15.57732	416000.00	3971500.00	13.91327
416000.00	3971000.00	12.78296	416000.00	3970500.00	11.74150
416000.00	3970000.00	10.87325	416000.00	3969500.00	10.19439
416000.00	3969000.00	9.62885	416000.00	3968500.00	9.13861
416000.00	3968000.00	8.71080	416000.00	3967500.00	8.32861
416000.00	3967000.00	7.97868	416000.00	3966500.00	7.67951
416500.00	3983000.00	6.70295	416500.00	3982500.00	7.27022
416500.00	3982000.00	7.94175	416500.00	3981500.00	8.80983
416500.00	3981000.00	10.13547	416500.00	3980500.00	11.59282
416500.00	3980000.00	12.41374	416500.00	3979500.00	13.92030
416500.00	3979000.00	16.17315	416500.00	3978500.00	22.01956
416500.00	3978000.00	12.75788	416500.00	3977500.00	16.00140
416500.00	3977000.00	16.75006	416500.00	3976500.00	15.57067
416500.00	3976000.00	14.45491	416500.00	3975500.00	15.46658
416500.00	3975000.00	15.59432	416500.00	3974500.00	16.87826
416500.00	3974000.00	21.70925	416500.00	3973500.00	28.48342
416500.00	3973000.00	48.03632	416500.00	3972500.00	43.03754
416500.00	3972000.00	25.96687	416500.00	3971500.00	20.52509
416500.00	3971000.00	17.18931	416500.00	3970500.00	14.81924
416500.00	3970000.00	13.08909	416500.00	3969500.00	11.93268
416500.00	3969000.00	11.02022	416500.00	3968500.00	10.24995
416500.00	3968000.00	9.64952	416500.00	3967500.00	9.20964
416500.00	3967000.00	8.81036	416500.00	3966500.00	8.43060
416500.00	3966000.00	8.06893	416500.00	3965500.00	7.74703
416500.00	3965000.00	7.45326	417000.00	3982000.00	6.72832
417000.00	3981500.00	7.33241	417000.00	3981000.00	8.06771
417000.00	3980500.00	8.78869	417000.00	3980000.00	9.50663
417000.00	3979500.00	10.49296	417000.00	3979000.00	12.40518
417000.00	3978500.00	11.31801	417000.00	3978000.00	14.79060
417000.00	3977500.00	11.73129	417000.00	3977000.00	9.20142
417000.00	3976500.00	10.97400	417000.00	3976000.00	12.84964
417000.00	3975500.00	12.85198	417000.00	3975000.00	13.41772
417000.00	3974500.00	13.90858	417000.00	3974000.00	13.86859
417000.00	3973500.00	15.32239	417000.00	3973000.00	17.94594
417000.00	3972500.00	21.30176	417000.00	3972000.00	28.13578
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417000.00	3970500.00	30.27306	417000.00	3970000.00	21.92017
417000.00	3969500.00	17.77571	417000.00	3969000.00	15.23483
417000.00	3968500.00	13.45480	417000.00	3968000.00	12.09540
417000.00	3967500.00	11.03677	417000.00	3967000.00	10.20707
417000.00	3966500.00	9.48999	417000.00	3966000.00	8.94380
417000.00	3965500.00	8.48859	417000.00	3965000.00	8.13503
417000.00	3964500.00	7.80529	417000.00	3964000.00	7.41416
417000.00	3963500.00	7.03826	417500.00	3980500.00	6.83881
417500.00	3980000.00	7.69192	417500.00	3979500.00	8.52977
417500.00	3979000.00	10.02367	417500.00	3978500.00	10.52075
417500.00	3978000.00	9.56147	417500.00	3977500.00	11.70765
417500.00	3977000.00	10.70434	417500.00	3976500.00	7.84810
417500.00	3976000.00	8.11204	417500.00	3975500.00	9.20905
417500.00	3975000.00	10.43832	417500.00	3974500.00	11.57552
417500.00	3974000.00	12.48443	417500.00	3973500.00	12.50725
417500.00	3973000.00	13.07081	417500.00	3972500.00	14.35667
417500.00	3972000.00	15.81872	417500.00	3971500.00	17.58037
417500.00	3971000.00	20.20479	417500.00	3970500.00	26.62415
417500.00	3970000.00	39.28409	417500.00	3969500.00	87.65707
417500.00	3969000.00	36.10464	417500.00	3968500.00	24.65709
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417500.00	3961000.00	6.09730	418000.00	3979500.00	6.87068
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418000.00	3978000.00	8.34317	418000.00	3977500.00	8.51972
418000.00	3976000.00	7.89079	418000.00	3975500.00	7.12631
418000.00	3975000.00	7.22949	418000.00	3974500.00	7.97689
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418000.00	3965000.00	12.57003	418000.00	3964500.00	11.27209
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418000.00	3963000.00	9.12442	418000.00	3962500.00	8.33341
418000.00	3962000.00	7.72352	418000.00	3961500.00	7.44570
418000.00	3961000.00	7.14850	418000.00	3960500.00	5.93418
418000.00	3960000.00	5.25442	418000.00	3959500.00	4.63158
418000.00	3959000.00	2.91516	418000.00	3958500.00	2.74009
418500.00	3974000.00	6.73614	418500.00	3973500.00	7.84178
418500.00	3973000.00	9.12559	418500.00	3972500.00	9.94228
418500.00	3972000.00	10.47063	418500.00	3971500.00	11.05235
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418500.00	3970000.00	12.80501	418500.00	3969500.00	13.31361
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418500.00	3967000.00	29.28643	418500.00	3966500.00	49.34097
418500.00	3966000.00	48.93693	418500.00	3965500.00	29.49713
418500.00	3965000.00	21.83504	418500.00	3964500.00	17.56238
418500.00	3964000.00	14.80609	418500.00	3963500.00	12.80444
418500.00	3963000.00	11.51466	418500.00	3962500.00	10.56185
418500.00	3962000.00	9.63195	418500.00	3961500.00	8.89726
418500.00	3961000.00	8.52340	418500.00	3960500.00	7.11371
418500.00	3960000.00	5.93137	418500.00	3959500.00	4.57546
418500.00	3959000.00	3.18224	418500.00	3958500.00	2.80416
418500.00	3958000.00	2.74160	419000.00	3972500.00	7.60992
419000.00	3972000.00	8.48619	419000.00	3971500.00	9.29440
419000.00	3971000.00	9.88918	419000.00	3970500.00	10.44594
419000.00	3970000.00	10.99707	419000.00	3969500.00	11.28481
419000.00	3969000.00	11.54009	419000.00	3968500.00	12.27582
419000.00	3968000.00	13.05190	419000.00	3967500.00	14.12692
419000.00	3967000.00	15.96595	419000.00	3966500.00	18.50405
419000.00	3966000.00	22.19995	419000.00	3965500.00	27.58204
419000.00	3965000.00	41.41516	419000.00	3964500.00	85.21493
419000.00	3964000.00	34.14022	419000.00	3963500.00	24.50245
419000.00	3963000.00	19.31641	419000.00	3962500.00	15.70305
419000.00	3962000.00	13.51094	419000.00	3961500.00	12.23408
419000.00	3961000.00	10.89278	419000.00	3960500.00	9.93215
419000.00	3960000.00	7.36060	419000.00	3959500.00	4.23005
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419000.00	3958000.00	3.12094	419000.00	3957500.00	2.72258
419500.00	3971000.00	7.96448	419500.00	3970500.00	8.70166

419500.00	3970000.00	9.41036	419500.00	3969500.00	9.94293
419500.00	3969000.00	10.15856	419500.00	3968500.00	10.36529
419500.00	3968000.00	10.81709	419500.00	3967500.00	11.27803
419500.00	3967000.00	11.84261	419500.00	3966500.00	12.86250
419500.00	3966000.00	14.20574	419500.00	3965500.00	15.91192
419500.00	3965000.00	18.05878	419500.00	3964500.00	20.59944
419500.00	3964000.00	25.33781	419500.00	3963500.00	32.85060
419500.00	3963000.00	56.84215	419500.00	3962500.00	40.21871
419500.00	3962000.00	27.50095	419500.00	3961500.00	22.26382
419500.00	3961000.00	18.99368	419500.00	3960500.00	15.75852
419500.00	3960000.00	10.50652	419500.00	3959500.00	5.07905
419500.00	3959000.00	4.47639	419500.00	3958500.00	3.35863
419500.00	3958000.00	2.31796	419500.00	3957500.00	2.03279
419500.00	3957000.00	1.93328	420000.00	3969000.00	8.84178
420000.00	3968500.00	9.17575	420000.00	3968000.00	9.39208
420000.00	3967500.00	9.66444	420000.00	3967000.00	9.92648
420000.00	3966500.00	10.25400	420000.00	3966000.00	10.79986
420000.00	3965500.00	11.53449	420000.00	3965000.00	12.56332
420000.00	3964500.00	13.84385	420000.00	3964000.00	15.03413
420000.00	3963500.00	16.82994	420000.00	3963000.00	19.24671
420000.00	3962500.00	22.84339	420000.00	3962000.00	28.94883
420000.00	3961500.00	34.76707	420000.00	3961000.00	41.96531
420000.00	3960500.00	57.06055	420000.00	3960000.00	27.07216
420000.00	3959500.00	8.07768	420000.00	3959000.00	5.50898
420000.00	3958500.00	4.07879	420000.00	3958000.00	3.22613
420000.00	3957500.00	2.66977	420000.00	3957000.00	2.28448
420500.00	3967500.00	8.53587	420500.00	3967000.00	8.78394
420500.00	3966500.00	8.95124	420500.00	3966000.00	9.15810
420500.00	3965500.00	9.41960	420500.00	3965000.00	9.79967
420500.00	3964500.00	10.46761	420500.00	3964000.00	11.23575
420500.00	3963500.00	11.93055	420500.00	3963000.00	12.85256
420500.00	3962500.00	14.01840	420500.00	3962000.00	15.36835
420500.00	3961500.00	16.91929	420500.00	3961000.00	17.55230
420500.00	3960500.00	19.35226	420500.00	3960000.00	20.84800
420500.00	3959500.00	13.49908	420500.00	3959000.00	9.17215
420500.00	3958500.00	4.44167	420500.00	3958000.00	2.04059
420500.00	3957500.00	1.32716	420500.00	3957000.00	0.97031
421000.00	3966000.00	8.23069	421000.00	3965500.00	8.39514
421000.00	3965000.00	8.55122	421000.00	3964500.00	8.80830
421000.00	3964000.00	9.18391	421000.00	3963500.00	9.61661
421000.00	3963000.00	9.99319	421000.00	3962500.00	10.46779
421000.00	3962000.00	11.05145	421000.00	3961500.00	11.57353
421000.00	3961000.00	12.44039	421000.00	3960500.00	12.95276
421000.00	3960000.00	13.02178	421000.00	3959500.00	10.39823
421000.00	3959000.00	10.18764	421000.00	3958500.00	6.89333
421000.00	3958000.00	6.98507	421000.00	3957500.00	5.71989
421000.00	3957000.00	4.15649	421500.00	3964000.00	7.92745
421500.00	3963500.00	8.10818	421500.00	3963000.00	8.30728
421500.00	3962500.00	8.58174	421500.00	3962000.00	8.98723
421500.00	3961500.00	9.42219	421500.00	3961000.00	9.58521
421500.00	3960500.00	10.08168	421500.00	3960000.00	10.34922
421500.00	3959500.00	9.09770	421500.00	3959000.00	7.89913
421500.00	3958500.00	8.01620	421500.00	3958000.00	5.83836
421500.00	3957500.00	5.51974	421500.00	3957000.00	5.58402
422000.00	3962000.00	7.82734	422000.00	3961500.00	8.03309
422000.00	3961000.00	8.12517	422000.00	3960500.00	8.25137
422000.00	3960000.00	8.58987	422000.00	3959500.00	8.63536
422000.00	3959000.00	6.33948	422000.00	3958500.00	6.50628
422000.00	3958000.00	6.58257	422000.00	3957500.00	5.15375
422000.00	3957000.00	4.58839	422500.00	3959500.00	7.55790
422500.00	3959000.00	6.17892	422500.00	3958500.00	5.50743
422500.00	3958000.00	5.60585	422500.00	3957500.00	5.60597
422500.00	3957000.00	4.57707	423000.00	3959000.00	6.13032
423000.00	3958500.00	4.98741	423000.00	3958000.00	4.92735
423000.00	3957500.00	4.97668	423000.00	3957000.00	4.90068
423500.00	3959000.00	5.99686	423500.00	3958500.00	4.83896
423500.00	3958000.00	4.51429	423500.00	3957500.00	4.48786
423500.00	3957000.00	4.50820	424000.00	3958500.00	4.88638
424000.00	3958000.00	4.21285	424000.00	3957500.00	4.19356
424000.00	3957000.00	4.15427	424500.00	3958000.00	4.13534
424500.00	3957500.00	3.93368	424500.00	3957000.00	3.94163
425000.00	3958000.00	4.14105	425000.00	3957500.00	3.71418
425000.00	3957000.00	3.72364	425500.00	3958000.00	4.07066
425500.00	3957500.00	3.57383	425500.00	3957000.00	3.46998

\*\*\* THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

\*\* CONC OF CO IN MICROGRAMS/M\*\*3 \*\*

X-COORD (M) Y-COORD (M) CONC (YYMMDDHH) X-COORD (M) Y-COORD (M) CONC (YYMMDDHH)

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411000.00 3997500.00 32.09627 (04010824) 411000.00 3997000.00 40.73410 (04010824)

411000.00	3996500.00	51.67862	(04010824)	411000.00	3996000.00	62.14844	(04010824)
411000.00	3995500.00	64.54049	(04010824)	411000.00	3995000.00	66.65607	(04010824)
411000.00	3994500.00	51.18036	(04010824)	411000.00	3994000.00	50.38779	(04010824)
411000.00	3993500.00	51.56749	(04010824)	411000.00	3993000.00	51.94997	(04010824)
411000.00	3992500.00	48.18036	(04010824)	411000.00	3992000.00	43.66454	(04010824)
411000.00	3991500.00	40.21518	(04010824)	411000.00	3991000.00	42.31200	(04090224)
411000.00	3990500.00	38.14035	(04010824)	411000.00	3990000.00	32.51663	(04010824)
411000.00	3989500.00	25.70522	(04010824)	411000.00	3989000.00	21.54149	(04010824)
411000.00	3988500.00	20.87979	(04071924)	411000.00	3988000.00	21.24486c	(04092524)
411000.00	3987500.00	22.28144c	(04092524)	411000.00	3987000.00	21.96554c	(04092524)
411000.00	3986500.00	21.53404c	(04092524)	411000.00	3986000.00	21.58568c	(04092524)
411000.00	3985500.00	20.70419c	(04092524)	411000.00	3985000.00	19.89949	(04090624)
411500.00	3997500.00	23.07999	(04010824)	411500.00	3997000.00	34.78660	(04010824)
411500.00	3996500.00	28.18502	(04010824)	411500.00	3996000.00	37.31763	(04010824)
411500.00	3995500.00	56.63829	(04010824)	411500.00	3995000.00	71.54144	(04010824)
411500.00	3994500.00	95.77908	(04010824)	411500.00	3994000.00	107.89395	(04010824)
411500.00	3993500.00	61.32518	(04010824)	411500.00	3993000.00	68.80788c	(04092524)
411500.00	3992500.00	78.41222	(04090224)	411500.00	3992000.00	60.57541	(04010824)
411500.00	3991500.00	58.75503	(04010824)	411500.00	3991000.00	54.39670	(04010824)
411500.00	3990500.00	48.02632	(04010824)	411500.00	3990000.00	44.82612	(04010824)
411500.00	3989500.00	45.12142	(04010824)	411500.00	3989000.00	40.33036	(04010824)
411500.00	3988500.00	31.55147	(04010824)	411500.00	3988000.00	26.05890	(04010824)
411500.00	3987500.00	25.02623	(04071924)	411500.00	3987000.00	25.35580c	(04092524)
411500.00	3986500.00	25.54298c	(04092524)	411500.00	3986000.00	25.45262c	(04092524)
411500.00	3985500.00	25.53311c	(04092524)	411500.00	3985000.00	25.64333	(04020224)
411500.00	3984500.00	24.80391	(04090224)	411500.00	3984000.00	25.00800	(04090224)
411500.00	3983500.00	24.85218	(04090224)	412000.00	3997500.00	25.12181c	(04081024)
412000.00	3997000.00	31.76572c	(04081024)	412000.00	3996500.00	43.29420	(04021024)
412000.00	3996000.00	114.08244c	(04012324)	412000.00	3995500.00	154.29498	(04010824)
412000.00	3995000.00	92.91885c	(04111724)	412000.00	3994500.00	175.97746	(04090224)
412000.00	3994000.00	154.01331c	(04111524)	412000.00	3993500.00	96.56583c	(04111524)
412000.00	3993000.00	84.16107	(04010824)	412000.00	3992500.00	242.57916c	(04110724)
412000.00	3992000.00	102.59765	(04100324)	412000.00	3991500.00	82.38781	(04100324)
412000.00	3991000.00	68.70323	(04100324)	412000.00	3990500.00	67.35896	(04010824)
412000.00	3990000.00	69.14075	(04010824)	412000.00	3989500.00	65.70602	(04010824)
412000.00	3989000.00	57.51207	(04010824)	412000.00	3988500.00	54.44378	(04010824)
412000.00	3988000.00	51.65990	(04010824)	412000.00	3987500.00	39.45918	(04010824)
412000.00	3987000.00	32.11301	(04100324)	412000.00	3986500.00	32.81319c	(04092524)
412000.00	3986000.00	32.48903c	(04092524)	412000.00	3985500.00	31.16855c	(04092524)
412000.00	3985000.00	30.07456c	(04092524)	412000.00	3984500.00	29.61647c	(04092524)
412000.00	3984000.00	28.16972	(04090224)	412000.00	3983500.00	27.39073	(04090224)
412000.00	3983000.00	25.44040	(04090224)	412000.00	3982500.00	23.71693	(04090224)
412000.00	3982000.00	21.86762	(04090224)	412500.00	3997500.00	57.74940c	(04012324)
412500.00	3997000.00	58.97467c	(04012324)	412500.00	3996500.00	37.48069c	(04012324)
412500.00	3996000.00	52.90368c	(04010524)	412500.00	3995500.00	48.30848c	(04010524)
412500.00	3995000.00	41.92794	(04120524)	412500.00	3994500.00	41.01739	(04122124)
412500.00	3994000.00	53.25663c	(04011524)	412500.00	3993500.00	39.54741	(04012624)
412500.00	3993000.00	33.39569	(04012624)	412500.00	3992500.00	37.39837	(04012624)
412500.00	3992000.00	62.47284	(04122124)	412500.00	3991500.00	203.26353	(04010824)
412500.00	3991000.00	79.99046	(04020224)	412500.00	3990500.00	63.15108	(04010824)
412500.00	3990000.00	61.88684	(04010824)	412500.00	3989500.00	68.18473	(04010824)
412500.00	3989000.00	78.37407	(04010824)	412500.00	3988500.00	90.42133	(04010824)
412500.00	3988000.00	91.55014	(04010824)	412500.00	3987500.00	75.96832	(04010824)
412500.00	3987000.00	69.93047	(04010824)	412500.00	3986500.00	51.29657	(04010824)
412500.00	3986000.00	43.56694c	(04092524)	412500.00	3985500.00	41.23004c	(04092524)
412500.00	3985000.00	38.12888c	(04092524)	412500.00	3984500.00	35.06093c	(04092524)
412500.00	3984000.00	32.71512c	(04092524)	412500.00	3983500.00	29.71521c	(04092524)
412500.00	3983000.00	26.54746	(04100324)	412500.00	3982500.00	25.44931c	(04021324)
412500.00	3982000.00	24.01024	(04100324)	412500.00	3981500.00	23.06344	(04100324)
412500.00	3981000.00	22.85609	(04100324)	412500.00	3980500.00	22.36670	(04100324)
413000.00	3997500.00	29.52916c	(04010524)	413000.00	3997000.00	29.65549c	(04010524)
413000.00	3996500.00	23.32469c	(04010524)	413000.00	3996000.00	20.65163c	(04012324)
413000.00	3995500.00	23.68766c	(04012324)	413000.00	3995000.00	25.24652c	(04012324)
413000.00	3994500.00	29.57099c	(04012324)	413000.00	3994000.00	30.94339c	(04012324)
413000.00	3993500.00	33.66341c	(04012324)	413000.00	3993000.00	37.53919c	(04012324)
413000.00	3992500.00	43.42978c	(04012324)	413000.00	3992000.00	50.91222c	(04012324)
413000.00	3991500.00	64.39582c	(04012324)	413000.00	3991000.00	87.31589	(04021024)
413000.00	3990500.00	113.35946c	(04020324)	413000.00	3990000.00	137.10890c	(04081024)
413000.00	3989500.00	104.31734	(04090224)	413000.00	3989000.00	105.25979	(04090224)
413000.00	3988500.00	104.84641	(04090224)	413000.00	3988000.00	105.43346	(04090224)
413000.00	3987500.00	113.88277	(04010824)	413000.00	3987000.00	128.17752	(04010824)
413000.00	3986500.00	173.63568	(04010824)	413000.00	3986000.00	120.03214	(04010824)
413000.00	3985500.00	78.31433	(04090224)	413000.00	3985000.00	64.56278	(04090224)
413000.00	3984500.00	59.34625c	(04111524)	413000.00	3984000.00	52.13989c	(04111524)
413000.00	3983500.00	49.09618	(04100324)	413000.00	3983000.00	46.03077	(04100324)
413000.00	3982500.00	43.18073	(04100324)	413000.00	3982000.00	41.00685	(04100324)
413000.00	3981500.00	39.43324	(04100324)	413000.00	3981000.00	37.25492	(04100324)
413000.00	3980500.00	35.52475	(04100324)	413000.00	3980000.00	33.94964	(04100324)
413000.00	3979500.00	32.51914	(04100324)	413500.00	3997500.00	16.36967c	(04010524)
413500.00	3997000.00	14.05434c	(04012324)	413500.00	3996500.00	14.51246c	(04012324)
413500.00	3996000.00	15.09931c	(04012324)	413500.00	3995500.00	16.13421c	(04012324)

413500.00	3995000.00	18.48092c (04012324)	413500.00	3994500.00	19.63968c (04012324)
413500.00	3994000.00	23.65734c (04012324)	413500.00	3993500.00	26.02621c (04012324)
413500.00	3993000.00	30.42176c (04012324)	413500.00	3992500.00	37.57560c (04012324)
413500.00	3992000.00	44.31543c (04012324)	413500.00	3991500.00	45.85722c (04012324)
413500.00	3991000.00	47.73959c (04012324)	413500.00	3990500.00	49.53268c (04012324)
413500.00	3990000.00	56.58568 (04120524)	413500.00	3989500.00	52.72278 (04120524)
413500.00	3989000.00	85.19992c (04110724)	413500.00	3988500.00	88.70233c (04011524)
413500.00	3988000.00	72.85703 (04011024)	413500.00	3987500.00	63.49035 (04012624)
413500.00	3987000.00	59.64275 (04012624)	413500.00	3986500.00	57.75243 (04012624)
413500.00	3986000.00	57.54726 (04012624)	413500.00	3985500.00	67.37079 (04010824)
413500.00	3985000.00	111.99291 (04010824)	413500.00	3984500.00	171.38225 (04010824)
413500.00	3984000.00	89.13819 (04082224)	413500.00	3983500.00	66.21532c (04101924)
413500.00	3983000.00	61.32524c (04101924)	413500.00	3982500.00	56.55544c (04101924)
413500.00	3982000.00	50.97339c (04101924)	413500.00	3981500.00	45.70123c (04101924)
413500.00	3981000.00	43.21427 (04100324)	413500.00	3980500.00	41.18970 (04100324)
413500.00	3980000.00	39.26351 (04100324)	413500.00	3979500.00	37.44853 (04100324)
413500.00	3979000.00	35.71334 (04100324)	413500.00	3978000.00	32.96987 (04100324)
413500.00	3977500.00	32.12093 (04100324)	413500.00	3977000.00	31.41063 (04100324)
413500.00	3976500.00	30.62169 (04100324)	413500.00	3976000.00	28.88988 (04100324)
413500.00	3975500.00	27.85510 (04100324)	413500.00	3975000.00	26.92840 (04100324)
413500.00	3974500.00	25.98821 (04100324)	414000.00	3997500.00	16.33621c (04012324)
414000.00	3997000.00	17.62821c (04012324)	414000.00	3996500.00	19.22379c (04012324)
414000.00	3996000.00	21.16443c (04012324)	414000.00	3995500.00	23.40801c (04012324)
414000.00	3995000.00	27.08325c (04012324)	414000.00	3994500.00	28.85048c (04012324)
414000.00	3994000.00	29.47537c (04012324)	414000.00	3993500.00	31.16019c (04012324)
414000.00	3993000.00	30.46435c (04012324)	414000.00	3992500.00	29.53590c (04012324)
414000.00	3992000.00	28.99077c (04012324)	414000.00	3991500.00	27.81625c (04012324)
414000.00	3991000.00	26.50043c (04012324)	414000.00	3990500.00	28.22531 (04110624)
414000.00	3990000.00	35.48668 (04110624)	414000.00	3989500.00	41.81927 (04120524)
414000.00	3989000.00	39.82100 (04120524)	414000.00	3988500.00	29.46913 (04110624)
414000.00	3988000.00	43.73040 (04010324)	414000.00	3987500.00	47.43901c (04110724)
414000.00	3987000.00	53.55706c (04011524)	414000.00	3986500.00	51.08107c (04011524)
414000.00	3986000.00	45.55321 (04011024)	414000.00	3985500.00	43.25531 (04012624)
414000.00	3985000.00	42.64039 (04012624)	414000.00	3984500.00	45.78660 (04012624)
414000.00	3984000.00	70.05881c (04112324)	414000.00	3983500.00	142.31938 (04010824)
414000.00	3983000.00	115.36197 (04020224)	414000.00	3982500.00	63.82423 (04082224)
414000.00	3982000.00	57.66484 (04082224)	414000.00	3981500.00	57.48336 (04010824)
414000.00	3981000.00	54.92598 (04010824)	414000.00	3980500.00	50.68625 (04010824)
414000.00	3980000.00	43.80922 (04010824)	414000.00	3979500.00	35.26147 (04010824)
414000.00	3979000.00	30.99058 (04010824)	414000.00	3978500.00	26.89504 (04020224)
414000.00	3978000.00	27.34869c (04101924)	414000.00	3977500.00	27.75102c (04101924)
414000.00	3977000.00	28.35008c (04101924)	414000.00	3976500.00	27.56837c (04011624)
414000.00	3976000.00	27.39002c (04011624)	414000.00	3975500.00	25.37478c (04101924)
414000.00	3975000.00	24.62107c (04101924)	414000.00	3974500.00	23.84576c (04101924)
414000.00	3974000.00	25.59130 (04062224)	414000.00	3973500.00	29.66140 (04090224)
414000.00	3973000.00	32.16511 (04090224)	414500.00	3992500.00	19.72738c (04012324)
414500.00	3992000.00	20.04283 (04110624)	414500.00	3991500.00	20.60592 (04110624)
414500.00	3991000.00	21.18906 (04110624)	414500.00	3990500.00	21.93010 (04110624)
414500.00	3990000.00	23.81129 (04110624)	414500.00	3989500.00	28.77580 (04110624)
414500.00	3989000.00	33.85495 (04122124)	414500.00	3988500.00	34.16702 (04120524)
414500.00	3988000.00	25.75635 (04110624)	414500.00	3987500.00	24.18854 (04110624)
414500.00	3987000.00	30.23176 (04010324)	414500.00	3986500.00	36.70315c (04110724)
414500.00	3986000.00	36.47461c (04011524)	414500.00	3985500.00	40.07594c (04011524)
414500.00	3985000.00	41.00143c (04011524)	414500.00	3984500.00	39.97004c (04011524)
414500.00	3984000.00	38.35685c (04011524)	414500.00	3983500.00	43.91541 (04012624)
414500.00	3983000.00	55.46332 (04122124)	414500.00	3982500.00	78.60722 (04122124)
414500.00	3982000.00	367.59161c (04110724)	414500.00	3981500.00	77.57309c (04011524)
414500.00	3981000.00	65.77646c (04092524)	414500.00	3980500.00	62.31596 (04010824)
414500.00	3980000.00	71.86328 (04010824)	414500.00	3979500.00	69.85254 (04010824)
414500.00	3979000.00	62.83834 (04010824)	414500.00	3978500.00	48.74240 (04010824)
414500.00	3978000.00	41.94388 (04010824)	414500.00	3977500.00	34.95625 (04010824)
414500.00	3977000.00	30.87768c (04021324)	414500.00	3976500.00	28.78802c (04092524)
414500.00	3976000.00	27.17974c (04092524)	414500.00	3975500.00	29.63957c (04092524)
414500.00	3975000.00	39.19387 (04062224)	414500.00	3974500.00	46.89690 (04090224)
414500.00	3974000.00	37.24810 (04090224)	414500.00	3973500.00	30.53636 (04092224)
414500.00	3973000.00	23.62192 (04092224)	414500.00	3972500.00	21.03952 (04100324)
414500.00	3972000.00	20.67689 (04100324)	414500.00	3971500.00	20.20433 (04100324)
415000.00	3991000.00	18.46797c (04020324)	415000.00	3990500.00	19.58853c (04020324)
415000.00	3990000.00	20.04825c (04020324)	415000.00	3989500.00	20.80790 (04110624)
415000.00	3989000.00	23.79280 (04110624)	415000.00	3988500.00	28.64951 (04122124)
415000.00	3988000.00	30.59291 (04120524)	415000.00	3987500.00	24.95630 (04110624)
415000.00	3987000.00	22.65843 (04110624)	415000.00	3986500.00	22.43004 (04110624)
415000.00	3986000.00	23.44599 (04122124)	415000.00	3985500.00	28.54123c (04110724)
415000.00	3985000.00	28.99276c (04110724)	415000.00	3984500.00	31.63493c (04011524)
415000.00	3984000.00	35.03367c (04011524)	415000.00	3983500.00	37.93048c (04011524)
415000.00	3983000.00	38.92065c (04011524)	415000.00	3982500.00	40.93764 (04012624)
415000.00	3982000.00	46.84872 (04122124)	415000.00	3981500.00	62.48392 (04122124)
415000.00	3981000.00	114.09518 (04122124)	415000.00	3980500.00	141.26627c (04011524)
415000.00	3980000.00	74.81733c (04101524)	415000.00	3979500.00	55.19698 (04010824)
415000.00	3979000.00	59.48839 (04010824)	415000.00	3978500.00	91.23562 (04010824)
415000.00	3978000.00	107.58203 (04010824)	415000.00	3977500.00	90.02994 (04010824)

415000.00	3977000.00	68.19894	(04010824)	415000.00	3976500.00	54.16111	(04020224)
415000.00	3976000.00	84.44989	(04090224)	415000.00	3975500.00	59.32015	(04092224)
415000.00	3975000.00	35.42147c	(04092524)	415000.00	3974500.00	31.74523c	(04092524)
415000.00	3974000.00	28.64188c	(04092524)	415000.00	3973500.00	27.01814c	(04092524)
415000.00	3973000.00	24.61081c	(04092524)	415000.00	3972500.00	22.48206c	(04092524)
415000.00	3972000.00	21.19346c	(04092524)	415000.00	3971500.00	21.39174c	(04111524)
415000.00	3971000.00	21.53699c	(04111524)	415000.00	3970500.00	21.59187c	(04111524)
415000.00	3970000.00	21.56176c	(04111524)	415500.00	3985500.00	23.77168c	(04012324)
415500.00	3985000.00	24.88003c	(04012324)	415500.00	3984500.00	26.08059c	(04012324)
415500.00	3984000.00	27.59402c	(04012324)	415500.00	3983500.00	29.76960c	(04012324)
415500.00	3983000.00	31.11012c	(04012324)	415500.00	3982500.00	33.72506c	(04012324)
415500.00	3982000.00	36.47961c	(04011524)	415500.00	3981500.00	38.36530c	(04011524)
415500.00	3981000.00	42.15881	(04110624)	415500.00	3980500.00	53.05291	(04122124)
415500.00	3980000.00	76.61371	(04122124)	415500.00	3979500.00	173.55521c	(04110724)
415500.00	3979000.00	100.08096c	(04081024)	415500.00	3978500.00	75.79910c	(04081024)
415500.00	3978000.00	76.06036c	(04081024)	415500.00	3977500.00	120.41994	(04090224)
415500.00	3977000.00	93.35542c	(04012324)	415500.00	3976500.00	221.18886	(04010824)
415500.00	3976000.00	174.59657	(04010824)	415500.00	3975500.00	94.27648	(04100324)
415500.00	3975000.00	77.74396	(04100324)	415500.00	3974500.00	66.41784	(04100324)
415500.00	3974000.00	56.97151	(04100324)	415500.00	3973500.00	51.49765	(04100324)
415500.00	3973000.00	47.31774	(04100324)	415500.00	3972500.00	43.93814	(04100324)
415500.00	3972000.00	41.05647	(04100324)	415500.00	3971500.00	38.50362	(04100324)
415500.00	3971000.00	36.34800	(04100324)	415500.00	3970500.00	34.43109	(04100324)
415500.00	3970000.00	32.72054	(04100324)	415500.00	3969500.00	31.20790	(04100324)
415500.00	3969000.00	29.95223	(04100324)	415500.00	3968500.00	28.82107	(04100324)
415500.00	3968000.00	27.80482	(04100324)	416000.00	3984500.00	20.65137	(04110624)
416000.00	3984000.00	21.42752	(04110624)	416000.00	3983500.00	24.10040c	(04010224)
416000.00	3983000.00	25.80440c	(04010224)	416000.00	3982500.00	27.99509c	(04010224)
416000.00	3982000.00	32.69976c	(04010224)	416000.00	3981500.00	39.02655c	(04010224)
416000.00	3981000.00	45.00973c	(04010224)	416000.00	3980500.00	58.90713c	(04012324)
416000.00	3980000.00	93.85959c	(04012324)	416000.00	3979500.00	183.09520c	(04012324)
416000.00	3979000.00	265.41562	(04120524)	416000.00	3978500.00	146.86098c	(04110724)
416000.00	3978000.00	109.42790c	(04011524)	416000.00	3977500.00	89.64504c	(04011524)
416000.00	3977000.00	68.27618	(04011024)	416000.00	3976500.00	57.98172	(04011024)
416000.00	3976000.00	56.67316	(04012624)	416000.00	3975500.00	63.34632c	(04110724)
416000.00	3975000.00	85.39207c	(04110724)	416000.00	3974500.00	164.27754	(04010824)
416000.00	3974000.00	108.91419	(04010824)	416000.00	3973500.00	72.70476	(04100324)
416000.00	3973000.00	61.81328	(04100324)	416000.00	3972500.00	55.71095	(04100324)
416000.00	3972000.00	51.19658	(04100324)	416000.00	3971500.00	47.80984	(04100324)
416000.00	3971000.00	45.15426	(04100324)	416000.00	3970500.00	42.85872	(04100324)
416000.00	3970000.00	40.61344	(04100324)	416000.00	3969500.00	38.69684	(04100324)
416000.00	3969000.00	36.97113	(04100324)	416000.00	3968500.00	35.31083	(04100324)
416000.00	3968000.00	33.72903	(04100324)	416000.00	3967500.00	32.28020	(04100324)
416000.00	3967000.00	30.95575	(04100324)	416000.00	3966500.00	29.82238	(04100324)
416500.00	3983000.00	40.74683c	(04012324)	416500.00	3982500.00	45.11613c	(04012324)
416500.00	3982000.00	43.32564c	(04012324)	416500.00	3981500.00	33.35138c	(04012324)
416500.00	3981000.00	36.87985	(04110624)	416500.00	3980500.00	51.00378c	(04010524)
416500.00	3980000.00	42.42502c	(04010524)	416500.00	3979500.00	38.63932	(04110624)
416500.00	3979000.00	43.93777	(04110624)	416500.00	3978500.00	79.31713	(04122124)
416500.00	3978000.00	34.54350	(04110624)	416500.00	3977500.00	66.07288c	(04110724)
416500.00	3977000.00	73.70586c	(04110724)	416500.00	3976500.00	69.91894c	(04011524)
416500.00	3976000.00	63.46013	(04011024)	416500.00	3975500.00	55.18158	(04011524)
416500.00	3975000.00	47.66009	(04011024)	416500.00	3974500.00	49.22658	(04012624)
416500.00	3974000.00	57.18315	(04012624)	416500.00	3973500.00	68.35154	(04122124)
416500.00	3973000.00	160.27538c	(04020924)	416500.00	3972500.00	138.97150	(04010824)
416500.00	3972000.00	68.17447	(04020224)	416500.00	3971500.00	52.11599	(04020224)
416500.00	3971000.00	42.79195	(04100324)	416500.00	3970500.00	38.47627	(04100324)
416500.00	3970000.00	35.37152	(04100324)	416500.00	3969500.00	33.12444	(04100324)
416500.00	3969000.00	31.32318	(04100324)	416500.00	3968500.00	29.93951	(04100324)
416500.00	3968000.00	28.91810	(04100324)	416500.00	3967500.00	28.15585	(04100324)
416500.00	3967000.00	27.56581	(04100324)	416500.00	3966500.00	26.98574	(04100324)
416500.00	3966000.00	26.35522	(04100324)	416500.00	3965500.00	25.78459	(04100324)
416500.00	3965000.00	25.27075	(04100324)	417000.00	3982000.00	29.14484	(04110624)
417000.00	3981500.00	28.07234c	(04010524)	417000.00	3981000.00	26.87670c	(04010524)
417000.00	3980500.00	27.19137	(04110624)	417000.00	3980000.00	29.79876	(04110624)
417000.00	3979500.00	31.99986	(04110624)	417000.00	3979000.00	36.55405	(04110624)
417000.00	3978500.00	33.69232	(04110624)	417000.00	3978000.00	50.50015	(04122124)
417000.00	3977500.00	37.12354	(04120524)	417000.00	3977000.00	27.30921c	(04120824)
417000.00	3976500.00	41.78292c	(04110724)	417000.00	3976000.00	53.60669c	(04110724)
417000.00	3975500.00	53.16514c	(04011524)	417000.00	3975000.00	56.39842c	(04011524)
417000.00	3974500.00	52.95979c	(04011524)	417000.00	3974000.00	48.35778	(04011024)
417000.00	3973500.00	46.13826	(04012624)	417000.00	3973000.00	49.81149	(04012624)
417000.00	3972500.00	54.45089	(04012624)	417000.00	3972000.00	73.79825	(04122124)
417000.00	3971500.00	144.03375c	(04020924)	417000.00	3971000.00	201.03951	(04010824)
417000.00	3970500.00	83.34901	(04020224)	417000.00	3970000.00	57.42174	(04020224)
417000.00	3969500.00	45.11923	(04100324)	417000.00	3969000.00	39.71595	(04100324)
417000.00	3968500.00	36.09949	(04100324)	417000.00	3968000.00	33.14269	(04100324)
417000.00	3967500.00	30.81299	(04100324)	417000.00	3967000.00	28.91587	(04100324)
417000.00	3966500.00	27.42489	(04100324)	417000.00	3966000.00	26.13749	(04100324)
417000.00	3965500.00	25.08848	(04100324)	417000.00	3965000.00	24.28649	(04100324)
417000.00	3964500.00	23.59352	(04100324)	417000.00	3964000.00	22.94330	(04100324)

417000.00	3963500.00	22.41362	(04100324)	417500.00	3980500.00	23.02131	(04110624)
417500.00	3980000.00	24.96049	(04110624)	417500.00	3979500.00	27.36865	(04110624)
417500.00	3979000.00	31.56922	(04110624)	417500.00	3978500.00	33.07776	(04110624)
417500.00	3978000.00	31.00462	(04110624)	417500.00	3977500.00	39.47159	(04122124)
417500.00	3977000.00	38.32892	(04120524)	417500.00	3976500.00	25.00953	(04110624)
417500.00	3976000.00	24.41846c	(04120824)	417500.00	3975500.00	31.11668c	(04110724)
417500.00	3975000.00	41.96637c	(04110724)	417500.00	3974500.00	42.60794c	(04110724)
417500.00	3974000.00	46.74059c	(04011524)	417500.00	3973500.00	47.42545c	(04011524)
417500.00	3973000.00	46.69799c	(04011524)	417500.00	3972500.00	45.14645c	(04011524)
417500.00	3972000.00	45.35691	(04012624)	417500.00	3971500.00	47.60128	(04012624)
417500.00	3971000.00	53.36649	(04012624)	417500.00	3970500.00	70.87560c	(04110724)
417500.00	3970000.00	111.65668c	(04110724)	417500.00	3969500.00	456.91360	(04010824)
417500.00	3969000.00	106.29194	(04020224)	417500.00	3968500.00	66.65354	(04020224)
417500.00	3968000.00	49.09222	(04100324)	417500.00	3967500.00	42.46307	(04100324)
417500.00	3967000.00	37.63982	(04100324)	417500.00	3966500.00	34.20659	(04100324)
417500.00	3966000.00	31.57140	(04100324)	417500.00	3965500.00	29.54823	(04100324)
417500.00	3965000.00	27.96787	(04100324)	417500.00	3964500.00	26.63977	(04100324)
417500.00	3964000.00	25.26441	(04100324)	417500.00	3963500.00	24.25025	(04100324)
417500.00	3963000.00	23.49736	(04100324)	417500.00	3962500.00	22.82560	(04100324)
417500.00	3962000.00	22.24335	(04100324)	417500.00	3961500.00	21.69239	(04100324)
417500.00	3961000.00	21.27806	(04100324)	418000.00	3979500.00	23.70387	(04110624)
418000.00	3979000.00	26.90437	(04110624)	418000.00	3978500.00	30.15607	(04110624)
418000.00	3978000.00	27.99419	(04110624)	418000.00	3977500.00	29.22959	(04110624)
418000.00	3976000.00	25.89255	(04110624)	418000.00	3975500.00	23.11811	(04110624)
418000.00	3975000.00	22.08986	(04110624)	418000.00	3974500.00	25.51631c	(04110724)
418000.00	3974000.00	34.37784c	(04110724)	418000.00	3973500.00	38.75785c	(04110724)
418000.00	3973000.00	37.58332c	(04011524)	418000.00	3972500.00	41.11838c	(04011524)
418000.00	3972000.00	42.68151c	(04011524)	418000.00	3971500.00	42.54430c	(04120824)
418000.00	3971000.00	42.18071c	(04120824)	418000.00	3970500.00	42.61544	(04012624)
418000.00	3970000.00	46.60167	(04012624)	418000.00	3969500.00	54.84276c	(04110724)
418000.00	3969000.00	68.33356c	(04110724)	418000.00	3968500.00	97.22388c	(04110724)
418000.00	3968000.00	200.48515c	(04110724)	418000.00	3967500.00	131.07291	(04020224)
418000.00	3967000.00	74.77311	(04020224)	418000.00	3966500.00	52.49439	(04020224)
418000.00	3966000.00	42.53648	(04100324)	418000.00	3965500.00	37.77855	(04100324)
418000.00	3965000.00	34.41630	(04100324)	418000.00	3964500.00	31.84238	(04100324)
418000.00	3964000.00	30.00638	(04100324)	418000.00	3963500.00	28.39431	(04100324)
418000.00	3963000.00	27.07761	(04100324)	418000.00	3962500.00	25.81129	(04100324)
418000.00	3962000.00	24.66454	(04100324)	418000.00	3961500.00	23.75286	(04100324)
418000.00	3961000.00	23.09714	(04100324)	418000.00	3960500.00	22.46046	(04100324)
418000.00	3960000.00	21.71837	(04100324)	418000.00	3959500.00	20.96821	(04100324)
418000.00	3959000.00	18.27120c	(04111524)	418000.00	3958500.00	17.80540c	(04111524)
418500.00	3974000.00	21.35638	(04110624)	418500.00	3973500.00	22.96774	(04110624)
418500.00	3973000.00	29.52861c	(04110724)	418500.00	3972500.00	34.25407c	(04110724)
418500.00	3972000.00	33.25706c	(04110724)	418500.00	3971500.00	35.89277c	(04011524)
418500.00	3971000.00	37.77830c	(04011524)	418500.00	3970500.00	38.61020c	(04120824)
418500.00	3970000.00	39.99699c	(04120824)	418500.00	3969500.00	39.59888c	(04120824)
418500.00	3969000.00	40.98238	(04012624)	418500.00	3968500.00	45.85871	(04012624)
418500.00	3968000.00	53.77649c	(04110724)	418500.00	3967500.00	65.86116c	(04110724)
418500.00	3967000.00	85.44046c	(04110724)	418500.00	3966500.00	151.70781c	(04011524)
418500.00	3966000.00	166.41298	(04010824)	418500.00	3965500.00	82.71687	(04020224)
418500.00	3965000.00	57.73181	(04020224)	418500.00	3964500.00	42.81133	(04020224)
418500.00	3964000.00	37.98935	(04100324)	418500.00	3963500.00	34.42157	(04100324)
418500.00	3963000.00	31.83270	(04100324)	418500.00	3962500.00	29.73793	(04100324)
418500.00	3962000.00	28.20869	(04100324)	418500.00	3961500.00	27.13416	(04100324)
418500.00	3961000.00	26.06648	(04100324)	418500.00	3960500.00	25.02591	(04100324)
418500.00	3960000.00	23.81534	(04100324)	418500.00	3959500.00	22.15282	(04100324)
418500.00	3959000.00	19.70221c	(04111524)	418500.00	3958500.00	19.62779c	(04111524)
418500.00	3958000.00	19.43347c	(04111524)	419000.00	3972500.00	23.54959	(04110624)
419000.00	3972000.00	25.76269c	(04110724)	419000.00	3971500.00	29.91897c	(04110724)
419000.00	3971000.00	31.26936c	(04110724)	419000.00	3970500.00	30.84473c	(04011524)
419000.00	3970000.00	33.53111c	(04011524)	419000.00	3969500.00	34.67115c	(04011524)
419000.00	3969000.00	35.96626c	(04120824)	419000.00	3968500.00	37.32533c	(04120824)
419000.00	3968000.00	38.44844c	(04120824)	419000.00	3967500.00	39.84095	(04012624)
419000.00	3967000.00	45.52505c	(04110724)	419000.00	3966500.00	53.15428c	(04110724)
419000.00	3966000.00	62.60460c	(04110724)	419000.00	3965500.00	79.47251c	(04110724)
419000.00	3965000.00	128.33533c	(04011524)	419000.00	3964500.00	407.51169	(04010824)
419000.00	3964000.00	95.09188	(04020224)	419000.00	3963500.00	63.25547	(04020224)
419000.00	3963000.00	47.90677	(04020224)	419000.00	3962500.00	41.27633	(04100324)
419000.00	3962000.00	37.17611	(04100324)	419000.00	3961500.00	34.12497	(04100324)
419000.00	3961000.00	31.98123	(04100324)	419000.00	3960500.00	30.17583	(04100324)
419000.00	3960000.00	28.74031	(04100324)	419000.00	3959500.00	24.46093	(04090224)
419000.00	3959000.00	22.97091c	(04111524)	419000.00	3958500.00	22.09132c	(04111524)
419000.00	3958000.00	21.35396c	(04111524)	419000.00	3957500.00	19.70106	(04100324)
419500.00	3971000.00	24.59865	(04110624)	419500.00	3970500.00	26.70409c	(04110724)
419500.00	3970000.00	29.22324c	(04110724)	419500.00	3969500.00	29.13831	(04110624)
419500.00	3969000.00	29.91108	(04110624)	419500.00	3968500.00	30.58763c	(04011524)
419500.00	3968000.00	32.41566c	(04120824)	419500.00	3967500.00	34.52082c	(04120824)
419500.00	3967000.00	35.55547c	(04120824)	419500.00	3966500.00	37.10537c	(04120824)
419500.00	3966000.00	39.63102c	(04110724)	419500.00	3965500.00	45.46030c	(04110724)
419500.00	3965000.00	51.86456c	(04110724)	419500.00	3964500.00	59.19751c	(04110724)
419500.00	3964000.00	75.45592c	(04110724)	419500.00	3963500.00	103.24678c	(04110724)

419500.00	3963000.00	212.86209c	(04011524)	419500.00	3962500.00	118.37667	(04010824)
419500.00	3962000.00	72.87701	(04020224)	419500.00	3961500.00	55.54416	(04020224)
419500.00	3961000.00	47.46881	(04100324)	419500.00	3960500.00	42.83234	(04100324)
419500.00	3960000.00	38.55259	(04100324)	419500.00	3959500.00	30.29341c	(04111524)
419500.00	3959000.00	28.85261c	(04111524)	419500.00	3958500.00	24.31364	(04100324)
419500.00	3958000.00	19.36604c	(04111524)	419500.00	3957500.00	18.64481c	(04111524)
419500.00	3957000.00	18.11490c	(04111524)	420000.00	3969000.00	27.73057	(04110624)
420000.00	3968500.00	28.55490	(04110624)	420000.00	3968000.00	29.08089	(04110624)
420000.00	3967500.00	29.74577	(04110624)	420000.00	3967000.00	30.47770	(04110624)
420000.00	3966500.00	31.21101c	(04120824)	420000.00	3966000.00	32.99789c	(04120824)
420000.00	3965500.00	34.70566c	(04120824)	420000.00	3965000.00	36.30039c	(04120824)
420000.00	3964500.00	40.10606c	(04110724)	420000.00	3964000.00	44.15007c	(04110724)
420000.00	3963500.00	49.45691c	(04110724)	420000.00	3963000.00	57.39264c	(04110724)
420000.00	3962500.00	69.09532c	(04110724)	420000.00	3962000.00	88.86002c	(04110724)
420000.00	3961500.00	130.44580c	(04011524)	420000.00	3961000.00	168.41098c	(04011524)
420000.00	3960500.00	250.96100c	(04110724)	420000.00	3960000.00	125.77287c	(04111524)
420000.00	3959500.00	61.91547	(04100324)	420000.00	3959000.00	47.10212	(04100324)
420000.00	3958500.00	37.06737	(04100324)	420000.00	3958000.00	30.67319	(04100324)
420000.00	3957500.00	26.34012	(04100324)	420000.00	3957000.00	23.21322	(04100324)
420500.00	3967500.00	28.04967	(04110624)	420500.00	3967000.00	28.57156	(04110624)
420500.00	3966500.00	29.08702	(04110624)	420500.00	3966000.00	29.48344	(04110624)
420500.00	3965500.00	30.09408	(04110624)	420500.00	3965000.00	30.98180	(04110624)
420500.00	3964500.00	32.79960	(04110624)	420500.00	3964000.00	34.30373	(04110624)
420500.00	3963500.00	35.41445c	(04110724)	420500.00	3963000.00	39.13625c	(04110724)
420500.00	3962500.00	43.16273c	(04110724)	420500.00	3962000.00	47.73089c	(04110724)
420500.00	3961500.00	54.79993c	(04110724)	420500.00	3961000.00	61.62104c	(04110724)
420500.00	3960500.00	72.65343c	(04110724)	420500.00	3960000.00	90.53789c	(04011524)
420500.00	3959500.00	83.84728c	(04011524)	420500.00	3959000.00	77.07100	(04011024)
420500.00	3958500.00	45.74121	(04011024)	420500.00	3958000.00	21.96570	(04011024)
420500.00	3957500.00	14.26882	(04012624)	420500.00	3957000.00	11.02580	(04012624)
421000.00	3966000.00	28.58286	(04110624)	421000.00	3965500.00	29.09856	(04110624)
421000.00	3965000.00	29.38938	(04110624)	421000.00	3964500.00	29.98614	(04110624)
421000.00	3964000.00	30.74709	(04110624)	421000.00	3963500.00	31.22526	(04110624)
421000.00	3963000.00	31.45942c	(04120824)	421000.00	3962500.00	32.72600c	(04120824)
421000.00	3962000.00	35.22304c	(04110724)	421000.00	3961500.00	38.11413c	(04110724)
421000.00	3961000.00	41.80511c	(04110724)	421000.00	3960500.00	45.67404c	(04110724)
421000.00	3960000.00	45.61149c	(04110724)	421000.00	3959500.00	51.07232c	(04110724)
421000.00	3959000.00	55.36243c	(04110724)	421000.00	3958500.00	56.44210c	(04011524)
421000.00	3958000.00	60.87836c	(04011524)	421000.00	3957500.00	53.66094c	(04011524)
421000.00	3957000.00	40.96326	(04011024)	421500.00	3964000.00	25.40948	(04110624)
421500.00	3963500.00	25.79996	(04110624)	421500.00	3963000.00	26.37786	(04110624)
421500.00	3962500.00	27.51392c	(04120824)	421500.00	3962000.00	29.03202c	(04120824)
421500.00	3961500.00	30.55010c	(04120824)	421500.00	3961000.00	31.59527c	(04110724)
421500.00	3960500.00	34.30387c	(04110724)	421500.00	3960000.00	34.56080c	(04110724)
421500.00	3959500.00	35.82533c	(04110724)	421500.00	3959000.00	38.96640c	(04110724)
421500.00	3958500.00	42.31313c	(04110724)	421500.00	3958000.00	39.74986c	(04110724)
421500.00	3957500.00	42.80947c	(04011524)	421500.00	3957000.00	46.95221c	(04011524)
422000.00	3962000.00	25.82538	(04110624)	422000.00	3961500.00	26.16956	(04110624)
422000.00	3961000.00	26.61617c	(04120824)	422000.00	3960500.00	27.87133c	(04120824)
422000.00	3960000.00	29.13692c	(04120824)	422000.00	3959500.00	30.18615c	(04120824)
422000.00	3959000.00	30.16304c	(04110724)	422000.00	3958500.00	32.13208c	(04110724)
422000.00	3958000.00	34.54573c	(04110724)	422000.00	3957500.00	33.62545c	(04110724)
422000.00	3957000.00	33.48054c	(04110724)	422500.00	3959500.00	25.77523c	(04120824)
422500.00	3959000.00	24.78207c	(04120824)	422500.00	3958500.00	25.63881c	(04110724)
422500.00	3958000.00	27.17969c	(04110724)	422500.00	3957500.00	29.22822c	(04110724)
422500.00	3957000.00	29.35708c	(04110724)	423000.00	3959000.00	22.34826	(04110624)
423000.00	3958500.00	20.59417	(04122124)	423000.00	3958000.00	21.70543c	(04110724)
423000.00	3957500.00	23.01564c	(04110724)	423000.00	3957000.00	24.83587c	(04110724)
423500.00	3959000.00	22.75828	(04110624)	423500.00	3958500.00	19.69572	(04122124)
423500.00	3958000.00	18.84771	(04122124)	423500.00	3957500.00	18.76151c	(04110724)
423500.00	3957000.00	19.66476c	(04110724)	424000.00	3958500.00	19.64586	(04110624)
424000.00	3958000.00	18.49686	(04122124)	424000.00	3957500.00	17.97862	(04122124)
424000.00	3957000.00	17.48820	(04122124)	424500.00	3958000.00	18.43853	(04122124)
424500.00	3957500.00	17.83936	(04122124)	424500.00	3957000.00	17.47631	(04122124)
425000.00	3958000.00	18.20205	(04122124)	425000.00	3957500.00	17.57177	(04122124)
425000.00	3957000.00	17.34544	(04122124)	425500.00	3958000.00	18.81165	(04110624)
425500.00	3957500.00	17.10494	(04122124)	425500.00	3957000.00	16.89600	(04110624)

**Output for Nitrogen Oxides (NOx)**

\*\*\* THE ANNUAL ( 1 YRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

		** CONC OF CO	IN MICROGRAMS/M**3		
X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
411000.00	3997500.00	1.47732	411000.00	3997000.00	2.25450
411000.00	3996500.00	2.75785	411000.00	3996000.00	4.80447
411000.00	3995500.00	8.06344	411000.00	3995000.00	8.71371
411000.00	3994500.00	8.18381	411000.00	3994000.00	8.82895
411000.00	3993500.00	9.73910	411000.00	3993000.00	10.52988
411000.00	3992500.00	9.96149	411000.00	3992000.00	9.85815
411000.00	3991500.00	10.12677	411000.00	3991000.00	9.59986

411000.00	3990500.00	8.13076	411000.00	3990000.00	6.99246
411000.00	3989500.00	6.38084	411000.00	3989000.00	6.20118
411000.00	3988500.00	6.14342	411000.00	3988000.00	6.23139
411000.00	3987500.00	6.30770	411000.00	3987000.00	6.32321
411000.00	3986500.00	6.34259	411000.00	3986000.00	6.33269
411000.00	3985500.00	6.28597	411000.00	3985000.00	6.21534
411500.00	3997500.00	1.11019	411500.00	3997000.00	1.99759
411500.00	3996500.00	2.10228	411500.00	3996000.00	5.19426
411500.00	3995500.00	10.43372	411500.00	3995000.00	10.58552
411500.00	3994500.00	13.75511	411500.00	3994000.00	16.17976
411500.00	3993500.00	15.54759	411500.00	3993000.00	18.44694
411500.00	3992500.00	17.26733	411500.00	3992000.00	12.68544
411500.00	3991500.00	10.50875	411500.00	3991000.00	9.73905
411500.00	3990500.00	9.15231	411500.00	3990000.00	8.93500
411500.00	3989500.00	8.76395	411500.00	3989000.00	8.46163
411500.00	3988500.00	8.08469	411500.00	3988000.00	7.84036
411500.00	3987500.00	7.80654	411500.00	3987000.00	7.86734
411500.00	3986500.00	7.94054	411500.00	3986000.00	7.97774
411500.00	3985500.00	8.11769	411500.00	3985000.00	7.94895
411500.00	3984500.00	7.72353	411500.00	3984000.00	7.44809
411500.00	3983500.00	6.80786	412000.00	3997500.00	1.28123
412000.00	3997000.00	1.69013	412000.00	3996500.00	2.52542
412000.00	3996000.00	6.13909	412000.00	3995500.00	40.42313
412000.00	3995000.00	28.16200	412000.00	3994500.00	40.08570
412000.00	3994000.00	38.54736	412000.00	3993500.00	29.10134
412000.00	3993000.00	26.32986	412000.00	3992500.00	68.73272
412000.00	3992000.00	25.31329	412000.00	3991500.00	19.54843
412000.00	3991000.00	16.13015	412000.00	3990500.00	14.42134
412000.00	3990000.00	13.10609	412000.00	3989500.00	12.53619
412000.00	3989000.00	12.20999	412000.00	3988500.00	11.85797
412000.00	3988000.00	11.19316	412000.00	3987500.00	10.50640
412000.00	3987000.00	10.26586	412000.00	3986500.00	10.36224
412000.00	3986000.00	10.30540	412000.00	3985500.00	10.13358
412000.00	3985000.00	9.80884	412000.00	3984500.00	9.58222
412000.00	3984000.00	9.18564	412000.00	3983500.00	8.55558
412000.00	3983000.00	7.77059	412000.00	3982500.00	7.36443
412000.00	3982000.00	6.88894	412500.00	3997500.00	1.15181
412500.00	3997000.00	1.52779	412500.00	3996500.00	1.72133
412500.00	3996000.00	2.76132	412500.00	3995500.00	7.54333
412500.00	3995000.00	13.68603	412500.00	3994500.00	12.73280
412500.00	3994000.00	13.94357	412500.00	3993500.00	12.23784
412500.00	3993000.00	11.45691	412500.00	3992500.00	13.27230
412500.00	3992000.00	21.42855	412500.00	3991500.00	46.15685
412500.00	3991000.00	27.45415	412500.00	3990500.00	18.10357
412500.00	3990000.00	14.90238	412500.00	3989500.00	14.55344
412500.00	3989000.00	14.55979	412500.00	3988500.00	15.12777
412500.00	3988000.00	15.72924	412500.00	3987500.00	15.75240
412500.00	3987000.00	15.23153	412500.00	3986500.00	13.94224
412500.00	3986000.00	13.40437	412500.00	3985500.00	12.70001
412500.00	3985000.00	12.27379	412500.00	3984500.00	11.82172
412500.00	3984000.00	10.95845	412500.00	3983500.00	10.28660
412500.00	3983000.00	9.53144	412500.00	3982500.00	8.65272
412500.00	3982000.00	8.08301	412500.00	3981500.00	7.67036
412500.00	3981000.00	7.60572	412500.00	3980500.00	7.31063
413000.00	3997500.00	1.36844	413000.00	3997000.00	1.45581
413000.00	3996500.00	1.48869	413000.00	3996000.00	1.57041
413000.00	3995500.00	3.77629	413000.00	3995000.00	5.23309
413000.00	3994500.00	8.19993	413000.00	3994000.00	8.58716
413000.00	3993500.00	8.10754	413000.00	3993000.00	9.28880
413000.00	3992500.00	10.38545	413000.00	3992000.00	11.37067
413000.00	3991500.00	15.26052	413000.00	3991000.00	21.75514
413000.00	3990500.00	29.86032	413000.00	3990000.00	42.42418
413000.00	3989500.00	33.69373	413000.00	3989000.00	31.65143
413000.00	3988500.00	30.12680	413000.00	3988000.00	28.97677
413000.00	3987500.00	28.54772	413000.00	3987000.00	28.43569
413000.00	3986500.00	29.31436	413000.00	3986000.00	28.09284
413000.00	3985500.00	22.66097	413000.00	3985000.00	19.76861
413000.00	3984500.00	16.38322	413000.00	3984000.00	13.66043
413000.00	3983500.00	13.71359	413000.00	3983000.00	12.51576
413000.00	3982500.00	11.58729	413000.00	3982000.00	10.67301
413000.00	3981500.00	9.97446	413000.00	3981000.00	9.46013
413000.00	3980500.00	9.10430	413000.00	3980000.00	8.31669
413000.00	3979500.00	7.86535	413500.00	3997500.00	1.03131
413500.00	3997000.00	1.03793	413500.00	3996500.00	1.06732
413500.00	3996000.00	1.24156	413500.00	3995500.00	1.66548
413500.00	3995000.00	4.19316	413500.00	3994500.00	4.14277
413500.00	3994000.00	5.89492	413500.00	3993500.00	7.05615
413500.00	3993000.00	6.26255	413500.00	3992500.00	6.56263
413500.00	3992000.00	8.05296	413500.00	3991500.00	8.95591
413500.00	3991000.00	11.39450	413500.00	3990500.00	14.69520
413500.00	3990000.00	17.71799	413500.00	3989500.00	16.17561



413500.00	3989000.00	20.08677	413500.00	3988500.00	20.08564
413500.00	3988000.00	18.77367	413500.00	3987500.00	18.01670
413500.00	3987000.00	17.69460	413500.00	3986500.00	17.94407
413500.00	3986000.00	18.80436	413500.00	3985500.00	22.52012
413500.00	3985000.00	29.50560	413500.00	3984500.00	44.89972
413500.00	3984000.00	27.13936	413500.00	3983500.00	19.17497
413500.00	3983000.00	15.98039	413500.00	3982500.00	14.54599
413500.00	3982000.00	13.36887	413500.00	3981500.00	12.04030
413500.00	3981000.00	11.22732	413500.00	3980500.00	10.88635
413500.00	3980000.00	10.00916	413500.00	3979500.00	9.17531
413500.00	3979000.00	8.65851	413500.00	3978000.00	8.06544
413500.00	3977500.00	8.16464	413500.00	3977000.00	8.17535
413500.00	3976500.00	8.00970	413500.00	3976000.00	7.49769
413500.00	3975500.00	7.26585	413500.00	3975000.00	6.87981
413500.00	3974500.00	6.65490	414000.00	3997500.00	0.82594
414000.00	3997000.00	0.85469	414000.00	3996500.00	0.99445
414000.00	3996000.00	1.07363	414000.00	3995500.00	1.24035
414000.00	3995000.00	3.14241	414000.00	3994500.00	3.58372
414000.00	3994000.00	3.34456	414000.00	3993500.00	4.65806
414000.00	3993000.00	5.88193	414000.00	3992500.00	5.66760
414000.00	3992000.00	6.12935	414000.00	3991500.00	6.53954
414000.00	3991000.00	7.33123	414000.00	3990500.00	8.76884
414000.00	3990000.00	11.09151	414000.00	3989500.00	12.28220
414000.00	3989000.00	11.92872	414000.00	3988500.00	9.85289
414000.00	3988000.00	12.06452	414000.00	3987500.00	13.18507
414000.00	3987000.00	13.09453	414000.00	3986500.00	12.93521
414000.00	3986000.00	12.77682	414000.00	3985500.00	12.99910
414000.00	3985000.00	13.93268	414000.00	3984500.00	16.27556
414000.00	3984000.00	25.46341	414000.00	3983500.00	37.49719
414000.00	3983000.00	34.86253	414000.00	3982500.00	20.51379
414000.00	3982000.00	16.25565	414000.00	3981500.00	14.32468
414000.00	3981000.00	12.24901	414000.00	3980500.00	11.60258
414000.00	3980000.00	11.08550	414000.00	3979500.00	9.87648
414000.00	3979000.00	9.26532	414000.00	3978500.00	8.91553
414000.00	3978000.00	8.80797	414000.00	3977500.00	8.92691
414000.00	3977000.00	9.16026	414000.00	3976500.00	8.76434
414000.00	3976000.00	8.19954	414000.00	3975500.00	7.75209
414000.00	3975000.00	7.52779	414000.00	3974500.00	7.60357
414000.00	3974000.00	7.90998	414000.00	3973500.00	7.95776
414000.00	3973000.00	7.80647	414500.00	3992500.00	5.15831
414500.00	3992000.00	5.55301	414500.00	3991500.00	5.70223
414500.00	3991000.00	5.93581	414500.00	3990500.00	6.23401
414500.00	3990000.00	7.14957	414500.00	3989500.00	8.68406
414500.00	3989000.00	9.81381	414500.00	3988500.00	9.87399
414500.00	3988000.00	8.07349	414500.00	3987500.00	7.92391
414500.00	3987000.00	9.11469	414500.00	3986500.00	10.16843
414500.00	3986000.00	10.33952	414500.00	3985500.00	10.50295
414500.00	3985000.00	10.81617	414500.00	3984500.00	11.61157
414500.00	3984000.00	12.37577	414500.00	3983500.00	15.56477
414500.00	3983000.00	19.55346	414500.00	3982500.00	26.77855
414500.00	3982000.00	78.53844	414500.00	3981500.00	27.42399
414500.00	3981000.00	19.82321	414500.00	3980500.00	15.12618
414500.00	3980000.00	13.97279	414500.00	3979500.00	12.08826
414500.00	3979000.00	10.97583	414500.00	3978500.00	10.46356
414500.00	3978000.00	10.66619	414500.00	3977500.00	10.66618
414500.00	3977000.00	10.69525	414500.00	3976500.00	9.95827
414500.00	3976000.00	9.26559	414500.00	3975500.00	9.45888
414500.00	3975000.00	10.23184	414500.00	3974500.00	10.12673
414500.00	3974000.00	9.38878	414500.00	3973500.00	8.34623
414500.00	3973000.00	7.62826	414500.00	3972500.00	7.23629
414500.00	3972000.00	6.97560	414500.00	3971500.00	6.71400
415000.00	3991000.00	5.40850	415000.00	3990500.00	5.49722
415000.00	3990000.00	5.50326	415000.00	3989500.00	6.11565
415000.00	3989000.00	6.89079	415000.00	3988500.00	8.20889
415000.00	3988000.00	8.61766	415000.00	3987500.00	7.43989
415000.00	3987000.00	6.79468	415000.00	3986500.00	6.98560
415000.00	3986000.00	7.73261	415000.00	3985500.00	8.54854
415000.00	3985000.00	9.09884	415000.00	3984500.00	9.41029
415000.00	3984000.00	10.13347	415000.00	3983500.00	11.29892
415000.00	3983000.00	12.46850	415000.00	3982500.00	14.74880
415000.00	3982000.00	17.19309	415000.00	3981500.00	21.63566
415000.00	3981000.00	33.99951	415000.00	3980500.00	38.71396
415000.00	3980000.00	24.40504	415000.00	3979500.00	17.37282
415000.00	3979000.00	13.28973	415000.00	3978500.00	13.55780
415000.00	3978000.00	14.70379	415000.00	3977500.00	15.23282
415000.00	3977000.00	16.31102	415000.00	3976500.00	15.08381
415000.00	3976000.00	16.74377	415000.00	3975500.00	14.27729
415000.00	3975000.00	11.79132	415000.00	3974500.00	10.64994
415000.00	3974000.00	9.87618	415000.00	3973500.00	9.30121
415000.00	3973000.00	8.68448	415000.00	3972500.00	8.07430
415000.00	3972000.00	7.70822	415000.00	3971500.00	7.46300

415000.00	3971000.00	7.21534	415000.00	3970500.00	7.00594
415000.00	3970000.00	6.83168	415500.00	3985500.00	6.39539
415500.00	3985000.00	6.99864	415500.00	3984500.00	7.76158
415500.00	3984000.00	8.56380	415500.00	3983500.00	9.04747
415500.00	3983000.00	9.67771	415500.00	3982500.00	10.79912
415500.00	3982000.00	12.34813	415500.00	3981500.00	13.80760
415500.00	3981000.00	15.55504	415500.00	3980500.00	18.72472
415500.00	3980000.00	26.68017	415500.00	3979500.00	41.23214
415500.00	3979000.00	24.03563	415500.00	3978500.00	21.10609
415500.00	3978000.00	22.50703	415500.00	3977500.00	34.06109
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415500.00	3976000.00	32.99293	415500.00	3975500.00	26.79851
415500.00	3975000.00	22.48738	415500.00	3974500.00	18.79632
415500.00	3974000.00	15.88752	415500.00	3973500.00	14.01882
415500.00	3973000.00	12.62093	415500.00	3972500.00	11.49561
415500.00	3972000.00	10.51051	415500.00	3971500.00	9.80229
415500.00	3971000.00	9.19951	415500.00	3970500.00	8.65264
415500.00	3970000.00	8.18645	415500.00	3969500.00	7.80865
415500.00	3969000.00	7.51756	415500.00	3968500.00	7.26888
415500.00	3968000.00	7.04162	416000.00	3984500.00	6.03695
416000.00	3984000.00	6.62647	416000.00	3983500.00	7.19396
416000.00	3983000.00	8.09516	416000.00	3982500.00	8.57654
416000.00	3982000.00	9.45659	416000.00	3981500.00	10.64629
416000.00	3981000.00	11.84813	416000.00	3980500.00	12.94175
416000.00	3980000.00	14.52891	416000.00	3979500.00	19.03220
416000.00	3979000.00	52.62413	416000.00	3978500.00	29.31243
416000.00	3978000.00	24.63972	416000.00	3977500.00	20.01361
416000.00	3977000.00	16.95532	416000.00	3976500.00	16.41673
416000.00	3976000.00	19.38342	416000.00	3975500.00	21.49271
416000.00	3975000.00	26.51258	416000.00	3974500.00	46.11506
416000.00	3974000.00	31.37543	416000.00	3973500.00	22.41413
416000.00	3973000.00	18.33550	416000.00	3972500.00	15.83920
416000.00	3972000.00	13.94934	416000.00	3971500.00	12.54384
416000.00	3971000.00	11.58394	416000.00	3970500.00	10.68457
416000.00	3970000.00	9.92949	416000.00	3969500.00	9.33584
416000.00	3969000.00	8.83838	416000.00	3968500.00	8.40523
416000.00	3968000.00	8.02609	416000.00	3967500.00	7.68616
416000.00	3967000.00	7.37281	416000.00	3966500.00	7.10413
416500.00	3983000.00	6.22226	416500.00	3982500.00	6.74549
416500.00	3982000.00	7.36252	416500.00	3981500.00	8.15807
416500.00	3981000.00	9.36930	416500.00	3980500.00	10.69144
416500.00	3980000.00	11.41687	416500.00	3979500.00	12.72523
416500.00	3979000.00	14.57708	416500.00	3978500.00	19.75609
416500.00	3978000.00	11.45278	416500.00	3977500.00	14.47667
416500.00	3977000.00	15.24583	416500.00	3976500.00	14.18705
416500.00	3976000.00	13.14508	416500.00	3975500.00	14.00906
416500.00	3975000.00	14.04894	416500.00	3974500.00	15.07712
416500.00	3974000.00	19.15134	416500.00	3973500.00	24.56608
416500.00	3973000.00	40.03612	416500.00	3972500.00	35.73881
416500.00	3972000.00	22.15962	416500.00	3971500.00	17.82488
416500.00	3971000.00	15.13371	416500.00	3970500.00	13.19071
416500.00	3970000.00	11.74642	416500.00	3969500.00	10.77174
416500.00	3969000.00	9.99347	416500.00	3968500.00	9.33069
416500.00	3968000.00	8.81383	416500.00	3967500.00	8.43621
416500.00	3967000.00	8.09055	416500.00	3966500.00	7.75804
416500.00	3966000.00	7.43909	416500.00	3965500.00	7.15236
416500.00	3965000.00	6.88906	417000.00	3982000.00	6.25164
417000.00	3981500.00	6.80944	417000.00	3981000.00	7.48767
417000.00	3980500.00	8.14986	417000.00	3980000.00	8.80414
417000.00	3979500.00	9.69597	417000.00	3979000.00	11.39805
417000.00	3978500.00	10.38524	417000.00	3978000.00	13.54087
417000.00	3977500.00	10.73810	417000.00	3977000.00	8.44143
417000.00	3976500.00	10.09394	417000.00	3976000.00	11.82537
417000.00	3975500.00	11.82134	417000.00	3975000.00	12.32232
417000.00	3974500.00	12.73588	417000.00	3974000.00	12.63983
417000.00	3973500.00	13.87565	417000.00	3973000.00	16.10603
417000.00	3972500.00	18.83959	417000.00	3972000.00	24.36105
417000.00	3971500.00	36.85853	417000.00	3971000.00	46.35417
417000.00	3970500.00	25.71884	417000.00	3970000.00	18.97926
417000.00	3969500.00	15.59586	417000.00	3969000.00	13.50711
417000.00	3968500.00	12.02789	417000.00	3968000.00	10.88202
417000.00	3967500.00	9.98129	417000.00	3967000.00	9.27047
417000.00	3966500.00	8.65119	417000.00	3966000.00	8.17975
417000.00	3965500.00	7.78464	417000.00	3965000.00	7.47612
417000.00	3964500.00	7.18584	417000.00	3964000.00	6.83574
417000.00	3963500.00	6.49700	417500.00	3980500.00	6.35754
417500.00	3980000.00	7.14613	417500.00	3979500.00	7.91768
417500.00	3979000.00	9.28172	417500.00	3978500.00	9.71485
417500.00	3978000.00	8.84328	417500.00	3977500.00	10.81144
417500.00	3977000.00	9.88325	417500.00	3976500.00	7.25248
417500.00	3976000.00	7.49650	417500.00	3975500.00	8.51302

417500.00	3975000.00	9.65366	417500.00	3974500.00	10.69803
417500.00	3974000.00	11.51522	417500.00	3973500.00	11.50791
417500.00	3973000.00	11.98473	417500.00	3972500.00	13.10443
417500.00	3972000.00	14.34675	417500.00	3971500.00	15.80642
417500.00	3971000.00	17.94938	417500.00	3970500.00	23.25146
417500.00	3970000.00	33.31978	417500.00	3969500.00	70.31835
417500.00	3969000.00	30.41074	417500.00	3968500.00	21.21392
417500.00	3968000.00	16.93792	417500.00	3967500.00	14.24211
417500.00	3967000.00	12.38852	417500.00	3966500.00	11.04175
417500.00	3966000.00	9.99315	417500.00	3965500.00	9.31103
417500.00	3965000.00	8.72804	417500.00	3964500.00	8.20084
417500.00	3964000.00	7.75625	417500.00	3963500.00	7.35959
417500.00	3963000.00	6.92561	417500.00	3962500.00	6.51163
417500.00	3962000.00	6.31944	417500.00	3961500.00	6.15420
417500.00	3961000.00	5.63331	418000.00	3979500.00	6.39248
418000.00	3979000.00	7.37911	418000.00	3978500.00	8.48943
418000.00	3978000.00	7.74778	418000.00	3977500.00	7.91198
418000.00	3976000.00	7.31870	418000.00	3975500.00	6.60698
418000.00	3975000.00	6.70259	418000.00	3974500.00	7.39718
418000.00	3974000.00	8.99450	418000.00	3973500.00	10.06765
418000.00	3973000.00	10.38968	418000.00	3972500.00	10.68315
418000.00	3972000.00	11.41679	418000.00	3971500.00	12.08293
418000.00	3971000.00	12.87600	418000.00	3970500.00	13.81420
418000.00	3970000.00	15.12016	418000.00	3969500.00	17.98003
418000.00	3969000.00	21.18087	418000.00	3968500.00	28.35236
418000.00	3968000.00	46.58517	418000.00	3967500.00	35.64398
418000.00	3967000.00	23.50447	418000.00	3966500.00	17.85545
418000.00	3966000.00	14.55620	418000.00	3965500.00	12.59805
418000.00	3965000.00	11.25943	418000.00	3964500.00	10.15695
418000.00	3964000.00	9.35491	418000.00	3963500.00	8.80070
418000.00	3963000.00	8.32021	418000.00	3962500.00	7.61824
418000.00	3962000.00	7.07498	418000.00	3961500.00	6.83317
418000.00	3961000.00	6.56881	418000.00	3960500.00	5.46303
418000.00	3960000.00	4.84421	418000.00	3959500.00	4.27695
418000.00	3959000.00	2.71068	418000.00	3958500.00	2.55050
418500.00	3974000.00	6.25801	418500.00	3973500.00	7.28220
418500.00	3973000.00	8.47118	418500.00	3972500.00	9.22353
418500.00	3972000.00	9.70330	418500.00	3971500.00	10.22611
418500.00	3971000.00	10.68058	418500.00	3970500.00	11.22659
418500.00	3970000.00	11.75681	418500.00	3969500.00	12.17765
418500.00	3969000.00	13.40775	418500.00	3968500.00	14.69971
418500.00	3968000.00	16.79857	418500.00	3967500.00	20.21407
418500.00	3967000.00	25.47336	418500.00	3966500.00	41.26454
418500.00	3966000.00	40.65485	418500.00	3965500.00	25.14231
418500.00	3965000.00	18.91527	418500.00	3964500.00	15.40439
418500.00	3964000.00	13.12293	418500.00	3963500.00	11.43001
418500.00	3963000.00	10.34228	418500.00	3962500.00	9.53802
418500.00	3962000.00	8.73072	418500.00	3961500.00	8.08495
418500.00	3961000.00	7.76264	418500.00	3960500.00	6.49483
418500.00	3960000.00	5.42941	418500.00	3959500.00	4.20723
418500.00	3959000.00	2.94863	418500.00	3958500.00	2.60656
418500.00	3958000.00	2.55068	419000.00	3972500.00	7.07537
419000.00	3972000.00	7.88793	419000.00	3971500.00	8.63380
419000.00	3971000.00	9.17917	419000.00	3970500.00	9.68529
419000.00	3970000.00	10.17886	419000.00	3969500.00	10.42487
419000.00	3969000.00	10.63684	419000.00	3968500.00	11.28386
419000.00	3968000.00	11.95688	419000.00	3967500.00	12.88811
419000.00	3967000.00	14.48772	419000.00	3966500.00	16.65748
419000.00	3966000.00	19.73460	419000.00	3965500.00	24.07042
419000.00	3965000.00	35.08615	419000.00	3964500.00	68.56488
419000.00	3964000.00	28.84416	419000.00	3963500.00	21.07343
419000.00	3963000.00	16.84770	419000.00	3962500.00	13.84308
419000.00	3962000.00	12.01163	419000.00	3961500.00	10.93106
419000.00	3961000.00	9.76328	419000.00	3960500.00	8.93524
419000.00	3960000.00	6.65871	419000.00	3959500.00	3.88563
419000.00	3959000.00	3.24489	419000.00	3958500.00	3.02580
419000.00	3958000.00	2.89155	419000.00	3957500.00	2.52786
419500.00	3971000.00	7.41047	419500.00	3970500.00	8.09338
419500.00	3970000.00	8.74542	419500.00	3969500.00	9.23106
419500.00	3969000.00	9.42080	419500.00	3968500.00	9.59876
419500.00	3968000.00	9.99831	419500.00	3967500.00	10.40230
419500.00	3967000.00	10.89544	419500.00	3966500.00	11.79765
419500.00	3966000.00	12.97994	419500.00	3965500.00	14.46883
419500.00	3965000.00	16.30613	419500.00	3964500.00	18.41182
419500.00	3964000.00	22.32156	419500.00	3963500.00	28.29550
419500.00	3963000.00	46.87099	419500.00	3962500.00	33.45628
419500.00	3962000.00	23.48180	419500.00	3961500.00	19.15625
419500.00	3961000.00	16.45501	419500.00	3960500.00	13.74487
419500.00	3960000.00	9.26919	419500.00	3959500.00	4.61594
419500.00	3959000.00	4.09091	419500.00	3958500.00	3.09324
419500.00	3958000.00	2.15231	419500.00	3957500.00	1.89207

419500.00	3957000.00	1.80119	420000.00	3969000.00	8.22598
420000.00	3968500.00	8.53041	420000.00	3968000.00	8.72268
420000.00	3967500.00	8.96419	420000.00	3967000.00	9.19384
420000.00	3966500.00	9.48131	420000.00	3966000.00	9.96489
420000.00	3965500.00	10.61827	420000.00	3965000.00	11.53532
420000.00	3964500.00	12.66878	420000.00	3964000.00	13.69703
420000.00	3963500.00	15.24467	420000.00	3963000.00	17.29722
420000.00	3962500.00	20.29008	420000.00	3962000.00	25.24932
420000.00	3961500.00	29.89439	420000.00	3961000.00	35.16203
420000.00	3960500.00	45.00103	420000.00	3960000.00	22.08479
420000.00	3959500.00	7.19655	420000.00	3959000.00	5.00768
420000.00	3958500.00	3.74485	420000.00	3958000.00	2.97776
420000.00	3957500.00	2.47233	420000.00	3957000.00	2.12044
420500.00	3967500.00	7.94345	420500.00	3967000.00	8.16722
420500.00	3966500.00	8.31409	420500.00	3966000.00	8.49579
420500.00	3965500.00	8.72581	420500.00	3965000.00	9.06411
420500.00	3964500.00	9.66489	420500.00	3964000.00	10.35227
420500.00	3963500.00	10.96698	420500.00	3963000.00	11.78093
420500.00	3962500.00	12.80163	420500.00	3962000.00	13.96574
420500.00	3961500.00	15.30321	420500.00	3961000.00	15.79741
420500.00	3960500.00	17.32759	420500.00	3960000.00	18.55196
420500.00	3959500.00	12.22880	420500.00	3959000.00	8.40097
420500.00	3958500.00	4.11283	420500.00	3958000.00	1.91016
420500.00	3957500.00	1.24571	420500.00	3957000.00	0.91132
421000.00	3966000.00	7.65980	421000.00	3965500.00	7.80611
421000.00	3965000.00	7.94351	421000.00	3964500.00	8.17355
421000.00	3964000.00	8.51171	421000.00	3963500.00	8.90098
421000.00	3963000.00	9.23590	421000.00	3962500.00	9.65762
421000.00	3962000.00	10.17421	421000.00	3961500.00	10.63326
421000.00	3961000.00	11.40835	421000.00	3960500.00	11.85314
421000.00	3960000.00	11.90020	421000.00	3959500.00	9.58458
421000.00	3959000.00	9.38821	421000.00	3958500.00	6.41413
421000.00	3958000.00	6.49154	421000.00	3957500.00	5.32479
421000.00	3957000.00	3.87745	421500.00	3964000.00	7.37341
421500.00	3963500.00	7.53479	421500.00	3963000.00	7.71275
421500.00	3962500.00	7.95922	421500.00	3962000.00	8.32513
421500.00	3961500.00	8.71691	421500.00	3961000.00	8.86168
421500.00	3960500.00	9.31103	421500.00	3960000.00	9.54942
421500.00	3959500.00	8.41109	421500.00	3959000.00	7.33248
421500.00	3958500.00	7.44074	421500.00	3958000.00	5.44978
421500.00	3957500.00	5.15561	421500.00	3957000.00	5.21247
422000.00	3962000.00	7.27699	422000.00	3961500.00	7.46192
422000.00	3961000.00	7.54305	422000.00	3960500.00	7.65746
422000.00	3960000.00	7.96639	422000.00	3959500.00	8.00484
422000.00	3959000.00	5.90635	422000.00	3958500.00	6.06037
422000.00	3958000.00	6.13172	422000.00	3957500.00	4.81734
422000.00	3957000.00	4.29633	422500.00	3959500.00	7.02777
422500.00	3959000.00	5.75921	422500.00	3958500.00	5.14037
422500.00	3958000.00	5.23125	422500.00	3957500.00	5.23221
422500.00	3957000.00	4.28208	423000.00	3959000.00	5.71733
423000.00	3958500.00	4.66150	423000.00	3958000.00	4.60511
423000.00	3957500.00	4.65059	423000.00	3957000.00	4.58022
423500.00	3959000.00	5.59774	423500.00	3958500.00	4.52557
423500.00	3958000.00	4.22373	423500.00	3957500.00	4.19854
423500.00	3957000.00	4.21723	424000.00	3958500.00	4.57145
424000.00	3958000.00	3.94546	424000.00	3957500.00	3.92677
424000.00	3957000.00	3.88960	424500.00	3958000.00	3.87470
424500.00	3957500.00	3.68648	424500.00	3957000.00	3.69318
425000.00	3958000.00	3.88062	425000.00	3957500.00	3.48287
425000.00	3957000.00	3.49128	425500.00	3958000.00	3.81525
425500.00	3957500.00	3.35223	425500.00	3957000.00	3.25528

\*\*\* THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*  
 \*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

\*\* CONC OF CO IN MICROGRAMS/M\*\*3 \*\*  
 X-COORD (M) Y-COORD (M) CONC (YYMMDDHH) X-COORD (M) Y-COORD (M) CONC (YYMMDDHH)

411000.00	3997500.00	29.83175	(04010824)	411000.00	3997000.00	37.87433	(04010824)
411000.00	3996500.00	48.03180	(04010824)	411000.00	3996000.00	57.58441	(04010824)
411000.00	3995500.00	59.67682	(04010824)	411000.00	3995000.00	61.66623	(04010824)
411000.00	3994500.00	47.44913	(04010824)	411000.00	3994000.00	46.70570	(04010824)
411000.00	3993500.00	47.75411	(04010824)	411000.00	3993000.00	48.04481	(04010824)
411000.00	3992500.00	44.67760	(04010824)	411000.00	3992000.00	40.57084	(04010824)
411000.00	3991500.00	37.43593	(04010824)	411000.00	3991000.00	38.84436	(04090224)
411000.00	3990500.00	35.58200	(04010824)	411000.00	3990000.00	30.34541	(04010824)
411000.00	3989500.00	23.98612	(04010824)	411000.00	3989000.00	20.09074	(04010824)
411000.00	3988500.00	19.42262	(04071924)	411000.00	3988000.00	19.65153c	(04092524)
411000.00	3987500.00	20.62508c	(04092524)	411000.00	3987000.00	20.35446c	(04092524)
411000.00	3986500.00	19.97529c	(04092524)	411000.00	3986000.00	20.04166c	(04092524)
411000.00	3985500.00	19.23060c	(04092524)	411000.00	3985000.00	18.46762	(04090624)

411500.00	3997500.00	21.04417	(04010824)	411500.00	3997000.00	31.62950	(04010824)
411500.00	3996500.00	25.75788	(04010824)	411500.00	3996000.00	33.83149	(04010824)
411500.00	3995500.00	51.14066	(04010824)	411500.00	3995000.00	64.94789	(04010824)
411500.00	3994500.00	86.80708	(04010824)	411500.00	3994000.00	97.38776	(04010824)
411500.00	3993500.00	55.61696	(04010824)	411500.00	3993000.00	60.37975c	(04092524)
411500.00	3992500.00	69.64996	(04090224)	411500.00	3992000.00	55.88805	(04010824)
411500.00	3991500.00	54.45070	(04010824)	411500.00	3991000.00	50.53788	(04010824)
411500.00	3990500.00	44.69160	(04010824)	411500.00	3990000.00	41.74400	(04010824)
411500.00	3989500.00	42.02148	(04010824)	411500.00	3989000.00	37.55849	(04010824)
411500.00	3988500.00	29.37622	(04010824)	411500.00	3988000.00	24.24708	(04010824)
411500.00	3987500.00	23.20432	(04071924)	411500.00	3987000.00	23.37766c	(04092524)
411500.00	3986500.00	23.58281c	(04092524)	411500.00	3986000.00	23.52713c	(04092524)
411500.00	3985500.00	23.62864c	(04092524)	411500.00	3985000.00	23.82358	(04020224)
411500.00	3984500.00	23.03087	(04090224)	411500.00	3984000.00	23.22658	(04090224)
411500.00	3983500.00	23.08835	(04090224)	412000.00	3997500.00	23.07573c	(04081024)
412000.00	3997000.00	28.92352c	(04081024)	412000.00	3996500.00	38.39249	(04021024)
412000.00	3996000.00	94.24136c	(04012324)	412000.00	3995500.00	122.98145	(04010824)
412000.00	3995000.00	77.46963c	(04111724)	412000.00	3994500.00	139.40501	(04090224)
412000.00	3994000.00	126.74879c	(04111524)	412000.00	3993500.00	83.33434c	(04111524)
412000.00	3993000.00	75.96946	(04010824)	412000.00	3992500.00	196.40173c	(04110724)
412000.00	3992000.00	88.28760	(04100324)	412000.00	3991500.00	73.08713	(04100324)
412000.00	3991000.00	61.94858	(04100324)	412000.00	3990500.00	62.28071	(04010824)
412000.00	3990000.00	64.07806	(04010824)	412000.00	3989500.00	60.92575	(04010824)
412000.00	3989000.00	53.33966	(04010824)	412000.00	3988500.00	50.49668	(04010824)
412000.00	3988000.00	47.91917	(04010824)	412000.00	3987500.00	36.59587	(04010824)
412000.00	3987000.00	29.68646	(04010824)	412000.00	3986500.00	30.02960c	(04092524)
412000.00	3986000.00	29.80114c	(04092524)	412000.00	3985500.00	28.64129c	(04092524)
412000.00	3985000.00	27.68081c	(04092524)	412000.00	3984500.00	27.30839c	(04092524)
412000.00	3984000.00	26.02118	(04090224)	412000.00	3983500.00	25.31671	(04090224)
412000.00	3983000.00	23.53905	(04090224)	412000.00	3982500.00	21.95486	(04090224)
412000.00	3982000.00	20.25907	(04090224)	412500.00	3997500.00	53.26549c	(04012324)
412500.00	3997000.00	54.26896c	(04012324)	412500.00	3996500.00	34.56705c	(04012324)
412500.00	3996000.00	47.33743c	(04010524)	412500.00	3995500.00	43.57321c	(04010524)
412500.00	3995000.00	36.69784	(04120524)	412500.00	3994500.00	35.52747	(04122124)
412500.00	3994000.00	47.07302c	(04011524)	412500.00	3993500.00	34.82808	(04012624)
412500.00	3993000.00	29.50121	(04012624)	412500.00	3992500.00	32.85479	(04012624)
412500.00	3992000.00	54.47528	(04122124)	412500.00	3991500.00	169.96873	(04010824)
412500.00	3991000.00	68.22103	(04020224)	412500.00	3990500.00	56.78253	(04010824)
412500.00	3990000.00	56.23627	(04010824)	412500.00	3989500.00	62.21540	(04010824)
412500.00	3989000.00	71.73492	(04010824)	412500.00	3988500.00	82.94596	(04010824)
412500.00	3988000.00	84.07468	(04010824)	412500.00	3987500.00	69.79708	(04010824)
412500.00	3987000.00	64.30625	(04010824)	412500.00	3986500.00	47.19274	(04010824)
412500.00	3986000.00	39.15908c	(04092524)	412500.00	3985500.00	37.26915c	(04092524)
412500.00	3985000.00	34.63023c	(04092524)	412500.00	3984500.00	31.96188c	(04092524)
412500.00	3984000.00	29.96470c	(04092524)	412500.00	3983500.00	27.28944c	(04092524)
412500.00	3983000.00	24.54928	(04100324)	412500.00	3982500.00	23.54517c	(04021324)
412500.00	3982000.00	22.28665	(04100324)	412500.00	3981500.00	21.43842	(04100324)
412500.00	3981000.00	21.26360	(04100324)	412500.00	3980500.00	20.82677	(04100324)
413000.00	3997500.00	27.18196c	(04010524)	413000.00	3997000.00	27.30124c	(04010524)
413000.00	3996500.00	21.49507c	(04010524)	413000.00	3996000.00	19.21230c	(04012324)
413000.00	3995500.00	21.91360c	(04012324)	413000.00	3995000.00	23.31615c	(04012324)
413000.00	3994500.00	27.20696c	(04012324)	413000.00	3994000.00	28.45967c	(04012324)
413000.00	3993500.00	30.92475c	(04012324)	413000.00	3993000.00	34.40692c	(04012324)
413000.00	3992500.00	39.62491c	(04012324)	413000.00	3992000.00	46.12906c	(04012324)
413000.00	3991500.00	57.65843c	(04012324)	413000.00	3991000.00	77.16081	(04021024)
413000.00	3990500.00	96.21408c	(04020324)	413000.00	3990000.00	117.41056c	(04081024)
413000.00	3989500.00	87.25207c	(04111724)	413000.00	3989000.00	86.45512	(04090224)
413000.00	3988500.00	87.29986	(04090224)	413000.00	3988000.00	88.76972	(04090224)
413000.00	3987500.00	97.80445	(04010824)	413000.00	3987000.00	111.72533	(04010824)
413000.00	3986500.00	153.27335	(04010824)	413000.00	3986000.00	107.33642	(04010824)
413000.00	3985500.00	68.47935	(04090224)	413000.00	3985000.00	57.88911c	(04111524)
413000.00	3984500.00	54.04406c	(04111524)	413000.00	3984000.00	47.77844c	(04111524)
413000.00	3983500.00	44.96538	(04100324)	413000.00	3983000.00	42.33023	(04100324)
413000.00	3982500.00	39.83149	(04100324)	413000.00	3982000.00	37.91155	(04100324)
413000.00	3981500.00	36.52046	(04100324)	413000.00	3981000.00	34.56046	(04100324)
413000.00	3980500.00	32.99915	(04100324)	413000.00	3980000.00	31.57055	(04100324)
413000.00	3979500.00	30.26744	(04100324)	413500.00	3997500.00	15.19597c	(04010524)
413500.00	3997000.00	13.11943c	(04012324)	413500.00	3996500.00	13.53816c	(04012324)
413500.00	3996000.00	14.07521c	(04012324)	413500.00	3995500.00	15.01788c	(04012324)
413500.00	3995000.00	17.13835c	(04012324)	413500.00	3994500.00	18.20103c	(04012324)
413500.00	3994000.00	21.87321c	(04012324)	413500.00	3993500.00	24.05042c	(04012324)
413500.00	3993000.00	28.08329c	(04012324)	413500.00	3992500.00	34.61466c	(04012324)
413500.00	3992000.00	40.71994c	(04012324)	413500.00	3991500.00	42.07671c	(04012324)
413500.00	3991000.00	43.72596c	(04012324)	413500.00	3990500.00	45.22492c	(04012324)
413500.00	3990000.00	50.92879	(04120524)	413500.00	3989500.00	46.04169	(04120524)
413500.00	3989000.00	76.91928c	(04110724)	413500.00	3988500.00	79.46313c	(04011524)
413500.00	3988000.00	65.00627	(04011024)	413500.00	3987500.00	55.76086	(04012624)
413500.00	3987000.00	52.08963	(04012624)	413500.00	3986500.00	50.15060	(04012624)
413500.00	3986000.00	49.76120	(04012624)	413500.00	3985500.00	61.80153	(04010824)
413500.00	3985000.00	101.47834	(04010824)	413500.00	3984500.00	148.26285	(04010824)
413500.00	3984000.00	76.47773	(04082224)	413500.00	3983500.00	58.67668c	(04010924)

413500.00	3983000.00	55.32042c (04101924)	413500.00	3982500.00	51.48318c (04101924)
413500.00	3982000.00	46.65823c (04101924)	413500.00	3981500.00	41.98779c (04101924)
413500.00	3981000.00	39.83630 (04100324)	413500.00	3980500.00	38.06945 (04100324)
413500.00	3980000.00	36.36385 (04100324)	413500.00	3979500.00	34.73925 (04100324)
413500.00	3979000.00	33.17670 (04100324)	413500.00	3978000.00	30.69304 (04100324)
413500.00	3977500.00	29.91367 (04100324)	413500.00	3977000.00	29.25759 (04100324)
413500.00	3976500.00	28.52261 (04100324)	413500.00	3976000.00	26.92942 (04100324)
413500.00	3975500.00	25.97927 (04100324)	413500.00	3975000.00	25.12698 (04100324)
413500.00	3974500.00	24.26029 (04100324)	414000.00	3997500.00	15.27888c (04012324)
414000.00	3997000.00	16.47926c (04012324)	414000.00	3996500.00	17.96089c (04012324)
414000.00	3996000.00	19.76170c (04012324)	414000.00	3995500.00	21.84148c (04012324)
414000.00	3995000.00	25.21839c (04012324)	414000.00	3994500.00	26.84713c (04012324)
414000.00	3994000.00	27.42210c (04012324)	414000.00	3993500.00	28.96022c (04012324)
414000.00	3993000.00	28.30951c (04012324)	414000.00	3992500.00	27.44442c (04012324)
414000.00	3992000.00	26.91857c (04012324)	414000.00	3991500.00	25.80874c (04012324)
414000.00	3991000.00	24.55921c (04012324)	414000.00	3990500.00	26.00009 (04110624)
414000.00	3990000.00	32.67807 (04110624)	414000.00	3989500.00	38.37220 (04120524)
414000.00	3989000.00	36.17458 (04120524)	414000.00	3988500.00	26.98591 (04110624)
414000.00	3988000.00	39.93123 (04010324)	414000.00	3987500.00	43.62511c (04110724)
414000.00	3987000.00	49.03696c (04011524)	414000.00	3986500.00	46.74544c (04011524)
414000.00	3986000.00	41.57569 (04011024)	414000.00	3985500.00	39.13447 (04012624)
414000.00	3985000.00	38.36446 (04012624)	414000.00	3984500.00	40.69043 (04012624)
414000.00	3984000.00	61.72395 (04010824)	414000.00	3983500.00	126.35480 (04010824)
414000.00	3983000.00	97.52741 (04020224)	414000.00	3982500.00	56.50194 (04082224)
414000.00	3982000.00	51.98294 (04082224)	414000.00	3981500.00	52.92471 (04010824)
414000.00	3981000.00	50.77999 (04010824)	414000.00	3980500.00	46.93425 (04010824)
414000.00	3980000.00	40.61569 (04010824)	414000.00	3979500.00	32.75937 (04010824)
414000.00	3979000.00	28.81366 (04010824)	414000.00	3978500.00	24.86877 (04020224)
414000.00	3978000.00	25.31304c (04101924)	414000.00	3977500.00	25.68077c (04101924)
414000.00	3977000.00	26.20101c (04101924)	414000.00	3976500.00	25.53329c (04011624)
414000.00	3976000.00	25.34145c (04011624)	414000.00	3975500.00	23.51150c (04101924)
414000.00	3975000.00	22.83246c (04101924)	414000.00	3974500.00	22.13008c (04101924)
414000.00	3974000.00	23.67043 (04062224)	414000.00	3973500.00	27.50526 (04090224)
414000.00	3973000.00	29.83852 (04090224)	414500.00	3992500.00	18.39329c (04012324)
414500.00	3992000.00	18.66894 (04110624)	414500.00	3991500.00	19.16465 (04110624)
414500.00	3991000.00	19.67589 (04110624)	414500.00	3990500.00	20.33162 (04110624)
414500.00	3990000.00	22.06782 (04110624)	414500.00	3989500.00	26.69076 (04110624)
414500.00	3989000.00	31.20119 (04122124)	414500.00	3988500.00	31.46472 (04120524)
414500.00	3988000.00	23.86569 (04110624)	414500.00	3987500.00	22.37864 (04110624)
414500.00	3987000.00	27.86132 (04010324)	414500.00	3986500.00	33.99822c (04110724)
414500.00	3986000.00	33.66747c (04011524)	414500.00	3985500.00	36.99807c (04011524)
414500.00	3985000.00	37.82513c (04011524)	414500.00	3984500.00	36.78204c (04011524)
414500.00	3984000.00	35.12182c (04011524)	414500.00	3983500.00	39.54266 (04012624)
414500.00	3983000.00	49.34360 (04122124)	414500.00	3982500.00	67.48160 (04122124)
414500.00	3982000.00	302.37326c (04110724)	414500.00	3981500.00	67.28947c (04101524)
414500.00	3981000.00	57.57167 (04082224)	414500.00	3980500.00	57.08784 (04010824)
414500.00	3980000.00	66.19893 (04010824)	414500.00	3979500.00	64.67212 (04010824)
414500.00	3979000.00	58.25282 (04010824)	414500.00	3978500.00	45.18930 (04010824)
414500.00	3978000.00	38.81540 (04010824)	414500.00	3977500.00	32.25463 (04010824)
414500.00	3977000.00	28.14537c (04021324)	414500.00	3976500.00	26.20545c (04092524)
414500.00	3976000.00	24.83060c (04092524)	414500.00	3975500.00	27.15648c (04092524)
414500.00	3975000.00	35.95489 (04062224)	414500.00	3974500.00	43.20884 (04090224)
414500.00	3974000.00	34.35163 (04090224)	414500.00	3973500.00	28.16336 (04090224)
414500.00	3973000.00	21.80066 (04092224)	414500.00	3972500.00	19.53037 (04100324)
414500.00	3972000.00	19.21192 (04100324)	414500.00	3971500.00	18.79046 (04100324)
415000.00	3991000.00	17.13444c (04020324)	415000.00	3990500.00	18.15032c (04020324)
415000.00	3990000.00	18.55512c (04020324)	415000.00	3989500.00	19.35306 (04110624)
415000.00	3989000.00	22.19029 (04110624)	415000.00	3988500.00	26.52493 (04122124)
415000.00	3988000.00	28.34630 (04120524)	415000.00	3987500.00	23.25986 (04110624)
415000.00	3987000.00	21.08671 (04110624)	415000.00	3986500.00	20.86232 (04110624)
415000.00	3986000.00	21.67624 (04122124)	415000.00	3985500.00	26.53189c (04110724)
415000.00	3985000.00	26.94803c (04110724)	415000.00	3984500.00	29.31939c (04011524)
415000.00	3984000.00	32.41889c (04011524)	415000.00	3983500.00	35.02216c (04011524)
415000.00	3983000.00	35.83841c (04011524)	415000.00	3982500.00	37.12954 (04012624)
415000.00	3982000.00	42.21817 (04122124)	415000.00	3981500.00	55.08136 (04122124)
415000.00	3981000.00	96.00995 (04122124)	415000.00	3980500.00	124.03197c (04011524)
415000.00	3980000.00	65.17563c (04101524)	415000.00	3979500.00	50.20642 (04010824)
415000.00	3979000.00	54.56749 (04010824)	415000.00	3978500.00	83.50639 (04010824)
415000.00	3978000.00	98.45337 (04010824)	415000.00	3977500.00	82.45181 (04010824)
415000.00	3977000.00	62.10327 (04010824)	415000.00	3976500.00	49.01941 (04020224)
415000.00	3976000.00	76.36040 (04090224)	415000.00	3975500.00	53.52602 (04092224)
415000.00	3975000.00	31.96466c (04092524)	415000.00	3974500.00	28.76531c (04092524)
415000.00	3974000.00	26.05920c (04092524)	415000.00	3973500.00	24.66344c (04092524)
415000.00	3973000.00	22.53145c (04092524)	415000.00	3972500.00	20.63365c (04092524)
415000.00	3972000.00	19.59714c (04111524)	415000.00	3971500.00	19.91469c (04111524)
415000.00	3971000.00	20.06833c (04111524)	415000.00	3970500.00	20.13515c (04111524)
415000.00	3970000.00	20.12071c (04111524)	415500.00	3985500.00	22.08162c (04012324)
415500.00	3985000.00	23.08854c (04012324)	415500.00	3984500.00	24.17558c (04012324)
415500.00	3984000.00	25.53904c (04012324)	415500.00	3983500.00	27.49039c (04012324)
415500.00	3983000.00	28.66766c (04012324)	415500.00	3982500.00	30.97621c (04012324)
415500.00	3982000.00	33.68665c (04011524)	415500.00	3981500.00	35.28163c (04011524)

415500.00	3981000.00	38.29328	(04122124)	415500.00	3980500.00	47.49051	(04122124)
415500.00	3980000.00	66.84523	(04122124)	415500.00	3979500.00	152.86375c	(04110724)
415500.00	3979000.00	90.37525c	(04081024)	415500.00	3978500.00	68.63600c	(04081024)
415500.00	3978000.00	67.74077c	(04081024)	415500.00	3977500.00	103.43769	(04090224)
415500.00	3977000.00	74.84610c	(04012324)	415500.00	3976500.00	186.84045	(04010824)
415500.00	3976000.00	155.06381	(04010824)	415500.00	3975500.00	83.48014	(04010824)
415500.00	3975000.00	68.87395	(04100324)	415500.00	3974500.00	59.53845	(04100324)
415500.00	3974000.00	51.57050	(04100324)	415500.00	3973500.00	46.92015	(04100324)
415500.00	3973000.00	43.31946	(04100324)	415500.00	3972500.00	40.37258	(04100324)
415500.00	3972000.00	37.83141	(04100324)	415500.00	3971500.00	35.55972	(04100324)
415500.00	3971000.00	33.62925	(04100324)	415500.00	3970500.00	31.90421	(04100324)
415500.00	3970000.00	30.35909	(04100324)	415500.00	3969500.00	28.98865	(04100324)
415500.00	3969000.00	27.84770	(04100324)	415500.00	3968500.00	26.81695	(04100324)
415500.00	3968000.00	25.88967	(04100324)	416000.00	3984500.00	19.28930	(04110624)
416000.00	3984000.00	19.99548	(04110624)	416000.00	3983500.00	22.42780c	(04010224)
416000.00	3983000.00	23.99122c	(04010224)	416000.00	3982500.00	25.99278c	(04010224)
416000.00	3982000.00	30.31410c	(04010224)	416000.00	3981500.00	36.11316c	(04010224)
416000.00	3981000.00	41.51112c	(04010224)	416000.00	3980500.00	53.77230c	(04012324)
416000.00	3980000.00	84.84213c	(04012324)	416000.00	3979500.00	160.224109c	(04012324)
416000.00	3979000.00	221.65523	(04120524)	416000.00	3978500.00	129.23193c	(04110724)
416000.00	3978000.00	96.67329c	(04110724)	416000.00	3977500.00	80.12183c	(04011524)
416000.00	3977000.00	61.55021	(04011024)	416000.00	3976500.00	51.98256	(04011024)
416000.00	3976000.00	50.02373	(04012624)	416000.00	3975500.00	56.48032c	(04110724)
416000.00	3975000.00	75.52451c	(04110724)	416000.00	3974500.00	146.54128	(04010824)
416000.00	3974000.00	96.77012	(04010824)	416000.00	3973500.00	62.74900	(04100324)
416000.00	3973000.00	54.77069	(04100324)	416000.00	3972500.00	50.11136	(04100324)
416000.00	3972000.00	46.50284	(04100324)	416000.00	3971500.00	43.70177	(04100324)
416000.00	3971000.00	41.45403	(04100324)	416000.00	3970500.00	39.46843	(04100324)
416000.00	3970000.00	37.49701	(04100324)	416000.00	3969500.00	35.79841	(04100324)
416000.00	3969000.00	34.25488	(04100324)	416000.00	3968500.00	32.75998	(04100324)
416000.00	3968000.00	31.32894	(04100324)	416000.00	3967500.00	30.01313	(04100324)
416000.00	3967000.00	28.80599	(04100324)	416000.00	3966500.00	27.77143	(04100324)
416500.00	3983000.00	37.86426c	(04012324)	416500.00	3982500.00	41.86354c	(04012324)
416500.00	3982000.00	40.15242c	(04012324)	416500.00	3981500.00	30.91535c	(04012324)
416500.00	3981000.00	34.18326	(04110624)	416500.00	3980500.00	46.61050c	(04010524)
416500.00	3980000.00	38.82066c	(04010524)	416500.00	3979500.00	35.67876	(04110624)
416500.00	3979000.00	40.02039	(04110624)	416500.00	3978500.00	71.02356	(04122124)
416500.00	3978000.00	31.56693	(04110624)	416500.00	3977500.00	60.75925c	(04110724)
416500.00	3977000.00	67.99664c	(04110724)	416500.00	3976500.00	64.30415c	(04011524)
416500.00	3976000.00	58.33565	(04011024)	416500.00	3975500.00	50.66265c	(04011524)
416500.00	3975000.00	43.53719	(04011024)	416500.00	3974500.00	44.35988	(04012624)
416500.00	3974000.00	50.79634	(04012624)	416500.00	3973500.00	61.02024c	(04020924)
416500.00	3973000.00	141.32542c	(04020924)	416500.00	3972500.00	123.30856	(04010824)
416500.00	3972000.00	59.44538	(04020224)	416500.00	3971500.00	46.13768	(04020224)
416500.00	3971000.00	38.06364	(04100324)	416500.00	3970500.00	34.61945	(04100324)
416500.00	3970000.00	32.08357	(04100324)	416500.00	3969500.00	30.22132	(04100324)
416500.00	3969000.00	28.70185	(04100324)	416500.00	3968500.00	27.52668	(04100324)
416500.00	3968000.00	26.65973	(04100324)	416500.00	3967500.00	26.01396	(04100324)
416500.00	3967000.00	25.51489	(04100324)	416500.00	3966500.00	25.01619	(04100324)
416500.00	3966000.00	24.46460	(04100324)	416500.00	3965500.00	23.96162	(04100324)
416500.00	3965000.00	23.50641	(04100324)	417000.00	3982000.00	27.16392	(04110624)
417000.00	3981500.00	25.99182c	(04010524)	417000.00	3981000.00	24.90967c	(04010524)
417000.00	3980500.00	25.38712	(04110624)	417000.00	3980000.00	27.80893	(04110624)
417000.00	3979500.00	29.83027	(04110624)	417000.00	3979000.00	33.86980	(04110624)
417000.00	3978500.00	31.24977	(04110624)	417000.00	3978000.00	46.18180	(04122124)
417000.00	3977500.00	33.97408	(04120524)	417000.00	3977000.00	25.33085c	(04120824)
417000.00	3976500.00	38.81758c	(040110724)	417000.00	3976000.00	49.81600c	(04110724)
417000.00	3975500.00	49.23094c	(04011524)	417000.00	3975000.00	52.21507c	(04011524)
417000.00	3974500.00	48.98238c	(04011524)	417000.00	3974000.00	44.52620	(04011024)
417000.00	3973500.00	42.07966	(04012624)	417000.00	3973000.00	45.03044	(04012624)
417000.00	3972500.00	48.48905	(04012624)	417000.00	3972000.00	64.00857	(04122124)
417000.00	3971500.00	128.60622c	(04020924)	417000.00	3971000.00	175.81921	(04010824)
417000.00	3970500.00	72.56757	(04020224)	417000.00	3970000.00	50.78672	(04020224)
417000.00	3969500.00	39.97792	(04100324)	417000.00	3969000.00	35.62052	(04100324)
417000.00	3968500.00	32.64278	(04100324)	417000.00	3968000.00	30.15248	(04100324)
417000.00	3967500.00	28.16271	(04100324)	417000.00	3967000.00	26.52366	(04100324)
417000.00	3966500.00	25.22737	(04100324)	417000.00	3966000.00	24.10283	(04100324)
417000.00	3965500.00	23.18322	(04100324)	417000.00	3965000.00	22.47946	(04100324)
417000.00	3964500.00	21.86908	(04100324)	417000.00	3964000.00	21.29254	(04100324)
417000.00	3963500.00	20.82298	(04100324)	417500.00	3980500.00	21.53741	(04110624)
417500.00	3980000.00	23.34925	(04110624)	417500.00	3979500.00	25.59477	(04110624)
417500.00	3979000.00	29.44231	(04110624)	417500.00	3978500.00	30.76703	(04110624)
417500.00	3978000.00	28.94503	(04110624)	417500.00	3977500.00	36.42291	(04122124)
417500.00	3977000.00	35.39353	(04120524)	417500.00	3976500.00	23.33541	(04110624)
417500.00	3976000.00	22.75911c	(04120824)	417500.00	3975500.00	29.02408c	(04110724)
417500.00	3975000.00	39.12658c	(04110724)	417500.00	3974500.00	39.71397c	(04110724)
417500.00	3974000.00	43.40355c	(04011524)	417500.00	3973500.00	44.01013c	(04011524)
417500.00	3973000.00	43.26437c	(04011524)	417500.00	3972500.00	41.70076c	(04011524)
417500.00	3972000.00	41.38346	(04012624)	417500.00	3971500.00	43.08700	(04012624)
417500.00	3971000.00	47.81584	(04012624)	417500.00	3970500.00	64.29645c	(04110724)
417500.00	3970000.00	99.34879c	(04110724)	417500.00	3969500.00	378.96310	(04010824)

417500.00	3969000.00	91.39135	(04020224)	417500.00	3968500.00	58.56449	(04020224)
417500.00	3968000.00	43.22372	(04100324)	417500.00	3967500.00	37.92443	(04100324)
417500.00	3967000.00	33.95242	(04100324)	417500.00	3966500.00	31.06582	(04100324)
417500.00	3966000.00	28.82157	(04100324)	417500.00	3965500.00	27.07958	(04100324)
417500.00	3965000.00	25.70621	(04100324)	417500.00	3964500.00	24.54325	(04100324)
417500.00	3964000.00	23.32845	(04100324)	417500.00	3963500.00	22.43162	(04100324)
417500.00	3963000.00	21.76601	(04100324)	417500.00	3962500.00	21.16944	(04100324)
417500.00	3962000.00	20.65120	(04100324)	417500.00	3961500.00	20.15880	(04100324)
417500.00	3961000.00	19.78852	(04100324)	418000.00	3979500.00	22.20071	(04110624)
418000.00	3979000.00	25.17307	(04110624)	418000.00	3978500.00	28.15444	(04110624)
418000.00	3978000.00	26.20028	(04110624)	418000.00	3977500.00	27.37173	(04110624)
418000.00	3976000.00	24.22460	(04110624)	418000.00	3975500.00	21.58563	(04110624)
418000.00	3975000.00	20.60805	(04110624)	418000.00	3974500.00	23.84304c	(04110724)
418000.00	3974000.00	32.10252c	(04110724)	418000.00	3973500.00	36.17178c	(04110724)
418000.00	3973000.00	34.96802c	(04011524)	418000.00	3972500.00	38.22998c	(04011524)
418000.00	3972000.00	39.62906c	(04011524)	418000.00	3971500.00	39.48490c	(04120824)
418000.00	3971000.00	39.04168c	(04120824)	418000.00	3970500.00	38.92677	(04012624)
418000.00	3970000.00	42.27414	(04012624)	418000.00	3969500.00	50.24434c	(04110724)
418000.00	3969000.00	62.24380c	(04110724)	418000.00	3968500.00	87.55398c	(04110724)
418000.00	3968000.00	173.67876c	(04110724)	418000.00	3967500.00	111.55410	(04010824)
418000.00	3967000.00	65.43133	(04020224)	418000.00	3966500.00	46.54959	(04020224)
418000.00	3966000.00	37.84592	(04100324)	418000.00	3965500.00	33.99206	(04100324)
418000.00	3965000.00	31.19927	(04100324)	418000.00	3964500.00	29.02761	(04100324)
418000.00	3964000.00	27.46547	(04100324)	418000.00	3963500.00	26.07418	(04100324)
418000.00	3963000.00	24.92679	(04100324)	418000.00	3962500.00	23.81308	(04100324)
418000.00	3962000.00	22.79848	(04100324)	418000.00	3961500.00	21.99026	(04100324)
418000.00	3961000.00	21.40701	(04100324)	418000.00	3960500.00	20.83615	(04100324)
418000.00	3960000.00	20.16228	(04100324)	418000.00	3959500.00	19.48072	(04100324)
418000.00	3959000.00	17.05101c	(04111524)	418000.00	3958500.00	16.62457c	(04111524)
418500.00	3974000.00	19.95512	(04110624)	418500.00	3973500.00	21.44456	(04110624)
418500.00	3973000.00	27.60020c	(04110724)	418500.00	3972500.00	32.00397c	(04110724)
418500.00	3972000.00	31.06204c	(04110724)	418500.00	3971500.00	33.41140c	(04011524)
418500.00	3971000.00	35.13788c	(04011524)	418500.00	3970500.00	35.91679c	(04120824)
418500.00	3970000.00	37.13437c	(04120824)	418500.00	3969500.00	36.68292c	(04120824)
418500.00	3969000.00	37.72725c	(04120824)	418500.00	3968500.00	41.75423	(04012624)
418500.00	3968000.00	49.45368c	(04110724)	418500.00	3967500.00	60.23744c	(04110724)
418500.00	3967000.00	77.28307c	(04110724)	418500.00	3966500.00	132.97362c	(04011524)
418500.00	3966000.00	146.71828	(04010824)	418500.00	3965500.00	72.18621	(04020224)
418500.00	3965000.00	51.00009	(04020224)	418500.00	3964500.00	38.17104	(04020224)
418500.00	3964000.00	34.05421	(04100324)	418500.00	3963500.00	31.11669	(04100324)
418500.00	3963000.00	28.95084	(04100324)	418500.00	3962500.00	27.17272	(04100324)
418500.00	3962000.00	25.86631	(04100324)	418500.00	3961500.00	24.94724	(04100324)
418500.00	3961000.00	24.01427	(04100324)	418500.00	3960500.00	23.09515	(04100324)
418500.00	3960000.00	22.00717	(04100324)	418500.00	3959500.00	20.49906	(04100324)
418500.00	3959000.00	18.33077c	(04111524)	418500.00	3958500.00	18.27185c	(04111524)
418500.00	3958000.00	18.10226c	(04111524)	419000.00	3972500.00	22.01685	(04110624)
419000.00	3972000.00	24.09766c	(04110724)	419000.00	3971500.00	27.98079c	(04110724)
419000.00	3971000.00	29.23022c	(04110724)	419000.00	3970500.00	28.73945c	(04011524)
419000.00	3970000.00	31.22410c	(04011524)	419000.00	3969500.00	32.25501c	(04011524)
419000.00	3969000.00	33.47332c	(04120824)	419000.00	3968500.00	34.68454c	(04120824)
419000.00	3968000.00	35.65117c	(04120824)	419000.00	3967500.00	36.52053	(04012624)
419000.00	3967000.00	42.09521c	(04110724)	419000.00	3966500.00	48.97631c	(04110724)
419000.00	3966000.00	57.36029c	(04110724)	419000.00	3965500.00	72.19909c	(04110724)
419000.00	3965000.00	113.63336c	(04011524)	419000.00	3964500.00	337.37216	(04010824)
419000.00	3964000.00	82.09695	(04020224)	419000.00	3963500.00	55.48499	(04020224)
419000.00	3963000.00	42.51526	(04020224)	419000.00	3962500.00	36.85913	(04100324)
419000.00	3962000.00	33.51301	(04100324)	419000.00	3961500.00	30.95883	(04100324)
419000.00	3961000.00	29.14454	(04100324)	419000.00	3960500.00	27.59768	(04100324)
419000.00	3960000.00	26.34441	(04100324)	419000.00	3959500.00	22.35883c	(04111524)
419000.00	3959000.00	21.25680c	(04111524)	419000.00	3958500.00	20.47284c	(04111524)
419000.00	3958000.00	19.81421c	(04111524)	419000.00	3957500.00	18.29390	(04100324)
419500.00	3971000.00	23.01539	(04110624)	419500.00	3970500.00	24.98833c	(04110724)
419500.00	3970000.00	27.33586c	(04110724)	419500.00	3969500.00	27.23719c	(04110724)
419500.00	3969000.00	27.92066	(04110624)	419500.00	3968500.00	28.49432c	(04011524)
419500.00	3968000.00	30.21588c	(04120824)	419500.00	3967500.00	32.14219c	(04120824)
419500.00	3967000.00	33.06282c	(04120824)	419500.00	3966500.00	34.43710c	(04120824)
419500.00	3966000.00	36.77291c	(04110724)	419500.00	3965500.00	42.08652c	(04110724)
419500.00	3965000.00	47.84660c	(04110724)	419500.00	3964500.00	54.37796c	(04110724)
419500.00	3964000.00	68.86974c	(04110724)	419500.00	3963500.00	93.16425c	(04110724)
419500.00	3963000.00	184.38345c	(04011524)	419500.00	3962500.00	103.23074	(04010824)
419500.00	3962000.00	63.19017	(04020224)	419500.00	3961500.00	48.52812	(04020224)
419500.00	3961000.00	41.89157	(04100324)	419500.00	3960500.00	38.17338	(04100324)
419500.00	3960000.00	34.59648	(04100324)	419500.00	3959500.00	27.62868c	(04111524)
419500.00	3959000.00	26.41492c	(04111524)	419500.00	3958500.00	22.36668	(04100324)
419500.00	3958000.00	17.96471c	(04111524)	419500.00	3957500.00	17.32077c	(04111524)
419500.00	3957000.00	16.84817c	(04111524)	420000.00	3969000.00	25.95295	(04110624)
420000.00	3968500.00	26.71097	(04110624)	420000.00	3968000.00	27.18238	(04110624)
420000.00	3967500.00	27.77795	(04110624)	420000.00	3967000.00	28.42876	(04110624)
420000.00	3966500.00	29.10398c	(04120824)	420000.00	3966000.00	30.73868c	(04120824)
420000.00	3965500.00	32.28607c	(04120824)	420000.00	3965000.00	33.71348c	(04120824)
420000.00	3964500.00	37.24442c	(04110724)	420000.00	3964000.00	40.92756c	(04110724)



420000.00	3963500.00	45.72290c	(04110724)	420000.00	3963000.00	52.85922c	(04110724)
420000.00	3962500.00	63.31131c	(04110724)	420000.00	3962000.00	80.72485c	(04110724)
420000.00	3961500.00	116.96611c	(04110724)	420000.00	3961000.00	146.76210c	(04011524)
420000.00	3960500.00	203.69661c	(04110724)	420000.00	3960000.00	103.41952c	(04111524)
420000.00	3959500.00	53.99031	(04100324)	420000.00	3959000.00	42.20086	(04100324)
420000.00	3958500.00	33.68676	(04100324)	420000.00	3958000.00	28.09829	(04100324)
420000.00	3957500.00	24.24783	(04100324)	420000.00	3957000.00	21.44101	(04100324)
420500.00	3967500.00	26.26288	(04110624)	420500.00	3967000.00	26.73397	(04110624)
420500.00	3966500.00	27.19552	(04110624)	420500.00	3966000.00	27.53901	(04110624)
420500.00	3965500.00	28.07775	(04110624)	420500.00	3965000.00	28.87208	(04110624)
420500.00	3964500.00	30.50967	(04110624)	420500.00	3964000.00	31.84947	(04110624)
420500.00	3963500.00	32.96636c	(04110724)	420500.00	3963000.00	36.38852c	(04110724)
420500.00	3962500.00	40.05912c	(04110724)	420500.00	3962000.00	44.20745c	(04110724)
420500.00	3961500.00	50.63163c	(04110724)	420500.00	3961000.00	56.79718c	(04110724)
420500.00	3960500.00	66.79200c	(04110724)	420500.00	3960000.00	82.77908c	(04011524)
420500.00	3959500.00	77.14851c	(04011524)	420500.00	3959000.00	71.01164	(04011024)
420500.00	3958500.00	42.41105	(04011024)	420500.00	3958000.00	20.56395	(04011024)
420500.00	3957500.00	13.40627	(04012624)	420500.00	3957000.00	10.37010	(04012624)
421000.00	3966000.00	26.76141	(04110624)	421000.00	3965500.00	27.22385	(04110624)
421000.00	3965000.00	27.47872	(04110624)	421000.00	3964500.00	28.01713	(04110624)
421000.00	3964000.00	28.70524	(04110624)	421000.00	3963500.00	29.12776	(04110624)
421000.00	3963000.00	29.33465c	(04120824)	421000.00	3962500.00	30.48684c	(04120824)
421000.00	3962000.00	32.81570c	(04110724)	421000.00	3961500.00	35.48907c	(04110724)
421000.00	3961000.00	38.88230c	(04110724)	421000.00	3960500.00	42.42785c	(04110724)
421000.00	3960000.00	42.52814c	(04110724)	421000.00	3959500.00	47.57044c	(04110724)
421000.00	3959000.00	51.49325c	(04110724)	421000.00	3958500.00	52.57248c	(04011524)
421000.00	3958000.00	56.61617c	(04011524)	421000.00	3957500.00	49.88501c	(04011524)
421000.00	3957000.00	38.24937	(04011024)	421500.00	3964000.00	23.81935	(04110624)
421500.00	3963500.00	24.17428	(04110624)	421500.00	3963000.00	24.70203	(04110624)
421500.00	3962500.00	25.70142c	(04120824)	421500.00	3962000.00	27.10516c	(04120824)
421500.00	3961500.00	28.50257c	(04120824)	421500.00	3961000.00	29.49634c	(04110724)
421500.00	3960500.00	32.00882c	(04110724)	421500.00	3960000.00	32.32981c	(04110724)
421500.00	3959500.00	33.52916c	(04110724)	421500.00	3959000.00	36.44601c	(04110724)
421500.00	3958500.00	39.54398c	(04110724)	421500.00	3958000.00	37.23332c	(04110724)
421500.00	3957500.00	40.01516c	(04011524)	421500.00	3957000.00	43.85235c	(04011524)
422000.00	3962000.00	24.20844	(04110624)	422000.00	3961500.00	24.51401	(04110624)
422000.00	3961000.00	24.87800c	(04120824)	422000.00	3960500.00	26.04675c	(04120824)
422000.00	3960000.00	27.21980c	(04120824)	422000.00	3959500.00	28.19106c	(04120824)
422000.00	3959000.00	28.27336c	(04110724)	422000.00	3958500.00	30.11396c	(04110724)
422000.00	3958000.00	32.36168c	(04110724)	422000.00	3957500.00	31.53702c	(04110724)
422000.00	3957000.00	31.41773c	(04110724)	422500.00	3959500.00	24.11252c	(04120824)
422500.00	3959000.00	23.21394c	(04120824)	422500.00	3958500.00	24.05406c	(04110724)
422500.00	3958000.00	25.50144c	(04110724)	422500.00	3957500.00	27.41669c	(04110724)
422500.00	3957000.00	27.55473c	(04110724)	423000.00	3959000.00	21.00265	(04110624)
423000.00	3958500.00	19.19270	(04122124)	423000.00	3958000.00	20.37694c	(04110724)
423000.00	3957500.00	21.60983c	(04110724)	423000.00	3957000.00	23.31659c	(04110724)
423500.00	3959000.00	21.38756	(04110624)	423500.00	3958500.00	18.39242	(04122124)
423500.00	3958000.00	17.58952	(04122124)	423500.00	3957500.00	17.62254c	(04110724)
423500.00	3957000.00	18.47288c	(04110724)	424000.00	3958500.00	18.51299	(04110624)
424000.00	3958000.00	17.29096	(04122124)	424000.00	3957500.00	16.79909	(04122124)
424000.00	3957000.00	16.33732	(04122124)	424500.00	3958000.00	17.25978	(04122124)
424500.00	3957500.00	16.69099	(04122124)	424500.00	3957000.00	16.38181	(04110624)
425000.00	3958000.00	17.09367	(04110624)	425000.00	3957500.00	16.45773	(04122124)
425000.00	3957000.00	16.24048	(04122124)	425500.00	3958000.00	17.73543	(04110624)
425500.00	3957500.00	16.11344	(04110624)	425500.00	3957000.00	15.95391	(04110624)

**Output Data for Sulfur Dioxide (SO<sub>2</sub>)**

\*\*\* THE ANNUAL ( 1 YRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

		** CONC OF CO	IN MICROGRAMS/M**3		
X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
411000.00	3997500.00	0.02823	411000.00	3997000.00	0.04331
411000.00	3996500.00	0.05297	411000.00	3996000.00	0.09351
411000.00	3995500.00	0.15859	411000.00	3995000.00	0.17124
411000.00	3994500.00	0.16126	411000.00	3994000.00	0.17446
411000.00	3993500.00	0.19265	411000.00	3993000.00	0.20849
411000.00	3992500.00	0.19615	411000.00	3992000.00	0.19280
411000.00	3991500.00	0.19717	411000.00	3991000.00	0.18631
411000.00	3990500.00	0.15743	411000.00	3990000.00	0.13521
411000.00	3989500.00	0.12328	411000.00	3989000.00	0.11978
411000.00	3988500.00	0.11862	411000.00	3988000.00	0.12026
411000.00	3987500.00	0.12167	411000.00	3987000.00	0.12192
411000.00	3986500.00	0.12225	411000.00	3986000.00	0.12200
411000.00	3985500.00	0.12104	411000.00	3985000.00	0.11961
411500.00	3997500.00	0.02144	411500.00	3997000.00	0.03891
411500.00	3996500.00	0.04100	411500.00	3996000.00	0.10466
411500.00	3995500.00	0.21303	411500.00	3995000.00	0.21421
411500.00	3994500.00	0.27827	411500.00	3994000.00	0.32841
411500.00	3993500.00	0.31888	411500.00	3993000.00	0.37931
411500.00	3992500.00	0.34963	411500.00	3992000.00	0.25397

411500.00	3991500.00	0.20808	411500.00	3991000.00	0.19119
411500.00	3990500.00	0.17859	411500.00	3990000.00	0.17370
411500.00	3989500.00	0.17003	411500.00	3989000.00	0.16409
411500.00	3988500.00	0.15680	411500.00	3988000.00	0.15205
411500.00	3987500.00	0.15134	411500.00	3987000.00	0.15241
411500.00	3986500.00	0.15374	411500.00	3986000.00	0.15433
411500.00	3985500.00	0.15690	411500.00	3985000.00	0.15343
411500.00	3984500.00	0.14892	411500.00	3984000.00	0.14346
411500.00	3983500.00	0.13095	412000.00	3997500.00	0.02472
412000.00	3997000.00	0.03288	412000.00	3996500.00	0.04999
412000.00	3996000.00	0.12906	412000.00	3995500.00	0.90984
412000.00	3995000.00	0.60929	412000.00	3994500.00	0.89555
412000.00	3994000.00	0.85481	412000.00	3993500.00	0.62514
412000.00	3993000.00	0.55382	412000.00	3992500.00	1.53922
412000.00	3992000.00	0.53024	412000.00	3991500.00	0.39753
412000.00	3991000.00	0.32195	412000.00	3990500.00	0.28466
412000.00	3990000.00	0.25699	412000.00	3989500.00	0.24514
412000.00	3989000.00	0.23851	412000.00	3988500.00	0.23149
412000.00	3988000.00	0.21852	412000.00	3987500.00	0.20524
412000.00	3987000.00	0.20057	412000.00	3986500.00	0.20232
412000.00	3986000.00	0.20101	412000.00	3985500.00	0.19739
412000.00	3985000.00	0.19066	412000.00	3984500.00	0.18584
412000.00	3984000.00	0.17778	412000.00	3983500.00	0.16527
412000.00	3983000.00	0.14984	412000.00	3982500.00	0.14186
412000.00	3982000.00	0.13254	412500.00	3997500.00	0.02211
412500.00	3997000.00	0.02954	412500.00	3996500.00	0.03338
412500.00	3996000.00	0.05424	412500.00	3995500.00	0.15386
412500.00	3995000.00	0.28182	412500.00	3994500.00	0.26145
412500.00	3994000.00	0.28326	412500.00	3993500.00	0.24738
412500.00	3993000.00	0.23057	412500.00	3992500.00	0.26874
412500.00	3992000.00	0.44094	412500.00	3991500.00	1.01345
412500.00	3991000.00	0.57858	412500.00	3990500.00	0.37279
412500.00	3990000.00	0.30158	412500.00	3989500.00	0.29260
412500.00	3989000.00	0.29167	412500.00	3988500.00	0.30197
412500.00	3988000.00	0.31320	412500.00	3987500.00	0.31323
412500.00	3987000.00	0.30274	412500.00	3986500.00	0.27737
412500.00	3986000.00	0.26659	412500.00	3985500.00	0.25174
412500.00	3985000.00	0.24225	412500.00	3984500.00	0.23216
412500.00	3984000.00	0.21409	412500.00	3983500.00	0.20014
412500.00	3983000.00	0.18486	412500.00	3982500.00	0.16737
412500.00	3982000.00	0.15601	412500.00	3981500.00	0.14778
412500.00	3981000.00	0.14633	412500.00	3980500.00	0.14047
413000.00	3997500.00	0.02621	413000.00	3997000.00	0.02791
413000.00	3996500.00	0.02857	413000.00	3996000.00	0.03027
413000.00	3995500.00	0.07444	413000.00	3995000.00	0.10374
413000.00	3994500.00	0.16219	413000.00	3994000.00	0.16965
413000.00	3993500.00	0.15967	413000.00	3993000.00	0.18231
413000.00	3992500.00	0.20390	413000.00	3992000.00	0.22440
413000.00	3991500.00	0.30424	413000.00	3991000.00	0.44336
413000.00	3990500.00	0.64144	413000.00	3990000.00	0.91830
413000.00	3989500.00	0.72786	413000.00	3989000.00	0.68304
413000.00	3988500.00	0.64685	413000.00	3988000.00	0.61878
413000.00	3987500.00	0.60676	413000.00	3987000.00	0.60083
413000.00	3986500.00	0.61374	413000.00	3986000.00	0.58396
413000.00	3985500.00	0.46711	413000.00	3985000.00	0.40390
413000.00	3984500.00	0.32936	413000.00	3984000.00	0.27018
413000.00	3983500.00	0.27019	413000.00	3983000.00	0.24483
413000.00	3982500.00	0.22565	413000.00	3982000.00	0.20715
413000.00	3981500.00	0.19303	413000.00	3981000.00	0.18265
413000.00	3980500.00	0.17544	413000.00	3980000.00	0.16001
413500.00	3979500.00	0.15115	413500.00	3997500.00	0.01967
413500.00	3997000.00	0.01981	413500.00	3996500.00	0.02040
413500.00	3996000.00	0.02381	413500.00	3995500.00	0.03209
413500.00	3995000.00	0.08180	413500.00	3994500.00	0.08089
413500.00	3994000.00	0.11483	413500.00	3993500.00	0.13731
413500.00	3993000.00	0.12177	413500.00	3992500.00	0.12754
413500.00	3992000.00	0.15682	413500.00	3991500.00	0.17503
413500.00	3991000.00	0.22387	413500.00	3990500.00	0.29076
413500.00	3990000.00	0.35645	413500.00	3989500.00	0.33013
413500.00	3989000.00	0.40650	413500.00	3988500.00	0.40699
413500.00	3988000.00	0.38242	413500.00	3987500.00	0.36877
413500.00	3987000.00	0.36343	413500.00	3986500.00	0.36972
413500.00	3986000.00	0.38832	413500.00	3985500.00	0.46936
413500.00	3985000.00	0.62428	413500.00	3984500.00	0.98703
413500.00	3984000.00	0.57517	413500.00	3983500.00	0.39262
413500.00	3983000.00	0.32061	413500.00	3982500.00	0.28807
413500.00	3982000.00	0.26259	413500.00	3981500.00	0.23523
413500.00	3981000.00	0.21838	413500.00	3980500.00	0.21102
413500.00	3980000.00	0.19346	413500.00	3979500.00	0.17697
413500.00	3979000.00	0.16673	413500.00	3978000.00	0.15514
413500.00	3977500.00	0.15715	413500.00	3977000.00	0.15743

413500.00	3976500.00	0.15429	413500.00	3976000.00	0.14434
413500.00	3975500.00	0.13981	413500.00	3975000.00	0.13228
413500.00	3974500.00	0.12786	414000.00	3997500.00	0.01572
414000.00	3997000.00	0.01627	414000.00	3996500.00	0.01898
414000.00	3996000.00	0.02052	414000.00	3995500.00	0.02375
414000.00	3995000.00	0.06077	414000.00	3994500.00	0.06939
414000.00	3994000.00	0.06470	414000.00	3993500.00	0.09003
414000.00	3993000.00	0.11361	414000.00	3992500.00	0.10944
414000.00	3992000.00	0.11850	414000.00	3991500.00	0.12664
414000.00	3991000.00	0.14235	414000.00	3990500.00	0.17072
414000.00	3990000.00	0.21658	414000.00	3989500.00	0.24045
414000.00	3989000.00	0.23479	414000.00	3988500.00	0.19424
414000.00	3988000.00	0.23715	414000.00	3987500.00	0.25899
414000.00	3987000.00	0.25744	414000.00	3986500.00	0.25457
414000.00	3986000.00	0.25189	414000.00	3985500.00	0.25710
414000.00	3985000.00	0.27686	414000.00	3984500.00	0.32687
414000.00	3984000.00	0.52456	414000.00	3983500.00	0.80196
414000.00	3983000.00	0.74648	414000.00	3982500.00	0.42714
414000.00	3982000.00	0.33079	414000.00	3981500.00	0.28653
414000.00	3981000.00	0.24263	414000.00	3980500.00	0.22803
414000.00	3980000.00	0.21650	414000.00	3979500.00	0.19200
414000.00	3979000.00	0.17947	414000.00	3978500.00	0.17238
414000.00	3978000.00	0.17036	414000.00	3977500.00	0.17290
414000.00	3977000.00	0.17764	414000.00	3976500.00	0.17001
414000.00	3976000.00	0.15886	414000.00	3975500.00	0.14999
414000.00	3975000.00	0.14545	414000.00	3974500.00	0.14671
414000.00	3974000.00	0.15240	414000.00	3973500.00	0.15313
414000.00	3973000.00	0.15005	414500.00	3992500.00	0.09919
414500.00	3992000.00	0.10679	414500.00	3991500.00	0.10979
414500.00	3991000.00	0.11449	414500.00	3990500.00	0.12048
414500.00	3990000.00	0.13837	414500.00	3989500.00	0.16822
414500.00	3989000.00	0.19010	414500.00	3988500.00	0.19167
414500.00	3988000.00	0.15697	414500.00	3987500.00	0.15411
414500.00	3987000.00	0.17704	414500.00	3986500.00	0.19734
414500.00	3986000.00	0.20073	414500.00	3985500.00	0.20410
414500.00	3985000.00	0.21057	414500.00	3984500.00	0.22675
414500.00	3984000.00	0.24290	414500.00	3983500.00	0.30874
414500.00	3983000.00	0.39418	414500.00	3982500.00	0.55628
414500.00	3982000.00	1.74187	414500.00	3981500.00	0.57673
414500.00	3981000.00	0.40633	414500.00	3980500.00	0.30533
414500.00	3980000.00	0.27806	414500.00	3979500.00	0.23789
414500.00	3979000.00	0.21457	414500.00	3978500.00	0.20399
414500.00	3978000.00	0.20818	414500.00	3977500.00	0.20879
414500.00	3977000.00	0.21017	414500.00	3976500.00	0.19556
414500.00	3976000.00	0.18144	414500.00	3975500.00	0.18472
414500.00	3975000.00	0.19932	414500.00	3974500.00	0.19682
414500.00	3974000.00	0.18210	414500.00	3973500.00	0.16162
414500.00	3973000.00	0.14748	414500.00	3972500.00	0.13968
414500.00	3972000.00	0.13446	414500.00	3971500.00	0.12925
415000.00	3991000.00	0.10386	415000.00	3990500.00	0.10570
415000.00	3990000.00	0.10595	415000.00	3989500.00	0.11785
415000.00	3989000.00	0.13268	415000.00	3988500.00	0.15810
415000.00	3988000.00	0.16612	415000.00	3987500.00	0.14353
415000.00	3987000.00	0.13115	415000.00	3986500.00	0.13483
415000.00	3986000.00	0.14918	415000.00	3985500.00	0.16487
415000.00	3985000.00	0.17560	415000.00	3984500.00	0.18184
415000.00	3984000.00	0.19635	415000.00	3983500.00	0.21982
415000.00	3983000.00	0.24355	415000.00	3982500.00	0.29018
415000.00	3982000.00	0.34263	415000.00	3981500.00	0.44040
415000.00	3981000.00	0.71939	415000.00	3980500.00	0.82893
415000.00	3980000.00	0.50717	415000.00	3979500.00	0.35092
415000.00	3979000.00	0.26411	415000.00	3978500.00	0.26836
415000.00	3978000.00	0.29179	415000.00	3977500.00	0.30480
415000.00	3977000.00	0.32974	415000.00	3976500.00	0.30255
415000.00	3976000.00	0.33373	415000.00	3975500.00	0.28370
415000.00	3975000.00	0.23395	415000.00	3974500.00	0.21032
415000.00	3974000.00	0.19410	415000.00	3973500.00	0.18206
415000.00	3973000.00	0.16938	415000.00	3972500.00	0.15699
415000.00	3972000.00	0.14947	415000.00	3971500.00	0.14439
415000.00	3971000.00	0.13934	415000.00	3970500.00	0.13509
415000.00	3970000.00	0.13155	415500.00	3985500.00	0.12295
415500.00	3985000.00	0.13454	415500.00	3984500.00	0.14923
415500.00	3984000.00	0.16484	415500.00	3983500.00	0.17443
415500.00	3983000.00	0.18696	415500.00	3982500.00	0.20922
415500.00	3982000.00	0.24016	415500.00	3981500.00	0.27014
415500.00	3981000.00	0.30736	415500.00	3980500.00	0.37570
415500.00	3980000.00	0.54919	415500.00	3979500.00	0.87373
415500.00	3979000.00	0.48915	415500.00	3978500.00	0.43187
415500.00	3978000.00	0.46744	415500.00	3977500.00	0.73163
415500.00	3977000.00	0.65899	415500.00	3976500.00	1.01349
415500.00	3976000.00	0.69421	415500.00	3975500.00	0.55544

415500.00	3975000.00	0.46207	415500.00	3974500.00	0.38094
415500.00	3974000.00	0.31814	415500.00	3973500.00	0.27822
415500.00	3973000.00	0.24880	415500.00	3972500.00	0.22547
415500.00	3972000.00	0.20534	415500.00	3971500.00	0.19090
415500.00	3971000.00	0.17868	415500.00	3970500.00	0.16767
415500.00	3970000.00	0.15831	415500.00	3969500.00	0.15074
415500.00	3969000.00	0.14492	415500.00	3968500.00	0.13996
415500.00	3968000.00	0.13543	416000.00	3984500.00	0.11580
416000.00	3984000.00	0.12716	416000.00	3983500.00	0.13809
416000.00	3983000.00	0.15561	416000.00	3982500.00	0.16506
416000.00	3982000.00	0.18232	416000.00	3981500.00	0.20578
416000.00	3981000.00	0.22983	416000.00	3980500.00	0.25237
416000.00	3980000.00	0.28574	416000.00	3979500.00	0.38297
416000.00	3979000.00	1.12826	416000.00	3978500.00	0.61505
416000.00	3978000.00	0.50861	416000.00	3977500.00	0.40728
416000.00	3977000.00	0.34105	416000.00	3976500.00	0.33021
416000.00	3976000.00	0.39418	416000.00	3975500.00	0.44171
416000.00	3975000.00	0.55111	416000.00	3974500.00	1.00594
416000.00	3974000.00	0.67273	416000.00	3973500.00	0.46575
416000.00	3973000.00	0.37357	416000.00	3972500.00	0.31811
416000.00	3972000.00	0.27724	416000.00	3971500.00	0.24763
416000.00	3971000.00	0.22751	416000.00	3970500.00	0.20898
416000.00	3970000.00	0.19353	416000.00	3969500.00	0.18144
416000.00	3969000.00	0.17138	416000.00	3968500.00	0.16265
416000.00	3968000.00	0.15503	416000.00	3967500.00	0.14823
416000.00	3967000.00	0.14200	416000.00	3966500.00	0.13667
416500.00	3983000.00	0.11930	416500.00	3982500.00	0.12939
416500.00	3982000.00	0.14135	416500.00	3981500.00	0.15680
416500.00	3981000.00	0.18039	416500.00	3980500.00	0.20634
416500.00	3980000.00	0.22095	416500.00	3979500.00	0.24776
416500.00	3979000.00	0.28785	416500.00	3978500.00	0.39192
416500.00	3978000.00	0.22706	416500.00	3977500.00	0.28478
416500.00	3977000.00	0.29811	416500.00	3976500.00	0.27713
416500.00	3976000.00	0.25728	416500.00	3975500.00	0.27528
416500.00	3975000.00	0.27755	416500.00	3974500.00	0.30042
416500.00	3974000.00	0.38639	416500.00	3973500.00	0.50694
416500.00	3973000.00	0.85496	416500.00	3972500.00	0.76601
416500.00	3972000.00	0.46216	416500.00	3971500.00	0.36531
416500.00	3971000.00	0.30593	416500.00	3970500.00	0.26374
416500.00	3970000.00	0.23296	416500.00	3969500.00	0.21239
416500.00	3969000.00	0.19614	416500.00	3968500.00	0.18243
416500.00	3968000.00	0.17175	416500.00	3967500.00	0.16392
416500.00	3967000.00	0.15680	416500.00	3966500.00	0.15004
416500.00	3966000.00	0.14361	416500.00	3965500.00	0.13788
416500.00	3965000.00	0.13265	417000.00	3982000.00	0.11975
417000.00	3981500.00	0.13050	417000.00	3981000.00	0.14359
417000.00	3980500.00	0.15642	417000.00	3980000.00	0.16920
417000.00	3979500.00	0.18676	417000.00	3979000.00	0.22079
417000.00	3978500.00	0.20144	417000.00	3978000.00	0.26324
417000.00	3977500.00	0.20880	417000.00	3977000.00	0.16377
417000.00	3976500.00	0.19532	417000.00	3976000.00	0.22870
417000.00	3975500.00	0.22873	417000.00	3975000.00	0.23880
417000.00	3974500.00	0.24755	417000.00	3974000.00	0.24684
417000.00	3973500.00	0.27271	417000.00	3973000.00	0.31942
417000.00	3972500.00	0.37913	417000.00	3972000.00	0.50076
417000.00	3971500.00	0.77911	417000.00	3971000.00	1.00871
417000.00	3970500.00	0.53879	417000.00	3970000.00	0.39014
417000.00	3969500.00	0.31635	417000.00	3969000.00	0.27115
417000.00	3968500.00	0.23948	417000.00	3968000.00	0.21529
417000.00	3967500.00	0.19644	417000.00	3967000.00	0.18167
417000.00	3966500.00	0.16891	417000.00	3966000.00	0.15918
417000.00	3965500.00	0.15108	417000.00	3965000.00	0.14478
417000.00	3964500.00	0.13892	417000.00	3964000.00	0.13195
417000.00	3963500.00	0.12526	417500.00	3980500.00	0.12171
417500.00	3980000.00	0.13690	417500.00	3979500.00	0.15181
417500.00	3979000.00	0.17841	417500.00	3978500.00	0.18725
417500.00	3978000.00	0.17018	417500.00	3977500.00	0.20838
417500.00	3977000.00	0.19052	417500.00	3976500.00	0.13968
417500.00	3976000.00	0.14438	417500.00	3975500.00	0.16390
417500.00	3975000.00	0.18579	417500.00	3974500.00	0.20603
417500.00	3974000.00	0.22220	417500.00	3973500.00	0.22260
417500.00	3973000.00	0.23263	417500.00	3972500.00	0.25552
417500.00	3972000.00	0.28155	417500.00	3971500.00	0.31291
417500.00	3971000.00	0.35961	417500.00	3970500.00	0.47386
417500.00	3970000.00	0.69916	417500.00	3969500.00	1.56013
417500.00	3969000.00	0.64260	417500.00	3968500.00	0.43886
417500.00	3968000.00	0.34540	417500.00	3967500.00	0.28706
417500.00	3967000.00	0.24739	417500.00	3966500.00	0.21890
417500.00	3966000.00	0.19696	417500.00	3965500.00	0.18270
417500.00	3965000.00	0.17063	417500.00	3964500.00	0.15983
417500.00	3964000.00	0.15074	417500.00	3963500.00	0.14270

417500.00	3963000.00	0.13407	417500.00	3962500.00	0.12587
417500.00	3962000.00	0.12199	417500.00	3961500.00	0.11867
417500.00	3961000.00	0.10852	418000.00	3979500.00	0.12229
418000.00	3979000.00	0.14130	418000.00	3978500.00	0.16289
418000.00	3978000.00	0.14849	418000.00	3977500.00	0.15163
418000.00	3976000.00	0.14043	418000.00	3975500.00	0.12684
418000.00	3975000.00	0.12867	418000.00	3974500.00	0.14197
418000.00	3974000.00	0.17271	418000.00	3973500.00	0.19347
418000.00	3973000.00	0.19993	418000.00	3972500.00	0.20599
418000.00	3972000.00	0.22073	418000.00	3971500.00	0.23437
418000.00	3971000.00	0.25079	418000.00	3970500.00	0.27065
418000.00	3970000.00	0.29862	418000.00	3969500.00	0.35864
418000.00	3969000.00	0.42813	418000.00	3968500.00	0.58435
418000.00	3968000.00	0.99898	418000.00	3967500.00	0.76176
418000.00	3967000.00	0.48956	418000.00	3966500.00	0.36546
418000.00	3966000.00	0.29398	418000.00	3965500.00	0.25206
418000.00	3965000.00	0.22373	418000.00	3964500.00	0.20063
418000.00	3964000.00	0.18392	418000.00	3963500.00	0.17234
418000.00	3963000.00	0.16240	418000.00	3962500.00	0.14832
418000.00	3962000.00	0.13745	418000.00	3961500.00	0.13251
418000.00	3961000.00	0.12723	418000.00	3960500.00	0.10562
418000.00	3960000.00	0.09352	418000.00	3959500.00	0.08244
418000.00	3959000.00	0.05189	418000.00	3958500.00	0.04877
418500.00	3974000.00	0.11989	418500.00	3973500.00	0.13956
418500.00	3973000.00	0.16242	418500.00	3972500.00	0.17695
418500.00	3972000.00	0.18636	418500.00	3971500.00	0.19672
418500.00	3971000.00	0.20583	418500.00	3970500.00	0.21691
418500.00	3970000.00	0.22791	418500.00	3969500.00	0.23697
418500.00	3969000.00	0.26212	418500.00	3968500.00	0.28917
418500.00	3968000.00	0.33321	418500.00	3967500.00	0.40590
418500.00	3967000.00	0.52122	418500.00	3966500.00	0.87818
418500.00	3966000.00	0.87104	418500.00	3965500.00	0.52500
418500.00	3965000.00	0.38864	418500.00	3964500.00	0.31256
418500.00	3964000.00	0.26351	418500.00	3963500.00	0.22790
418500.00	3963000.00	0.20494	418500.00	3962500.00	0.18798
418500.00	3962000.00	0.17143	418500.00	3961500.00	0.15835
418500.00	3961000.00	0.15170	418500.00	3960500.00	0.12661
418500.00	3960000.00	0.10557	418500.00	3959500.00	0.08144
418500.00	3959000.00	0.05664	418500.00	3958500.00	0.04991
418500.00	3958000.00	0.04880	419000.00	3972500.00	0.13544
419000.00	3972000.00	0.15104	419000.00	3971500.00	0.16542
419000.00	3971000.00	0.17602	419000.00	3970500.00	0.18592
419000.00	3970000.00	0.19573	419000.00	3969500.00	0.20085
419000.00	3969000.00	0.20539	419000.00	3968500.00	0.21848
419000.00	3968000.00	0.23230	419000.00	3967500.00	0.25143
419000.00	3967000.00	0.28417	419000.00	3966500.00	0.32934
419000.00	3966000.00	0.39511	419000.00	3965500.00	0.49090
419000.00	3965000.00	0.73713	419000.00	3964500.00	1.51671
419000.00	3964000.00	0.60761	419000.00	3963500.00	0.43611
419000.00	3963000.00	0.34381	419000.00	3962500.00	0.27947
419000.00	3962000.00	0.24047	419000.00	3961500.00	0.21775
419000.00	3961000.00	0.19387	419000.00	3960500.00	0.17677
419000.00	3960000.00	0.13100	419000.00	3959500.00	0.07529
419000.00	3959000.00	0.06254	419000.00	3958500.00	0.05820
419000.00	3958000.00	0.05555	419000.00	3957500.00	0.04846
419500.00	3971000.00	0.14175	419500.00	3970500.00	0.15488
419500.00	3970000.00	0.16749	419500.00	3969500.00	0.17697
419500.00	3969000.00	0.18081	419500.00	3968500.00	0.18449
419500.00	3968000.00	0.19253	419500.00	3967500.00	0.20073
419500.00	3967000.00	0.21078	419500.00	3966500.00	0.22893
419500.00	3966000.00	0.25283	419500.00	3965500.00	0.28320
419500.00	3965000.00	0.32141	419500.00	3964500.00	0.36663
419500.00	3964000.00	0.45098	419500.00	3963500.00	0.58467
419500.00	3963000.00	1.01168	419500.00	3962500.00	0.71585
419500.00	3962000.00	0.48946	419500.00	3961500.00	0.39626
419500.00	3961000.00	0.33805	419500.00	3960500.00	0.28046
419500.00	3960000.00	0.18701	419500.00	3959500.00	0.09040
419500.00	3959000.00	0.07967	419500.00	3958500.00	0.05978
419500.00	3958000.00	0.04126	419500.00	3957500.00	0.03618
419500.00	3957000.00	0.03441	420000.00	3969000.00	0.15737
420000.00	3968500.00	0.16332	420000.00	3968000.00	0.16716
420000.00	3967500.00	0.17201	420000.00	3967000.00	0.17668
420000.00	3966500.00	0.18251	420000.00	3966000.00	0.19222
420000.00	3965500.00	0.20529	420000.00	3965000.00	0.22361
420000.00	3964500.00	0.24640	420000.00	3964000.00	0.26757
420000.00	3963500.00	0.29954	420000.00	3963000.00	0.34256
420000.00	3962500.00	0.40657	420000.00	3962000.00	0.51523
420000.00	3961500.00	0.61879	420000.00	3961000.00	0.74692
420000.00	3960500.00	1.01557	420000.00	3960000.00	0.48184
420000.00	3959500.00	0.14377	420000.00	3959000.00	0.09805
420000.00	3958500.00	0.07259	420000.00	3958000.00	0.05742

420000.00	3957500.00	0.04752	420000.00	3957000.00	0.04066
420500.00	3967500.00	0.15192	420500.00	3967000.00	0.15634
420500.00	3966500.00	0.15932	420500.00	3966000.00	0.16300
420500.00	3965500.00	0.16765	420500.00	3965000.00	0.17442
420500.00	3964500.00	0.18631	420500.00	3964000.00	0.19997
420500.00	3963500.00	0.21234	420500.00	3963000.00	0.22875
420500.00	3962500.00	0.24950	420500.00	3962000.00	0.27352
420500.00	3961500.00	0.30114	420500.00	3961000.00	0.31241
420500.00	3960500.00	0.34444	420500.00	3960000.00	0.37107
420500.00	3959500.00	0.24026	420500.00	3959000.00	0.16324
420500.00	3958500.00	0.07905	420500.00	3958000.00	0.03632
420500.00	3957500.00	0.02362	420500.00	3957000.00	0.01727
421000.00	3966000.00	0.14647	421000.00	3965500.00	0.14941
421000.00	3965000.00	0.15219	421000.00	3964500.00	0.15677
421000.00	3964000.00	0.16345	421000.00	3963500.00	0.17116
421000.00	3963000.00	0.17786	421000.00	3962500.00	0.18630
421000.00	3962000.00	0.19669	421000.00	3961500.00	0.20599
421000.00	3961000.00	0.22141	421000.00	3960500.00	0.23054
421000.00	3960000.00	0.23176	421000.00	3959500.00	0.18507
421000.00	3959000.00	0.18132	421000.00	3958500.00	0.12269
421000.00	3958000.00	0.12432	421000.00	3957500.00	0.10180
421000.00	3957000.00	0.07398	421500.00	3964000.00	0.14109
421500.00	3963500.00	0.14430	421500.00	3963000.00	0.14784
421500.00	3962500.00	0.15273	421500.00	3962000.00	0.15995
421500.00	3961500.00	0.16769	421500.00	3961000.00	0.17060
421500.00	3960500.00	0.17943	421500.00	3960000.00	0.18419
421500.00	3959500.00	0.16191	421500.00	3959000.00	0.14059
421500.00	3958500.00	0.14267	421500.00	3958000.00	0.10392
421500.00	3957500.00	0.09824	421500.00	3957000.00	0.09938
422000.00	3962000.00	0.13930	422000.00	3961500.00	0.14297
422000.00	3961000.00	0.14461	422000.00	3960500.00	0.14685
422000.00	3960000.00	0.15288	422000.00	3959500.00	0.15369
422000.00	3959000.00	0.11283	422000.00	3958500.00	0.11580
422000.00	3958000.00	0.11716	422000.00	3957500.00	0.09173
422000.00	3957000.00	0.08166	422500.00	3959500.00	0.13452
422500.00	3959000.00	0.10998	422500.00	3958500.00	0.09802
422500.00	3958000.00	0.09978	422500.00	3957500.00	0.09978
422500.00	3957000.00	0.08146	423000.00	3959000.00	0.10912
423000.00	3958500.00	0.08877	423000.00	3958000.00	0.08770
423000.00	3957500.00	0.08858	423000.00	3957000.00	0.08723
423500.00	3959000.00	0.10673	423500.00	3958500.00	0.08613
423500.00	3958000.00	0.08035	423500.00	3957500.00	0.07987
423500.00	3957000.00	0.08024	424000.00	3958500.00	0.08697
424000.00	3958000.00	0.07498	424000.00	3957500.00	0.07463
424000.00	3957000.00	0.07394	424500.00	3958000.00	0.07360
424500.00	3957500.00	0.07001	424500.00	3957000.00	0.07015
425000.00	3958000.00	0.07370	425000.00	3957500.00	0.06611
425000.00	3957000.00	0.06627	425500.00	3958000.00	0.07245
425500.00	3957500.00	0.06361	425500.00	3957000.00	0.06176

\*\*\* THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

\*\* CONC OF CO IN MICROGRAMS/M\*\*3 \*\*

X-COORD (M) Y-COORD (M) CONC (YYMMDDHH) X-COORD (M) Y-COORD (M) CONC (YYMMDDHH)

411000.00	3997500.00	0.57125	(04010824)	411000.00	3997000.00	0.72499	(04010824)
411000.00	3996500.00	0.91978	(04010824)	411000.00	3996000.00	1.10613	(04010824)
411000.00	3995500.00	1.14870	(04010824)	411000.00	3995000.00	1.18636	(04010824)
411000.00	3994500.00	0.91091	(04010824)	411000.00	3994000.00	0.89681	(04010824)
411000.00	3993500.00	0.91781	(04010824)	411000.00	3993000.00	0.92462	(04010824)
411000.00	3992500.00	0.85752	(04010824)	411000.00	3992000.00	0.77715	(04010824)
411000.00	3991500.00	0.71576	(04010824)	411000.00	3991000.00	0.75308	(04090224)
411000.00	3990500.00	0.67883	(04010824)	411000.00	3990000.00	0.57874	(04010824)
411000.00	3989500.00	0.45751	(04010824)	411000.00	3989000.00	0.38340	(04010824)
411000.00	3988500.00	0.37162	(04071924)	411000.00	3988000.00	0.37812c	(04092524)
411000.00	3987500.00	0.39657c	(04092524)	411000.00	3987000.00	0.39095c	(04092524)
411000.00	3986500.00	0.38327c	(04092524)	411000.00	3986000.00	0.38419c	(04092524)
411000.00	3985500.00	0.36850c	(04092524)	411000.00	3985000.00	0.35417	(04090624)
411500.00	3997500.00	0.41078	(04010824)	411500.00	3997000.00	0.61914	(04010824)
411500.00	3996500.00	0.50164	(04010824)	411500.00	3996000.00	0.66419	(04010824)
411500.00	3995500.00	1.00806	(04010824)	411500.00	3995000.00	1.27331	(04010824)
411500.00	3994500.00	1.70469	(04010824)	411500.00	3994000.00	1.92031	(04010824)
411500.00	3993500.00	1.09148	(04010824)	411500.00	3993000.00	1.22465c	(04092524)
411500.00	3992500.00	1.39559	(04090224)	411500.00	3992000.00	1.07813	(04010824)
411500.00	3991500.00	1.04573	(04010824)	411500.00	3991000.00	0.96816	(04010824)
411500.00	3990500.00	0.85478	(04010824)	411500.00	3990000.00	0.79782	(04010824)
411500.00	3989500.00	0.80308	(04010824)	411500.00	3989000.00	0.71781	(04010824)
411500.00	3988500.00	0.56156	(04010824)	411500.00	3988000.00	0.46380	(04010824)
411500.00	3987500.00	0.44542	(04071924)	411500.00	3987000.00	0.45129c	(04092524)
411500.00	3986500.00	0.45462c	(04092524)	411500.00	3986000.00	0.45301c	(04092524)

411500.00	3985500.00	0.45444c (04092524)	411500.00	3985000.00	0.45640 (04020224)
411500.00	3984500.00	0.44146 (04090224)	411500.00	3984000.00	0.44510 (04090224)
411500.00	3983500.00	0.44232 (04090224)	412000.00	3997500.00	0.44712c (04081024)
412000.00	3997000.00	0.56537c (04081024)	412000.00	3996500.00	0.77056 (04021024)
412000.00	3996000.00	2.03046c (04012324)	412000.00	3995500.00	2.74617 (04010824)
412000.00	3995000.00	1.65379c (04111724)	412000.00	3994500.00	3.13208 (04090224)
412000.00	3994000.00	2.74115c (04111524)	412000.00	3993500.00	1.71869c (04111524)
412000.00	3993000.00	1.49791 (04010824)	412000.00	3992500.00	4.31746c (04110724)
412000.00	3992000.00	1.82605 (04100324)	412000.00	3991500.00	1.46635 (04100324)
412000.00	3991000.00	1.22279 (04100324)	412000.00	3990500.00	1.19887 (04010824)
412000.00	3990000.00	1.23058 (04010824)	412000.00	3989500.00	1.16945 (04010824)
412000.00	3989000.00	1.02361 (04010824)	412000.00	3988500.00	0.96900 (04010824)
412000.00	3988000.00	0.91945 (04010824)	412000.00	3987500.00	0.70230 (04010824)
412000.00	3987000.00	0.57155 (04100324)	412000.00	3986500.00	0.58401c (04092524)
412000.00	3986000.00	0.57824c (04092524)	412000.00	3985500.00	0.55474c (04092524)
412000.00	3985000.00	0.53527c (04092524)	412000.00	3984500.00	0.52712c (04092524)
412000.00	3984000.00	0.50137 (04090224)	412000.00	3983500.00	0.48750 (04090224)
412000.00	3983000.00	0.45279 (04090224)	412000.00	3982500.00	0.42212 (04090224)
412000.00	3982000.00	0.38920 (04090224)	412500.00	3997500.00	1.02783c (04012324)
412500.00	3997000.00	1.04964c (04012324)	412500.00	3996500.00	0.66708c (04012324)
412500.00	3996000.00	0.94159c (04010524)	412500.00	3995500.00	0.85980c (04010524)
412500.00	3995000.00	0.74624 (04120524)	412500.00	3994500.00	0.73003 (04122124)
412500.00	3994000.00	0.94787c (04011524)	412500.00	3993500.00	0.70387 (04012624)
412500.00	3993000.00	0.59438 (04012624)	412500.00	3992500.00	0.66562 (04012624)
412500.00	3992000.00	1.11190 (04122124)	412500.00	3991500.00	3.61773 (04010824)
412500.00	3991000.00	1.42368 (04020224)	412500.00	3990500.00	1.12398 (04010824)
412500.00	3990000.00	1.10147 (04010824)	412500.00	3989500.00	1.21356 (04010824)
412500.00	3989000.00	1.39492 (04010824)	412500.00	3988500.00	1.60933 (04010824)
412500.00	3988000.00	1.62942 (04010824)	412500.00	3987500.00	1.35210 (04010824)
412500.00	3987000.00	1.24463 (04010824)	412500.00	3986500.00	0.91298 (04010824)
412500.00	3986000.00	0.77541c (04092524)	412500.00	3985500.00	0.73382c (04092524)
412500.00	3985000.00	0.67862c (04092524)	412500.00	3984500.00	0.62402c (04092524)
412500.00	3984000.00	0.58227c (04092524)	412500.00	3983500.00	0.52888c (04092524)
412500.00	3983000.00	0.47250 (04100324)	412500.00	3982500.00	0.45295c (04021324)
412500.00	3982000.00	0.42734 (04100324)	412500.00	3981500.00	0.41049 (04100324)
412500.00	3981000.00	0.40680 (04100324)	412500.00	3980500.00	0.39809 (04100324)
413000.00	3997500.00	0.52556c (04010524)	413000.00	3997000.00	0.52781c (04010524)
413000.00	3996500.00	0.41514c (04010524)	413000.00	3996000.00	0.36756c (04012324)
413000.00	3995500.00	0.42160c (04012324)	413000.00	3995000.00	0.44934c (04012324)
413000.00	3994500.00	0.52631c (04012324)	413000.00	3994000.00	0.55073c (04012324)
413000.00	3993500.00	0.59915c (04012324)	413000.00	3993000.00	0.66813c (04012324)
413000.00	3992500.00	0.77297c (04012324)	413000.00	3992000.00	0.90614c (04012324)
413000.00	3991500.00	1.14613c (04012324)	413000.00	3991000.00	1.55406 (04021024)
413000.00	3990500.00	2.01759c (04020324)	413000.00	3990000.00	2.44028c (04081024)
413000.00	3989500.00	1.85666 (04090224)	413000.00	3989000.00	1.87343 (04090224)
413000.00	3988500.00	1.86607 (04090224)	413000.00	3988000.00	1.87652 (04090224)
413000.00	3987500.00	2.02691 (04010824)	413000.00	3987000.00	2.28133 (04010824)
413000.00	3986500.00	3.09039 (04010824)	413000.00	3986000.00	2.13635 (04010824)
413000.00	3985500.00	1.39385 (04090224)	413000.00	3985000.00	1.14910 (04090224)
413000.00	3984500.00	1.05625c (04111524)	413000.00	3984000.00	0.92799c (04111524)
413000.00	3983500.00	0.87382 (04100324)	413000.00	3983000.00	0.81926 (04100324)
413000.00	3982500.00	0.76854 (04100324)	413000.00	3982000.00	0.72985 (04100324)
413000.00	3981500.00	0.70184 (04100324)	413000.00	3981000.00	0.66307 (04100324)
413000.00	3980500.00	0.63227 (04100324)	413000.00	3980000.00	0.60424 (04100324)
413000.00	3979500.00	0.57878 (04100324)	413500.00	3997500.00	0.29135c (04010524)
413500.00	3997000.00	0.25014c (04012324)	413500.00	3996500.00	0.25829c (04012324)
413500.00	3996000.00	0.26874c (04012324)	413500.00	3995500.00	0.28716c (04012324)
413500.00	3995000.00	0.32893c (04012324)	413500.00	3994500.00	0.34955c (04012324)
413500.00	3994000.00	0.42106c (04012324)	413500.00	3993500.00	0.46322c (04012324)
413500.00	3993000.00	0.54145c (04012324)	413500.00	3992500.00	0.66878c (04012324)
413500.00	3992000.00	0.78874c (04012324)	413500.00	3991500.00	0.81617c (04012324)
413500.00	3991000.00	0.84968c (04012324)	413500.00	3990500.00	0.88159c (04012324)
413500.00	3990000.00	1.00712 (04120524)	413500.00	3989500.00	0.93837 (04120524)
413500.00	3989000.00	1.51640c (04110724)	413500.00	3988500.00	1.57874c (04011524)
413500.00	3988000.00	1.29672 (04011024)	413500.00	3987500.00	1.13001 (04012624)
413500.00	3987000.00	1.06153 (04012624)	413500.00	3986500.00	1.02789 (04012624)
413500.00	3986000.00	1.02424 (04012624)	413500.00	3985500.00	1.19908 (04010824)
413500.00	3985000.00	1.99326 (04010824)	413500.00	3984500.00	3.05028 (04010824)
413500.00	3984000.00	1.58650 (04082224)	413500.00	3983500.00	1.17851c (04101924)
413500.00	3983000.00	1.09148c (04101924)	413500.00	3982500.00	1.00658c (04101924)
413500.00	3982000.00	0.90723c (04101924)	413500.00	3981500.00	0.81340c (04101924)
413500.00	3981000.00	0.76914 (04100324)	413500.00	3980500.00	0.73310 (04100324)
413500.00	3980000.00	0.69882 (04100324)	413500.00	3979500.00	0.66651 (04100324)
413500.00	3979000.00	0.63563 (04100324)	413500.00	3978000.00	0.58680 (04100324)
413500.00	3977500.00	0.57169 (04100324)	413500.00	3977000.00	0.55905 (04100324)
413500.00	3976500.00	0.54501 (04100324)	413500.00	3976000.00	0.51419 (04100324)
413500.00	3975500.00	0.49577 (04100324)	413500.00	3975000.00	0.47928 (04100324)
413500.00	3974500.00	0.46254 (04100324)	414000.00	3997500.00	0.29075c (04012324)
414000.00	3997000.00	0.31375c (04012324)	414000.00	3996500.00	0.34215c (04012324)
414000.00	3996000.00	0.37669c (04012324)	414000.00	3995500.00	0.41662c (04012324)
414000.00	3995000.00	0.48203c (04012324)	414000.00	3994500.00	0.51349c (04012324)

414000.00	3994000.00	0.52461c (04012324)	414000.00	3993500.00	0.55459c (04012324)
414000.00	3993000.00	0.54221c (04012324)	414000.00	3992500.00	0.52569c (04012324)
414000.00	3992000.00	0.51598c (04012324)	414000.00	3991500.00	0.49508c (04012324)
414000.00	3991000.00	0.47166c (04012324)	414000.00	3990500.00	0.50236 (04110624)
414000.00	3990000.00	0.63160 (04110624)	414000.00	3989500.00	0.74431 (04120524)
414000.00	3989000.00	0.70874 (04120524)	414000.00	3988500.00	0.52450 (04110624)
414000.00	3988000.00	0.77832 (04010324)	414000.00	3987500.00	0.84433c (04110724)
414000.00	3987000.00	0.95322c (04011524)	414000.00	3986500.00	0.90915c (04011524)
414000.00	3986000.00	0.81076 (04011024)	414000.00	3985500.00	0.76986 (04012624)
414000.00	3985000.00	0.75892 (04012624)	414000.00	3984500.00	0.81492 (04012624)
414000.00	3984000.00	1.24692c (04112324)	414000.00	3983500.00	2.53302 (04010824)
414000.00	3983000.00	2.05323 (04020224)	414000.00	3982500.00	1.13596 (04082224)
414000.00	3982000.00	1.02633 (04082224)	414000.00	3981500.00	1.02310 (04010824)
414000.00	3981000.00	0.97758 (04010824)	414000.00	3980500.00	0.90212 (04010824)
414000.00	3980000.00	0.77972 (04010824)	414000.00	3979500.00	0.62759 (04010824)
414000.00	3979000.00	0.55157 (04010824)	414000.00	3978500.00	0.47868 (04020224)
414000.00	3978000.00	0.48676c (04101924)	414000.00	3977500.00	0.49392c (04101924)
414000.00	3977000.00	0.50458c (04101924)	414000.00	3976500.00	0.49067c (04011624)
414000.00	3976000.00	0.48749c (04011624)	414000.00	3975500.00	0.45162c (04101924)
414000.00	3975000.00	0.43821c (04101924)	414000.00	3974500.00	0.42441c (04101924)
414000.00	3974000.00	0.45548 (04062224)	414000.00	3973500.00	0.52792 (04090224)
414000.00	3973000.00	0.57248 (04090224)	414500.00	3992500.00	0.35111c (04012324)
414500.00	3992000.00	0.35673 (04110624)	414500.00	3991500.00	0.36675 (04110624)
414500.00	3991000.00	0.37713 (04110624)	414500.00	3990500.00	0.39032 (04110624)
414500.00	3990000.00	0.42380 (04110624)	414500.00	3989500.00	0.51216 (04110624)
414500.00	3989000.00	0.60256 (04122124)	414500.00	3988500.00	0.60811 (04120524)
414500.00	3988000.00	0.45842 (04110624)	414500.00	3987500.00	0.43051 (04110624)
414500.00	3987000.00	0.53807 (04010324)	414500.00	3986500.00	0.65325c (04110724)
414500.00	3986000.00	0.64918c (04011524)	414500.00	3985500.00	0.71328c (04011524)
414500.00	3985000.00	0.72975c (04011524)	414500.00	3984500.00	0.71139c (04011524)
414500.00	3984000.00	0.68268c (04011524)	414500.00	3983500.00	0.78161 (04012624)
414500.00	3983000.00	0.98714 (04122124)	414500.00	3982500.00	1.39906 (04122124)
414500.00	3982000.00	6.54245c (04110724)	414500.00	3981500.00	1.38066c (04101524)
414500.00	3981000.00	1.17070c (04092524)	414500.00	3980500.00	1.10911 (04010824)
414500.00	3980000.00	1.27903 (04010824)	414500.00	3979500.00	1.24325 (04010824)
414500.00	3979000.00	1.11841 (04010824)	414500.00	3978500.00	0.86753 (04010824)
414500.00	3978000.00	0.74652 (04010824)	414500.00	3977500.00	0.62216 (04010824)
414500.00	3977000.00	0.54957c (04021324)	414500.00	3976500.00	0.51237c (04092524)
414500.00	3976000.00	0.48375c (04092524)	414500.00	3975500.00	0.52753c (04092524)
414500.00	3975000.00	0.69758 (04062224)	414500.00	3974500.00	0.83468 (04090224)
414500.00	3974000.00	0.66295 (04090224)	414500.00	3973500.00	0.54349 (04092224)
414500.00	3973000.00	0.42043 (04092224)	414500.00	3972500.00	0.37446 (04100324)
414500.00	3972000.00	0.36801 (04100324)	414500.00	3971500.00	0.35960 (04100324)
415000.00	3991000.00	0.32870c (04020324)	415000.00	3990500.00	0.34864c (04020324)
415000.00	3990000.00	0.35682c (04020324)	415000.00	3989500.00	0.37034 (04110624)
415000.00	3989000.00	0.42347 (04110624)	415000.00	3988500.00	0.50991 (04122124)
415000.00	3988000.00	0.54450 (04120524)	415000.00	3987500.00	0.44418 (04110624)
415000.00	3987000.00	0.40328 (04110624)	415000.00	3986500.00	0.39921 (04110624)
415000.00	3986000.00	0.41730 (04122124)	415000.00	3985500.00	0.50798c (04110724)
415000.00	3985000.00	0.51602c (04110724)	415000.00	3984500.00	0.56304c (04011524)
415000.00	3984000.00	0.62353c (04011524)	415000.00	3983500.00	0.67509c (04011524)
415000.00	3983000.00	0.69272c (04011524)	415000.00	3982500.00	0.72862 (04012624)
415000.00	3982000.00	0.83382 (04122124)	415000.00	3981500.00	1.11210 (04122124)
415000.00	3981000.00	2.03068 (04122124)	415000.00	3980500.00	2.51428c (04011524)
415000.00	3980000.00	1.33161c (04101524)	415000.00	3979500.00	0.98241 (04010824)
415000.00	3979000.00	1.05878 (04010824)	415000.00	3978500.00	1.62383 (04010824)
415000.00	3978000.00	1.91477 (04010824)	415000.00	3977500.00	1.60237 (04010824)
415000.00	3977000.00	1.21382 (04010824)	415000.00	3976500.00	0.96397 (04020224)
415000.00	3976000.00	1.50305 (04090224)	415000.00	3975500.00	1.05579 (04092224)
415000.00	3975000.00	0.63044c (04092524)	415000.00	3974500.00	0.56501c (04092524)
415000.00	3974000.00	0.50977c (04092524)	415000.00	3973500.00	0.48087c (04092524)
415000.00	3973000.00	0.43803c (04092524)	415000.00	3972500.00	0.40014c (04092524)
415000.00	3972000.00	0.37720c (04092524)	415000.00	3971500.00	0.38073c (04111524)
415000.00	3971000.00	0.38332c (04111524)	415000.00	3970500.00	0.38430c (04111524)
415000.00	3970000.00	0.38376c (04111524)	415500.00	3985500.00	0.42309c (04020324)
415500.00	3985000.00	0.44282c (04012324)	415500.00	3984500.00	0.46419c (04012324)
415500.00	3984000.00	0.49112c (04012324)	415500.00	3983500.00	0.52984c (04012324)
415500.00	3983000.00	0.55370c (04012324)	415500.00	3982500.00	0.60024c (04012324)
415500.00	3982000.00	0.64927c (04011524)	415500.00	3981500.00	0.68283c (04011524)
415500.00	3981000.00	0.75035 (04110624)	415500.00	3980500.00	0.94424 (04122124)
415500.00	3980000.00	1.36358 (04122124)	415500.00	3979500.00	3.08896c (04110724)
415500.00	3979000.00	1.78126c (04081024)	415500.00	3978500.00	1.34909c (04081024)
415500.00	3978000.00	1.35374c (04081024)	415500.00	3977500.00	2.14325 (04090224)
415500.00	3977000.00	1.66155c (04012324)	415500.00	3976500.00	3.93676 (04010824)
415500.00	3976000.00	3.10750 (04010824)	415500.00	3975500.00	1.67795 (04100324)
415500.00	3975000.00	1.38370 (04100324)	415500.00	3974500.00	1.18212 (04100324)
415500.00	3974000.00	1.01399 (04100324)	415500.00	3973500.00	0.91656 (04100324)
415500.00	3973000.00	0.84217 (04100324)	415500.00	3972500.00	0.78202 (04100324)
415500.00	3972000.00	0.73073 (04100324)	415500.00	3971500.00	0.68529 (04100324)
415500.00	3971000.00	0.64693 (04100324)	415500.00	3970500.00	0.61281 (04100324)
415500.00	3970000.00	0.58237 (04100324)	415500.00	3969500.00	0.55544 (04100324)



415500.00	3969000.00	0.53309	(04100324)	415500.00	3968500.00	0.51296	(04100324)
415500.00	3968000.00	0.49487	(04100324)	416000.00	3984500.00	0.36756	(04110624)
416000.00	3984000.00	0.38137	(04110624)	416000.00	3983500.00	0.42894c	(04010224)
416000.00	3983000.00	0.45927c	(04010224)	416000.00	3982500.00	0.49826c	(04010224)
416000.00	3982000.00	0.58200c	(04010224)	416000.00	3981500.00	0.69460c	(04010224)
416000.00	3981000.00	0.80109c	(04010224)	416000.00	3980500.00	1.04844c	(04012324)
416000.00	3980000.00	1.67053c	(04012324)	416000.00	3979500.00	3.25875c	(04012324)
416000.00	3979000.00	4.72391	(04120524)	416000.00	3978500.00	2.61386c	(04110724)
416000.00	3978000.00	1.94761c	(04011524)	416000.00	3977500.00	1.59552c	(04011524)
416000.00	3977000.00	1.21519	(04011024)	416000.00	3976500.00	1.03197	(04011024)
416000.00	3976000.00	1.00868	(04012624)	416000.00	3975500.00	1.12745c	(04110724)
416000.00	3975000.00	1.51982c	(04110724)	416000.00	3974500.00	2.92384	(04010824)
416000.00	3974000.00	1.93847	(04010824)	416000.00	3973500.00	1.29401	(04100324)
416000.00	3973000.00	1.10016	(04100324)	416000.00	3972500.00	0.99155	(04100324)
416000.00	3972000.00	0.91121	(04100324)	416000.00	3971500.00	0.85093	(04100324)
416000.00	3971000.00	0.80366	(04100324)	416000.00	3970500.00	0.76281	(04100324)
416000.00	3970000.00	0.72285	(04100324)	416000.00	3969500.00	0.68873	(04100324)
416000.00	3969000.00	0.65802	(04100324)	416000.00	3968500.00	0.62847	(04100324)
416000.00	3968000.00	0.60032	(04100324)	416000.00	3967500.00	0.57453	(04100324)
416000.00	3967000.00	0.55096	(04100324)	416000.00	3966500.00	0.53078	(04100324)
416500.00	3983000.00	0.72522c	(04012324)	416500.00	3982500.00	0.80298c	(04012324)
416500.00	3982000.00	0.77112c	(04012324)	416500.00	3981500.00	0.59359c	(04012324)
416500.00	3981000.00	0.65639	(04110624)	416500.00	3980500.00	0.90777c	(04010524)
416500.00	3980000.00	0.75509c	(04010524)	416500.00	3979500.00	0.68771	(04110624)
416500.00	3979000.00	0.78201	(04110624)	416500.00	3978500.00	1.41170	(04122124)
416500.00	3978000.00	0.61481	(04110624)	416500.00	3977500.00	1.17597c	(04110724)
416500.00	3977000.00	1.31183c	(04110724)	416500.00	3976500.00	1.24443c	(04011524)
416500.00	3976000.00	1.12947	(04011024)	416500.00	3975500.00	0.98213c	(04011524)
416500.00	3975000.00	0.84826	(04011024)	416500.00	3974500.00	0.87614	(04012624)
416500.00	3974000.00	1.01776	(04012624)	416500.00	3973500.00	1.21653	(04122124)
416500.00	3973000.00	2.85261c	(04020924)	416500.00	3972500.00	2.47344	(04010824)
416500.00	3972000.00	1.21338	(04020224)	416500.00	3971500.00	0.92757	(04020224)
416500.00	3971000.00	0.76162	(04100324)	416500.00	3970500.00	0.68481	(04100324)
416500.00	3970000.00	0.62955	(04100324)	416500.00	3969500.00	0.58955	(04100324)
416500.00	3969000.00	0.55750	(04100324)	416500.00	3968500.00	0.53287	(04100324)
416500.00	3968000.00	0.51469	(04100324)	416500.00	3967500.00	0.50112	(04100324)
416500.00	3967000.00	0.49062	(04100324)	416500.00	3966500.00	0.48030	(04100324)
416500.00	3966000.00	0.46907	(04100324)	416500.00	3965500.00	0.45892	(04100324)
416500.00	3965000.00	0.44977	(04100324)	417000.00	3982000.00	0.51872	(04110624)
417000.00	3981500.00	0.49964c	(04010524)	417000.00	3981000.00	0.47836c	(04010524)
417000.00	3980500.00	0.48396	(04110624)	417000.00	3980000.00	0.53036	(04110624)
417000.00	3979500.00	0.56954	(04110624)	417000.00	3979000.00	0.65060	(04110624)
417000.00	3978500.00	0.59966	(04110624)	417000.00	3978000.00	0.89881	(04122124)
417000.00	3977500.00	0.66073	(04120524)	417000.00	3977000.00	0.48605c	(04120824)
417000.00	3976500.00	0.74366c	(04110724)	417000.00	3976000.00	0.95410c	(04110724)
417000.00	3975500.00	0.94624c	(04011524)	417000.00	3975000.00	1.00379c	(04011524)
417000.00	3974500.00	0.94259c	(04011524)	417000.00	3974000.00	0.86068	(04011024)
417000.00	3973500.00	0.82118	(04012624)	417000.00	3973000.00	0.88655	(04012624)
417000.00	3972500.00	0.96913	(04012624)	417000.00	3972000.00	1.31347	(04122124)
417000.00	3971500.00	2.56354c	(04020924)	417000.00	3971000.00	3.57814	(04010824)
417000.00	3970500.00	1.48346	(04020224)	417000.00	3970000.00	1.02200	(04020224)
417000.00	3969500.00	0.80304	(04100324)	417000.00	3969000.00	0.70687	(04100324)
417000.00	3968500.00	0.64250	(04100324)	417000.00	3968000.00	0.58988	(04100324)
417000.00	3967500.00	0.54841	(04100324)	417000.00	3967000.00	0.51465	(04100324)
417000.00	3966500.00	0.48811	(04100324)	417000.00	3966000.00	0.46520	(04100324)
417000.00	3965500.00	0.44653	(04100324)	417000.00	3965000.00	0.43226	(04100324)
417000.00	3964500.00	0.41992	(04100324)	417000.00	3964000.00	0.40835	(04100324)
417000.00	3963500.00	0.39892	(04100324)	417500.00	3980500.00	0.40974	(04110624)
417500.00	3980000.00	0.44425	(04110624)	417500.00	3979500.00	0.48711	(04110624)
417500.00	3979000.00	0.56187	(04110624)	417500.00	3978500.00	0.58872	(04110624)
417500.00	3978000.00	0.55182	(04110624)	417500.00	3977500.00	0.70252	(04122124)
417500.00	3977000.00	0.68218	(04120524)	417500.00	3976500.00	0.44512	(04110624)
417500.00	3976000.00	0.43460c	(04120824)	417500.00	3975500.00	0.55382c	(04110724)
417500.00	3975000.00	0.74693c	(04110724)	417500.00	3974500.00	0.75834c	(04110724)
417500.00	3974000.00	0.83190c	(04011524)	417500.00	3973500.00	0.84409c	(04011524)
417500.00	3973000.00	0.83114c	(04011524)	417500.00	3972500.00	0.80352c	(04011524)
417500.00	3972000.00	0.80727	(04012624)	417500.00	3971500.00	0.84722	(04012624)
417500.00	3971000.00	0.94982	(04012624)	417500.00	3970500.00	1.26146c	(04110724)
417500.00	3970000.00	1.98728c	(04110724)	417500.00	3969500.00	8.13222	(04010824)
417500.00	3969000.00	1.89180	(04020224)	417500.00	3968500.00	1.18631	(04020224)
417500.00	3968000.00	0.87375	(04100324)	417500.00	3967500.00	0.75576	(04100324)
417500.00	3967000.00	0.66992	(04100324)	417500.00	3966500.00	0.60881	(04100324)
417500.00	3966000.00	0.56191	(04100324)	417500.00	3965500.00	0.52590	(04100324)
417500.00	3965000.00	0.49778	(04100324)	417500.00	3964500.00	0.47414	(04100324)
417500.00	3964000.00	0.44966	(04100324)	417500.00	3963500.00	0.43161	(04100324)
417500.00	3963000.00	0.41821	(04100324)	417500.00	3962500.00	0.40625	(04100324)
417500.00	3962000.00	0.39589	(04100324)	417500.00	3961500.00	0.38609	(04100324)
417500.00	3961000.00	0.37871	(04100324)	418000.00	3979500.00	0.42189	(04110624)
418000.00	3979000.00	0.47885	(04110624)	418000.00	3978500.00	0.53672	(04110624)
418000.00	3978000.00	0.49825	(04110624)	418000.00	3977500.00	0.52023	(04110624)
418000.00	3976000.00	0.46084	(04110624)	418000.00	3975500.00	0.41146	(04110624)

418000.00	3975000.00	0.39316	(04110624)	418000.00	3974500.00	0.45414c	(04110724)
418000.00	3974000.00	0.61186c	(04110724)	418000.00	3973500.00	0.68982c	(04110724)
418000.00	3973000.00	0.66892c	(04011524)	418000.00	3972500.00	0.73183c	(04011524)
418000.00	3972000.00	0.75965c	(04011524)	418000.00	3971500.00	0.75721c	(04120824)
418000.00	3971000.00	0.75074c	(04120824)	418000.00	3970500.00	0.75848	(04012624)
418000.00	3970000.00	0.82942	(04012624)	418000.00	3969500.00	0.97610c	(04110724)
418000.00	3969000.00	1.21621c	(04110724)	418000.00	3968500.00	1.73040c	(04110724)
418000.00	3968000.00	3.56827c	(04110724)	418000.00	3967500.00	2.33286	(04020224)
418000.00	3967000.00	1.33082	(04020224)	418000.00	3966500.00	0.93430	(04020224)
418000.00	3966000.00	0.75707	(04100324)	418000.00	3965500.00	0.67239	(04100324)
418000.00	3965000.00	0.61255	(04100324)	418000.00	3964500.00	0.56674	(04100324)
418000.00	3964000.00	0.53406	(04100324)	418000.00	3963500.00	0.50537	(04100324)
418000.00	3963000.00	0.48193	(04100324)	418000.00	3962500.00	0.45939	(04100324)
418000.00	3962000.00	0.43898	(04100324)	418000.00	3961500.00	0.42276	(04100324)
418000.00	3961000.00	0.41109	(04100324)	418000.00	3960500.00	0.39975	(04100324)
418000.00	3960000.00	0.38655	(04100324)	418000.00	3959500.00	0.37320	(04100324)
418000.00	3959000.00	0.32519c	(04111524)	418000.00	3958500.00	0.31690c	(04111524)
418500.00	3974000.00	0.38010	(04110624)	418500.00	3973500.00	0.40878	(04110624)
418500.00	3973000.00	0.52556c	(04110724)	418500.00	3972500.00	0.60966c	(04110724)
418500.00	3972000.00	0.59191c	(04110724)	418500.00	3971500.00	0.63883c	(04011524)
418500.00	3971000.00	0.67238c	(04011524)	418500.00	3970500.00	0.68719c	(04120824)
418500.00	3970000.00	0.71187c	(04120824)	418500.00	3969500.00	0.70479c	(04120824)
418500.00	3969000.00	0.72941	(04012624)	418500.00	3968500.00	0.81620	(04012624)
418500.00	3968000.00	0.95712c	(04110724)	418500.00	3967500.00	1.17221c	(04110724)
418500.00	3967000.00	1.52068c	(04110724)	418500.00	3966500.00	2.70012c	(04011524)
418500.00	3966000.00	2.96185	(04010824)	418500.00	3965500.00	1.47221	(04020224)
418500.00	3965000.00	1.02752	(04020224)	418500.00	3964500.00	0.76196	(04020224)
418500.00	3964000.00	0.67614	(04100324)	418500.00	3963500.00	0.61264	(04100324)
418500.00	3963000.00	0.56656	(04100324)	418500.00	3962500.00	0.52928	(04100324)
418500.00	3962000.00	0.50206	(04100324)	418500.00	3961500.00	0.48294	(04100324)
418500.00	3961000.00	0.46394	(04100324)	418500.00	3960500.00	0.44542	(04100324)
418500.00	3960000.00	0.42387	(04100324)	418500.00	3959500.00	0.39428	(04100324)
418500.00	3959000.00	0.35066c	(04111524)	418500.00	3958500.00	0.34934c	(04111524)
418500.00	3958000.00	0.34588c	(04111524)	419000.00	3972500.00	0.41914	(04110624)
419000.00	3972000.00	0.45853c	(04110724)	419000.00	3971500.00	0.53250c	(04110724)
419000.00	3971000.00	0.55654c	(04110724)	419000.00	3970500.00	0.54898c	(04011524)
419000.00	3970000.00	0.59679c	(04011524)	419000.00	3969500.00	0.61708c	(04011524)
419000.00	3969000.00	0.64013c	(04120824)	419000.00	3968500.00	0.66432c	(04120824)
419000.00	3968000.00	0.68431c	(04120824)	419000.00	3967500.00	0.70910	(04012624)
419000.00	3967000.00	0.81026c	(04110724)	419000.00	3966500.00	0.94605c	(04110724)
419000.00	3966000.00	1.11425c	(04110724)	419000.00	3965500.00	1.41447c	(04110724)
419000.00	3965000.00	2.28413c	(04011524)	419000.00	3964500.00	7.25295	(04010824)
419000.00	3964000.00	1.69246	(04020224)	419000.00	3963500.00	1.12583	(04020224)
419000.00	3963000.00	0.85265	(04020224)	419000.00	3962500.00	0.73464	(04100324)
419000.00	3962000.00	0.66167	(04100324)	419000.00	3961500.00	0.60736	(04100324)
419000.00	3961000.00	0.56921	(04100324)	419000.00	3960500.00	0.53707	(04100324)
419000.00	3960000.00	0.51152	(04100324)	419000.00	3959500.00	0.43536	(04090224)
419000.00	3959000.00	0.40884c	(04111524)	419000.00	3958500.00	0.39319c	(04111524)
419000.00	3958000.00	0.38006c	(04111524)	419000.00	3957500.00	0.35064	(04100324)
419500.00	3971000.00	0.43781	(04110624)	419500.00	3970500.00	0.47528c	(04110724)
419500.00	3970000.00	0.52012c	(04110724)	419500.00	3969500.00	0.51861	(04110624)
419500.00	3969000.00	0.53236	(04110624)	419500.00	3968500.00	0.54440c	(04011524)
419500.00	3968000.00	0.57694c	(04120824)	419500.00	3967500.00	0.61441c	(04120824)
419500.00	3967000.00	0.63282c	(04120824)	419500.00	3966500.00	0.66041c	(04120824)
419500.00	3966000.00	0.70536c	(04110724)	419500.00	3965500.00	0.80911c	(04110724)
419500.00	3965000.00	0.92309c	(04110724)	419500.00	3964500.00	1.05361c	(04110724)
419500.00	3964000.00	1.34298c	(04110724)	419500.00	3963500.00	1.83760c	(04110724)
419500.00	3963000.00	3.78855c	(04011524)	419500.00	3962500.00	2.10689	(04010824)
419500.00	3962000.00	1.29708	(04020224)	419500.00	3961500.00	0.98858	(04020224)
419500.00	3961000.00	0.84486	(04100324)	419500.00	3960500.00	0.76234	(04100324)
419500.00	3960000.00	0.68617	(04100324)	419500.00	3959500.00	0.53917c	(04111524)
419500.00	3959000.00	0.51352c	(04111524)	419500.00	3958500.00	0.43274	(04100324)
419500.00	3958000.00	0.34468c	(04111524)	419500.00	3957500.00	0.33184c	(04111524)
419500.00	3957000.00	0.32241c	(04111524)	420000.00	3969000.00	0.49355	(04110624)
420000.00	3968500.00	0.50822	(04110624)	420000.00	3968000.00	0.51759	(04110624)
420000.00	3967500.00	0.52942	(04110624)	420000.00	3967000.00	0.54245	(04110624)
420000.00	3966500.00	0.55550c	(04120824)	420000.00	3966000.00	0.58730c	(04120824)
420000.00	3965500.00	0.61770c	(04120824)	420000.00	3965000.00	0.64608c	(04120824)
420000.00	3964500.00	0.71381c	(04110724)	420000.00	3964000.00	0.78579c	(04110724)
420000.00	3963500.00	0.88024c	(04110724)	420000.00	3963000.00	1.02148c	(04110724)
420000.00	3962500.00	1.22977c	(04110724)	420000.00	3962000.00	1.58155c	(04110724)
420000.00	3961500.00	2.32169c	(04011524)	420000.00	3961000.00	2.99741c	(04011524)
420000.00	3960500.00	4.46665c	(04110724)	420000.00	3960000.00	2.23852c	(04111524)
420000.00	3959500.00	1.10198	(04100324)	420000.00	3959000.00	0.83833	(04100324)
420000.00	3958500.00	0.65973	(04100324)	420000.00	3958000.00	0.54593	(04100324)
420000.00	3957500.00	0.46881	(04100324)	420000.00	3957000.00	0.41315	(04100324)
420500.00	3967500.00	0.49923	(04110624)	420500.00	3967000.00	0.50852	(04110624)
420500.00	3966500.00	0.51770	(04110624)	420500.00	3966000.00	0.52475	(04110624)
420500.00	3965500.00	0.53562	(04110624)	420500.00	3965000.00	0.55142	(04110624)
420500.00	3964500.00	0.58377	(04110624)	420500.00	3964000.00	0.61054	(04110624)
420500.00	3963500.00	0.63031c	(04110724)	420500.00	3963000.00	0.69655c	(04110724)

420500.00	3962500.00	0.76822c	(04110724)	420500.00	3962000.00	0.84952c	(04110724)
420500.00	3961500.00	0.97534c	(04110724)	420500.00	3961000.00	1.09674c	(04110724)
420500.00	3960500.00	1.29310c	(04110724)	420500.00	3960000.00	1.61141c	(04011524)
420500.00	3959500.00	1.49233c	(04011524)	420500.00	3959000.00	1.37172	(04011024)
420500.00	3958500.00	0.81411	(04011024)	420500.00	3958000.00	0.39095	(04011024)
420500.00	3957500.00	0.25396	(04012624)	420500.00	3957000.00	0.19624	(04012624)
421000.00	3966000.00	0.50872	(04110624)	421000.00	3965500.00	0.51790	(04110624)
421000.00	3965000.00	0.52308	(04110624)	421000.00	3964500.00	0.53370	(04110624)
421000.00	3964000.00	0.54724	(04110624)	421000.00	3963500.00	0.55575	(04110624)
421000.00	3963000.00	0.55992c	(04120824)	421000.00	3962500.00	0.58246c	(04120824)
421000.00	3962000.00	0.62691c	(04110724)	421000.00	3961500.00	0.67836c	(04110724)
421000.00	3961000.00	0.74406c	(04110724)	421000.00	3960500.00	0.81291c	(04110724)
421000.00	3960000.00	0.81180c	(04110724)	421000.00	3959500.00	0.90899c	(04110724)
421000.00	3959000.00	0.98535c	(04110724)	421000.00	3958500.00	1.00457c	(04011524)
421000.00	3958000.00	1.08352c	(04011524)	421000.00	3957500.00	0.95507c	(04011524)
421000.00	3957000.00	0.72907	(04011024)	421500.00	3964000.00	0.45224	(04110624)
421500.00	3963500.00	0.45919	(04110624)	421500.00	3963000.00	0.46948	(04110624)
421500.00	3962500.00	0.48970c	(04120824)	421500.00	3962000.00	0.51672c	(04120824)
421500.00	3961500.00	0.54374c	(04120824)	421500.00	3961000.00	0.56234c	(04110724)
421500.00	3960500.00	0.61055c	(04110724)	421500.00	3960000.00	0.61512c	(04110724)
421500.00	3959500.00	0.63762c	(04110724)	421500.00	3959000.00	0.69353c	(04110724)
421500.00	3958500.00	0.75310c	(04110724)	421500.00	3958000.00	0.70748c	(04110724)
421500.00	3957500.00	0.76193c	(04011524)	421500.00	3957000.00	0.83566c	(04011524)
422000.00	3962000.00	0.45965	(04110624)	422000.00	3961500.00	0.46577	(04110624)
422000.00	3961000.00	0.47372c	(04120824)	422000.00	3960500.00	0.49606c	(04120824)
422000.00	3960000.00	0.51858c	(04120824)	422000.00	3959500.00	0.53726c	(04120824)
422000.00	3959000.00	0.53685c	(04110724)	422000.00	3958500.00	0.57189c	(04110724)
422000.00	3958000.00	0.61485c	(04110724)	422000.00	3957500.00	0.59847c	(04110724)
422000.00	3957000.00	0.59589c	(04110724)	422500.00	3959500.00	0.45875c	(04120824)
422500.00	3959000.00	0.44108c	(04120824)	422500.00	3958500.00	0.45632c	(04110724)
422500.00	3958000.00	0.48375c	(04110724)	422500.00	3957500.00	0.52021c	(04110724)
422500.00	3957000.00	0.52250c	(04110724)	423000.00	3959000.00	0.39776	(04110624)
423000.00	3958500.00	0.36654	(04122124)	423000.00	3958000.00	0.38632c	(04110724)
423000.00	3957500.00	0.40964c	(04110724)	423000.00	3957000.00	0.44203c	(04110724)
423500.00	3959000.00	0.40506	(04110624)	423500.00	3958500.00	0.35055	(04122124)
423500.00	3958000.00	0.33545	(04122124)	423500.00	3957500.00	0.33392c	(04110724)
423500.00	3957000.00	0.35000c	(04110724)	424000.00	3958500.00	0.34966	(04110624)
424000.00	3958000.00	0.32921	(04122124)	424000.00	3957500.00	0.31999	(04122124)
424000.00	3957000.00	0.31126	(04122124)	424500.00	3958000.00	0.32817	(04122124)
424500.00	3957500.00	0.31751	(04122124)	424500.00	3957000.00	0.31105	(04122124)
425000.00	3958000.00	0.32396	(04122124)	425000.00	3957500.00	0.31275	(04122124)
425000.00	3957000.00	0.30872	(04122124)	425500.00	3958000.00	0.33481	(04110624)
425500.00	3957500.00	0.30444	(04122124)	425500.00	3957000.00	0.30072	(04110624)

**Output Data for Particulate Matter (PM)**

\*\*\* THE ANNUAL ( 1 YRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

** CONC OF CO		IN MICROGRAMS/M**3		**	
X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
411000.00	3997500.00	0.06500	411000.00	3997000.00	0.09972
411000.00	3996500.00	0.12195	411000.00	3996000.00	0.21529
411000.00	3995500.00	0.36516	411000.00	3995000.00	0.39428
411000.00	3994500.00	0.37129	411000.00	3994000.00	0.40170
411000.00	3993500.00	0.44356	411000.00	3993000.00	0.48004
411000.00	3992500.00	0.45160	411000.00	3992000.00	0.44387
411000.00	3991500.00	0.45393	411000.00	3991000.00	0.42897
411000.00	3990500.00	0.36247	411000.00	3990000.00	0.31130
411000.00	3989500.00	0.28386	411000.00	3989000.00	0.27578
411000.00	3988500.00	0.27312	411000.00	3988000.00	0.27689
411000.00	3987500.00	0.28014	411000.00	3987000.00	0.28070
411000.00	3986500.00	0.28146	411000.00	3986000.00	0.28088
411000.00	3985500.00	0.27868	411000.00	3985000.00	0.27537
411500.00	3997500.00	0.04936	411500.00	3997000.00	0.08959
411500.00	3996500.00	0.09439	411500.00	3996000.00	0.24096
411500.00	3995500.00	0.49049	411500.00	3995000.00	0.49323
411500.00	3994500.00	0.64069	411500.00	3994000.00	0.75614
411500.00	3993500.00	0.73421	411500.00	3993000.00	0.87333
411500.00	3992500.00	0.80502	411500.00	3992000.00	0.58470
411500.00	3991500.00	0.47908	411500.00	3991000.00	0.44019
411500.00	3990500.00	0.41120	411500.00	3990000.00	0.39993
411500.00	3989500.00	0.39148	411500.00	3989000.00	0.37781
411500.00	3988500.00	0.36102	411500.00	3988000.00	0.35007
411500.00	3987500.00	0.34842	411500.00	3987000.00	0.35092
411500.00	3986500.00	0.35397	411500.00	3986000.00	0.35534
411500.00	3985500.00	0.36124	411500.00	3985000.00	0.35325
411500.00	3984500.00	0.34286	411500.00	3984000.00	0.33030
411500.00	3983500.00	0.30149	412000.00	3997500.00	0.05692
412000.00	3997000.00	0.07571	412000.00	3996500.00	0.11511
412000.00	3996000.00	0.29714	412000.00	3995500.00	2.09476

412000.00	3995000.00	1.40285	412000.00	3994500.00	2.06181
412000.00	39944000.00	1.96809	412000.00	3993500.00	1.43932
412000.00	3993000.00	1.27504	412000.00	3992500.00	3.54395
412000.00	3992000.00	1.22078	412000.00	3991500.00	0.91529
412000.00	3991000.00	0.74128	412000.00	3990500.00	0.65535
412000.00	3990000.00	0.59170	412000.00	3989500.00	0.56441
412000.00	3989000.00	0.54916	412000.00	3988500.00	0.53300
412000.00	3988000.00	0.50312	412000.00	3987500.00	0.47255
412000.00	3987000.00	0.46179	412000.00	3986500.00	0.46582
412000.00	3986000.00	0.46281	412000.00	3985500.00	0.45448
412000.00	3985000.00	0.43898	412000.00	3984500.00	0.42788
412000.00	3984000.00	0.40933	412000.00	3983500.00	0.38052
412000.00	3983000.00	0.34499	412000.00	3982500.00	0.32662
412000.00	3982000.00	0.30515	412500.00	3997500.00	0.05090
412500.00	3997000.00	0.06801	412500.00	3996500.00	0.07686
412500.00	3996000.00	0.12489	412500.00	3995500.00	0.35422
412500.00	3995000.00	0.64885	412500.00	3994500.00	0.60196
412500.00	3994000.00	0.65217	412500.00	3993500.00	0.56957
412500.00	3993000.00	0.53088	412500.00	3992500.00	0.61878
412500.00	3992000.00	1.01526	412500.00	3991500.00	2.33333
412500.00	3991000.00	1.33212	412500.00	3990500.00	0.85834
412500.00	3990000.00	0.69435	412500.00	3989500.00	0.67365
412500.00	3989000.00	0.67154	412500.00	3988500.00	0.69526
412500.00	3988000.00	0.72114	412500.00	3987500.00	0.72123
412500.00	3987000.00	0.69705	412500.00	3986500.00	0.63862
412500.00	3986000.00	0.61380	412500.00	3985500.00	0.57959
412500.00	3985000.00	0.55775	412500.00	3984500.00	0.53451
412500.00	3984000.00	0.49291	412500.00	3983500.00	0.46081
412500.00	3983000.00	0.42561	412500.00	3982500.00	0.38535
412500.00	3982000.00	0.35917	412500.00	3981500.00	0.34024
412500.00	3981000.00	0.33690	412500.00	3980500.00	0.32341
413000.00	3997500.00	0.06036	413000.00	3997000.00	0.06425
413000.00	3996500.00	0.06578	413000.00	3996000.00	0.06970
413000.00	3995500.00	0.17138	413000.00	3995000.00	0.23885
413000.00	3994500.00	0.37340	413000.00	3994000.00	0.39060
413000.00	3993500.00	0.36762	413000.00	3993000.00	0.41977
413000.00	3992500.00	0.46943	413000.00	3992000.00	0.51665
413000.00	3991500.00	0.70049	413000.00	3991000.00	1.02082
413000.00	3990500.00	1.47684	413000.00	3990000.00	2.11419
413000.00	3989500.00	1.67585	413000.00	3989000.00	1.57267
413000.00	3988500.00	1.48934	413000.00	3988000.00	1.42470
413000.00	3987500.00	1.39704	413000.00	3987000.00	1.38334
413000.00	3986500.00	1.41310	413000.00	3986000.00	1.34453
413000.00	3985500.00	1.07545	413000.00	3985000.00	0.92992
413000.00	3984500.00	0.75835	413000.00	3984000.00	0.62206
413000.00	3983500.00	0.62209	413000.00	3983000.00	0.56370
413000.00	3982500.00	0.51951	413000.00	3982000.00	0.47693
413000.00	3981500.00	0.44445	413000.00	3981000.00	0.42054
413000.00	3980500.00	0.40394	413000.00	3980000.00	0.36840
413000.00	3979500.00	0.34802	413500.00	3997500.00	0.04528
413500.00	3997000.00	0.04561	413500.00	3996500.00	0.04697
413500.00	3996000.00	0.05482	413500.00	3995500.00	0.07387
413500.00	3995000.00	0.18833	413500.00	3994500.00	0.18622
413500.00	3994000.00	0.26437	413500.00	3993500.00	0.31616
413500.00	3993000.00	0.28038	413500.00	3992500.00	0.29365
413500.00	3992000.00	0.36104	413500.00	3991500.00	0.40299
413500.00	3991000.00	0.51544	413500.00	3990500.00	0.66946
413500.00	3990000.00	0.82073	413500.00	3989500.00	0.76010
413500.00	3989000.00	0.93589	413500.00	3988500.00	0.93706
413500.00	3988000.00	0.88052	413500.00	3987500.00	0.84906
413500.00	3987000.00	0.83678	413500.00	3986500.00	0.85125
413500.00	3986000.00	0.89408	413500.00	3985500.00	1.08065
413500.00	3985000.00	1.43732	413500.00	3984500.00	2.27249
413500.00	3984000.00	1.32426	413500.00	3983500.00	0.90399
413500.00	3983000.00	0.73819	413500.00	3982500.00	0.66325
413500.00	3982000.00	0.60459	413500.00	3981500.00	0.54159
413500.00	3981000.00	0.50278	413500.00	3980500.00	0.48585
413500.00	3980000.00	0.44543	413500.00	3979500.00	0.40747
413500.00	3979000.00	0.38388	413500.00	3978000.00	0.35720
413500.00	3977500.00	0.36182	413500.00	3977000.00	0.36246
413500.00	3976500.00	0.35524	413500.00	3976000.00	0.33232
413500.00	3975500.00	0.32191	413500.00	3975000.00	0.30456
413500.00	3974500.00	0.29438	414000.00	3997500.00	0.03618
414000.00	3997000.00	0.03747	414000.00	3996500.00	0.04371
414000.00	3996000.00	0.04724	414000.00	3995500.00	0.05467
414000.00	3995000.00	0.13993	414000.00	3994500.00	0.15978
414000.00	3994000.00	0.14898	414000.00	3993500.00	0.20729
414000.00	3993000.00	0.26158	414000.00	3992500.00	0.25197
414000.00	3992000.00	0.27283	414000.00	3991500.00	0.29160
414000.00	3991000.00	0.32777	414000.00	3990500.00	0.39307
414000.00	3990000.00	0.49864	414000.00	3989500.00	0.55363

414000.00	3989000.00	0.54058	414000.00	3988500.00	0.44722
414000.00	3988000.00	0.54603	414000.00	3987500.00	0.59631
414000.00	3987000.00	0.59269	414000.00	3986500.00	0.58610
414000.00	3986000.00	0.57993	414000.00	3985500.00	0.59195
414000.00	3985000.00	0.63745	414000.00	3984500.00	0.75255
414000.00	3984000.00	1.20775	414000.00	3983500.00	1.84648
414000.00	3983000.00	1.71870	414000.00	3982500.00	0.98344
414000.00	3982000.00	0.76163	414000.00	3981500.00	0.65973
414000.00	3981000.00	0.55863	414000.00	3980500.00	0.52501
414000.00	3980000.00	0.49845	414000.00	3979500.00	0.44207
414000.00	3979000.00	0.41321	414000.00	3978500.00	0.39689
414000.00	3978000.00	0.39224	414000.00	3977500.00	0.39809
414000.00	3977000.00	0.40900	414000.00	3976500.00	0.39143
414000.00	3976000.00	0.36577	414000.00	3975500.00	0.34534
414000.00	3975000.00	0.33490	414000.00	3974500.00	0.33779
414000.00	3974000.00	0.35089	414000.00	3973500.00	0.35257
414000.00	3973000.00	0.34547	414500.00	3992500.00	0.22836
414500.00	3992000.00	0.24588	414500.00	3991500.00	0.25278
414500.00	3991000.00	0.26359	414500.00	3990500.00	0.27739
414500.00	3990000.00	0.31860	414500.00	3989500.00	0.38730
414500.00	3989000.00	0.43769	414500.00	3988500.00	0.44132
414500.00	3988000.00	0.36142	414500.00	3987500.00	0.35482
414500.00	3987000.00	0.40762	414500.00	3986500.00	0.45437
414500.00	3986000.00	0.46218	414500.00	3985500.00	0.46993
414500.00	3985000.00	0.48478	414500.00	3984500.00	0.52203
414500.00	3984000.00	0.55923	414500.00	3983500.00	0.71083
414500.00	3983000.00	0.90759	414500.00	3982500.00	1.28081
414500.00	3982000.00	4.01040	414500.00	3981500.00	1.32779
414500.00	3981000.00	0.93557	414500.00	3980500.00	0.70303
414500.00	3980000.00	0.64020	414500.00	3979500.00	0.54771
414500.00	3979000.00	0.49401	414500.00	3978500.00	0.46969
414500.00	3978000.00	0.47933	414500.00	3977500.00	0.48073
414500.00	3977000.00	0.48389	414500.00	3976500.00	0.45027
414500.00	3976000.00	0.41776	414500.00	3975500.00	0.42530
414500.00	3975000.00	0.45892	414500.00	3974500.00	0.45317
414500.00	3974000.00	0.41929	414500.00	3973500.00	0.37210
414500.00	3973000.00	0.33955	414500.00	3972500.00	0.32159
414500.00	3972000.00	0.30959	414500.00	3971500.00	0.29758
415000.00	3991000.00	0.23912	415000.00	3990500.00	0.24336
415000.00	3990000.00	0.24394	415000.00	3989500.00	0.27134
415000.00	3989000.00	0.30550	415000.00	3988500.00	0.36400
415000.00	3988000.00	0.38247	415000.00	3987500.00	0.33047
415000.00	3987000.00	0.30196	415000.00	3986500.00	0.31045
415000.00	3986000.00	0.34349	415000.00	3985500.00	0.37959
415000.00	3985000.00	0.40431	415000.00	3984500.00	0.41869
415000.00	3984000.00	0.45209	415000.00	3983500.00	0.50611
415000.00	3983000.00	0.56071	415000.00	3982500.00	0.66812
415000.00	3982000.00	0.78888	415000.00	3981500.00	1.01397
415000.00	3981000.00	1.65632	415000.00	3980500.00	1.90855
415000.00	3980000.00	1.16769	415000.00	3979500.00	0.80801
415000.00	3979000.00	0.60809	415000.00	3978500.00	0.61786
415000.00	3978000.00	0.67182	415000.00	3977500.00	0.70178
415000.00	3977000.00	0.75921	415000.00	3976500.00	0.69661
415000.00	3976000.00	0.76843	415000.00	3975500.00	0.65324
415000.00	3975000.00	0.53863	415000.00	3974500.00	0.48424
415000.00	3974000.00	0.44690	415000.00	3973500.00	0.41918
415000.00	3973000.00	0.39000	415000.00	3972500.00	0.36146
415000.00	3972000.00	0.34416	415000.00	3971500.00	0.33245
415000.00	3971000.00	0.32081	415000.00	3970500.00	0.31101
415000.00	3970000.00	0.30287	415500.00	3985500.00	0.28307
415500.00	3985000.00	0.30978	415500.00	3984500.00	0.34361
415500.00	3984000.00	0.37953	415500.00	3983500.00	0.40161
415500.00	3983000.00	0.43047	415500.00	3982500.00	0.48173
415500.00	3982000.00	0.55292	415500.00	3981500.00	0.62201
415500.00	3981000.00	0.70767	415500.00	3980500.00	0.86507
415500.00	3980000.00	1.26447	415500.00	3979500.00	2.01172
415500.00	3979000.00	1.12617	415500.00	3978500.00	0.99434
415500.00	3978000.00	1.07621	415500.00	3977500.00	1.68460
415500.00	3977000.00	1.51724	415500.00	3976500.00	2.33334
415500.00	3976000.00	1.59840	415500.00	3975500.00	1.27878
415500.00	3975000.00	1.06385	415500.00	3974500.00	0.87708
415500.00	3974000.00	0.73248	415500.00	3973500.00	0.64056
415500.00	3973000.00	0.57283	415500.00	3972500.00	0.51911
415500.00	3972000.00	0.47278	415500.00	3971500.00	0.43953
415500.00	3971000.00	0.41140	415500.00	3970500.00	0.38606
415500.00	3970000.00	0.36450	415500.00	3969500.00	0.34707
415500.00	3969000.00	0.33367	415500.00	3968500.00	0.32224
415500.00	3968000.00	0.31182	416000.00	3984500.00	0.26662
416000.00	3984000.00	0.29278	416000.00	3983500.00	0.31796
416000.00	3983000.00	0.35828	416000.00	3982500.00	0.38005
416000.00	3982000.00	0.41978	416000.00	3981500.00	0.47380

416000.00	3981000.00	0.52915	416000.00	3980500.00	0.58105
416000.00	3980000.00	0.65789	416000.00	3979500.00	0.88177
416000.00	3979000.00	2.59769	416000.00	3978500.00	1.41610
416000.00	3978000.00	1.17099	416000.00	3977500.00	0.93771
416000.00	3977000.00	0.78526	416000.00	3976500.00	0.76028
416000.00	3976000.00	0.90758	416000.00	3975500.00	1.01699
416000.00	3975000.00	1.26891	416000.00	3974500.00	2.31603
416000.00	3974000.00	1.54894	416000.00	3973500.00	1.07232
416000.00	3973000.00	0.86012	416000.00	3972500.00	0.73241
416000.00	3972000.00	0.63833	416000.00	3971500.00	0.57013
416000.00	3971000.00	0.52383	416000.00	3970500.00	0.48116
416000.00	3970000.00	0.44559	416000.00	3969500.00	0.41776
416000.00	3969000.00	0.39459	416000.00	3968500.00	0.37448
416000.00	3968000.00	0.35695	416000.00	3967500.00	0.34129
416000.00	3967000.00	0.32694	416000.00	3966500.00	0.31467
416500.00	3983000.00	0.27466	416500.00	3982500.00	0.29792
416500.00	3982000.00	0.32545	416500.00	3981500.00	0.36102
416500.00	3981000.00	0.41534	416500.00	3980500.00	0.47506
416500.00	3980000.00	0.50869	416500.00	3979500.00	0.57042
416500.00	3979000.00	0.66276	416500.00	3978500.00	0.90236
416500.00	3978000.00	0.52278	416500.00	3977500.00	0.65570
416500.00	3977000.00	0.68638	416500.00	3976500.00	0.63809
416500.00	3976000.00	0.59237	416500.00	3975500.00	0.63381
416500.00	3975000.00	0.63906	416500.00	3974500.00	0.69168
416500.00	3974000.00	0.88961	416500.00	3973500.00	1.16722
416500.00	3973000.00	1.96853	416500.00	3972500.00	1.76371
416500.00	3972000.00	1.06406	416500.00	3971500.00	0.84110
416500.00	3971000.00	0.70436	416500.00	3970500.00	0.60723
416500.00	3970000.00	0.53636	416500.00	3969500.00	0.48901
416500.00	3969000.00	0.45161	416500.00	3968500.00	0.42005
416500.00	3968000.00	0.39546	416500.00	3967500.00	0.37742
416500.00	3967000.00	0.36103	416500.00	3966500.00	0.34546
416500.00	3966000.00	0.33064	416500.00	3965500.00	0.31746
416500.00	3965000.00	0.30541	417000.00	3982000.00	0.27570
417000.00	3981500.00	0.30047	417000.00	3981000.00	0.33061
417000.00	3980500.00	0.36015	417000.00	3980000.00	0.38957
417000.00	3979500.00	0.43001	417000.00	3979000.00	0.50834
417000.00	3978500.00	0.46381	417000.00	3978000.00	0.60607
417000.00	3977500.00	0.48074	417000.00	3977000.00	0.37707
417000.00	3976500.00	0.44970	417000.00	3976000.00	0.52653
417000.00	3975500.00	0.52662	417000.00	3975000.00	0.54982
417000.00	3974500.00	0.57000	417000.00	3974000.00	0.56834
417000.00	3973500.00	0.62788	417000.00	3973000.00	0.73544
417000.00	3972500.00	0.87291	417000.00	3972000.00	1.15296
417000.00	3971500.00	1.79386	417000.00	3971000.00	2.32241
417000.00	3970500.00	1.24045	417000.00	3970000.00	0.89827
417000.00	3969500.00	0.72839	417000.00	3969000.00	0.62426
417000.00	3968500.00	0.55134	417000.00	3968000.00	0.49568
417000.00	3967500.00	0.45231	417000.00	3967000.00	0.41829
417000.00	3966500.00	0.38890	417000.00	3966000.00	0.36651
417000.00	3965500.00	0.34785	417000.00	3965000.00	0.33335
417000.00	3964500.00	0.31983	417000.00	3964000.00	0.30379
417000.00	3963500.00	0.28840	417500.00	3980500.00	0.28023
417500.00	3980000.00	0.31520	417500.00	3979500.00	0.34954
417500.00	3979000.00	0.41077	417500.00	3978500.00	0.43113
417500.00	3978000.00	0.39183	417500.00	3977500.00	0.47977
417500.00	3977000.00	0.43865	417500.00	3976500.00	0.32160
417500.00	3976000.00	0.33243	417500.00	3975500.00	0.37737
417500.00	3975000.00	0.42776	417500.00	3974500.00	0.47433
417500.00	3974000.00	0.51158	417500.00	3973500.00	0.51252
417500.00	3973000.00	0.53562	417500.00	3972500.00	0.58833
417500.00	3972000.00	0.64821	417500.00	3971500.00	0.72044
417500.00	3971000.00	0.82798	417500.00	3970500.00	1.09098
417500.00	3970000.00	1.60978	417500.00	3969500.00	3.59218
417500.00	3969000.00	1.47952	417500.00	3968500.00	1.01041
417500.00	3968000.00	0.79526	417500.00	3967500.00	0.66090
417500.00	3967000.00	0.56958	417500.00	3966500.00	0.50397
417500.00	3966000.00	0.45349	417500.00	3965500.00	0.42067
417500.00	3965000.00	0.39289	417500.00	3964500.00	0.36801
417500.00	3964000.00	0.34706	417500.00	3963500.00	0.32856
417500.00	3963000.00	0.30867	417500.00	3962500.00	0.28978
417500.00	3962000.00	0.28086	417500.00	3961500.00	0.27322
417500.00	3961000.00	0.24986	418000.00	3979500.00	0.28154
418000.00	3979000.00	0.32533	418000.00	3978500.00	0.37503
418000.00	3978000.00	0.34189	418000.00	3977500.00	0.34912
418000.00	3976000.00	0.32335	418000.00	3975500.00	0.29202
418000.00	3975000.00	0.29626	418000.00	3974500.00	0.32689
418000.00	3974000.00	0.39765	418000.00	3973500.00	0.44544
418000.00	3973000.00	0.46033	418000.00	3972500.00	0.47426
418000.00	3972000.00	0.50824	418000.00	3971500.00	0.53962
418000.00	3971000.00	0.57742	418000.00	3970500.00	0.62316

418000.00	3970000.00	0.68756	418000.00	3969500.00	0.82573
418000.00	3969000.00	0.98570	418000.00	3968500.00	1.34538
418000.00	3968000.00	2.29999	418000.00	3967500.00	1.75393
418000.00	3967000.00	1.12714	418000.00	3966500.00	0.84144
418000.00	3966000.00	0.67687	418000.00	3965500.00	0.58033
418000.00	3965000.00	0.51511	418000.00	3964500.00	0.46195
418000.00	3964000.00	0.42348	418000.00	3963500.00	0.39682
418000.00	3963000.00	0.37392	418000.00	3962500.00	0.34149
418000.00	3962000.00	0.31647	418000.00	3961500.00	0.30508
418000.00	3961000.00	0.29291	418000.00	3960500.00	0.24318
418000.00	3960000.00	0.21534	418000.00	3959500.00	0.18981
418000.00	3959000.00	0.11946	418000.00	3958500.00	0.11228
418500.00	3974000.00	0.27603	418500.00	3973500.00	0.32134
418500.00	3973000.00	0.37395	418500.00	3972500.00	0.40742
418500.00	3972000.00	0.42909	418500.00	3971500.00	0.45292
418500.00	3971000.00	0.47392	418500.00	3970500.00	0.49941
418500.00	3970000.00	0.52475	418500.00	3969500.00	0.54558
418500.00	3969000.00	0.60351	418500.00	3968500.00	0.66576
418500.00	3968000.00	0.76720	418500.00	3967500.00	0.93453
418500.00	3967000.00	1.20005	418500.00	3966500.00	2.02194
418500.00	3966000.00	2.00532	418500.00	3965500.00	1.20873
418500.00	3965000.00	0.89482	418500.00	3964500.00	0.71967
418500.00	3964000.00	0.60668	418500.00	3963500.00	0.52470
418500.00	3963000.00	0.47188	418500.00	3962500.00	0.43283
418500.00	3962000.00	0.39471	418500.00	3961500.00	0.36460
418500.00	3961000.00	0.34929	418500.00	3960500.00	0.29148
418500.00	3960000.00	0.24305	418500.00	3959500.00	0.18750
418500.00	3959000.00	0.13040	418500.00	3958500.00	0.11491
418500.00	3958000.00	0.11235	419000.00	3972500.00	0.31182
419000.00	3972000.00	0.34774	419000.00	3971500.00	0.38088
419000.00	3971000.00	0.40527	419000.00	3970500.00	0.42806
419000.00	3970000.00	0.45065	419000.00	3969500.00	0.46246
419000.00	3969000.00	0.47291	419000.00	3968500.00	0.50304
419000.00	3968000.00	0.53486	419000.00	3967500.00	0.57890
419000.00	3967000.00	0.65426	419000.00	3966500.00	0.75826
419000.00	3966000.00	0.90974	419000.00	3965500.00	1.13024
419000.00	3965000.00	1.69719	419000.00	3964500.00	3.49215
419000.00	3964000.00	1.39896	419000.00	3963500.00	1.00406
419000.00	3963000.00	0.79160	419000.00	3962500.00	0.64346
419000.00	3962000.00	0.55365	419000.00	3961500.00	0.50133
419000.00	3961000.00	0.44639	419000.00	3960500.00	0.40700
419000.00	3960000.00	0.30160	419000.00	3959500.00	0.17334
419000.00	3959000.00	0.14399	419000.00	3958500.00	0.13400
419000.00	3958000.00	0.12790	419000.00	3957500.00	0.11157
419500.00	3971000.00	0.32637	419500.00	3970500.00	0.35659
419500.00	3970000.00	0.38563	419500.00	3969500.00	0.40747
419500.00	3969000.00	0.41630	419500.00	3968500.00	0.42478
419500.00	3968000.00	0.44328	419500.00	3967500.00	0.46218
419500.00	3967000.00	0.48530	419500.00	3966500.00	0.52708
419500.00	3966000.00	0.58211	419500.00	3965500.00	0.65206
419500.00	3965000.00	0.74000	419500.00	3964500.00	0.84416
419500.00	3964000.00	1.03830	419500.00	3963500.00	1.34608
419500.00	3963000.00	2.32919	419500.00	3962500.00	1.64826
419500.00	3962000.00	1.12692	419500.00	3961500.00	0.91237
419500.00	3961000.00	0.77834	419500.00	3960500.00	0.64570
419500.00	3960000.00	0.43057	419500.00	3959500.00	0.20814
419500.00	3959000.00	0.18344	419500.00	3958500.00	0.13764
419500.00	3958000.00	0.09499	419500.00	3957500.00	0.08330
419500.00	3957000.00	0.07922	420000.00	3969000.00	0.36234
420000.00	3968500.00	0.37601	420000.00	3968000.00	0.38489
420000.00	3967500.00	0.39605	420000.00	3967000.00	0.40678
420000.00	3966500.00	0.42021	420000.00	3966000.00	0.44261
420000.00	3965500.00	0.47269	420000.00	3965000.00	0.51483
420000.00	3964500.00	0.56728	420000.00	3964000.00	0.61601
420000.00	3963500.00	0.68964	420000.00	3963000.00	0.78870
420000.00	3962500.00	0.93606	420000.00	3962000.00	1.18625
420000.00	3961500.00	1.42471	420000.00	3961000.00	1.71977
420000.00	3960500.00	2.33822	420000.00	3960000.00	1.10937
420000.00	3959500.00	0.33102	420000.00	3959000.00	0.22575
420000.00	3958500.00	0.16714	420000.00	3958000.00	0.13220
420000.00	3957500.00	0.10941	420000.00	3957000.00	0.09362
420500.00	3967500.00	0.34979	420500.00	3967000.00	0.35998
420500.00	3966500.00	0.36682	420500.00	3966000.00	0.37531
420500.00	3965500.00	0.38602	420500.00	3965000.00	0.40160
420500.00	3964500.00	0.42898	420500.00	3964000.00	0.46043
420500.00	3963500.00	0.48889	420500.00	3963000.00	0.52668
420500.00	3962500.00	0.57444	420500.00	3962000.00	0.62973
420500.00	3961500.00	0.69333	420500.00	3961000.00	0.71927
420500.00	3960500.00	0.79304	420500.00	3960000.00	0.85434
420500.00	3959500.00	0.55317	420500.00	3959000.00	0.37585
420500.00	3958500.00	0.18202	420500.00	3958000.00	0.08362

420500.00	3957500.00	0.05439	420500.00	3957000.00	0.03976
421000.00	3966000.00	0.33725	421000.00	3965500.00	0.34401
421000.00	3965000.00	0.35042	421000.00	3964500.00	0.36095
421000.00	3964000.00	0.37633	421000.00	3963500.00	0.39409
421000.00	3963000.00	0.40952	421000.00	3962500.00	0.42897
421000.00	3962000.00	0.45288	421000.00	3961500.00	0.47428
421000.00	3961000.00	0.50978	421000.00	3960500.00	0.53078
421000.00	3960000.00	0.53363	421000.00	3959500.00	0.42612
421000.00	3959000.00	0.41749	421000.00	3958500.00	0.28247
421000.00	3958000.00	0.28623	421000.00	3957500.00	0.23440
421000.00	3957000.00	0.17033	421500.00	3964000.00	0.32484
421500.00	3963500.00	0.33224	421500.00	3963000.00	0.34041
421500.00	3962500.00	0.35166	421500.00	3962000.00	0.36828
421500.00	3961500.00	0.38611	421500.00	3961000.00	0.39279
421500.00	3960500.00	0.41314	421500.00	3960000.00	0.42409
421500.00	3959500.00	0.37281	421500.00	3959000.00	0.32369
421500.00	3958500.00	0.32848	421500.00	3958000.00	0.23925
421500.00	3957500.00	0.22620	421500.00	3957000.00	0.22883
422000.00	3962000.00	0.32072	422000.00	3961500.00	0.32915
422000.00	3961000.00	0.33295	422000.00	3960500.00	0.33811
422000.00	3960000.00	0.35199	422000.00	3959500.00	0.35385
422000.00	3959000.00	0.25979	422000.00	3958500.00	0.26662
422000.00	3958000.00	0.26975	422000.00	3957500.00	0.21120
422000.00	3957000.00	0.18802	422500.00	3959500.00	0.30970
422500.00	3959000.00	0.25320	422500.00	3958500.00	0.22570
422500.00	3958000.00	0.22973	422500.00	3957500.00	0.22973
422500.00	3957000.00	0.18756	423000.00	3959000.00	0.25122
423000.00	3958500.00	0.20440	423000.00	3958000.00	0.20193
423000.00	3957500.00	0.20394	423000.00	3957000.00	0.20083
423500.00	3959000.00	0.24574	423500.00	3958500.00	0.19830
423500.00	3958000.00	0.18499	423500.00	3957500.00	0.18391
423500.00	3957000.00	0.18474	424000.00	3958500.00	0.20025
424000.00	3958000.00	0.17264	424000.00	3957500.00	0.17185
424000.00	3957000.00	0.17024	424500.00	3958000.00	0.16946
424500.00	3957500.00	0.16120	424500.00	3957000.00	0.16152
425000.00	3958000.00	0.16969	425000.00	3957500.00	0.15220
425000.00	3957000.00	0.15259	425500.00	3958000.00	0.16681
425500.00	3957500.00	0.14644	425500.00	3957000.00	0.14219

\*\*\* THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*  
 \*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

		** CONC OF CO IN MICROGRAMS/M**3			
X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
411000.00	3997500.00	1.31526 (04010824)	411000.00	3997000.00	1.66923 (04010824)
411000.00	3996500.00	2.11771 (04010824)	411000.00	3996000.00	2.54676 (04010824)
411000.00	3995500.00	2.64477 (04010824)	411000.00	3995000.00	2.73147 (04010824)
411000.00	3994500.00	2.09730 (04010824)	411000.00	3994000.00	2.06482 (04010824)
411000.00	3993500.00	2.11316 (04010824)	411000.00	3993000.00	2.12884 (04010824)
411000.00	3992500.00	1.97436 (04010824)	411000.00	3992000.00	1.78931 (04010824)
411000.00	3991500.00	1.64796 (04010824)	411000.00	3991000.00	1.73389 (04090224)
411000.00	3990500.00	1.56294 (04010824)	411000.00	3990000.00	1.33249 (04010824)
411000.00	3989500.00	1.05337 (04010824)	411000.00	3989000.00	0.88274 (04010824)
411000.00	3988500.00	0.85562 (04071924)	411000.00	3988000.00	0.87058c (04092524)
411000.00	3987500.00	0.91306c (04092524)	411000.00	3987000.00	0.90012c (04092524)
411000.00	3986500.00	0.88243c (04092524)	411000.00	3986000.00	0.88455c (04092524)
411000.00	3985500.00	0.84843c (04092524)	411000.00	3985000.00	0.81545 (04090624)
411500.00	3997500.00	0.94579 (04010824)	411500.00	3997000.00	1.42550 (04010824)
411500.00	3996500.00	1.15498 (04010824)	411500.00	3996000.00	1.52922 (04010824)
411500.00	3995500.00	2.32096 (04010824)	411500.00	3995000.00	2.93167 (04010824)
411500.00	3994500.00	3.92489 (04010824)	411500.00	3994000.00	4.42134 (04010824)
411500.00	3993500.00	2.51302 (04010824)	411500.00	3993000.00	2.81965c (04092524)
411500.00	3992500.00	3.21323 (04090224)	411500.00	3992000.00	2.48230 (04010824)
411500.00	3991500.00	2.40770 (04010824)	411500.00	3991000.00	2.22910 (04010824)
411500.00	3990500.00	1.96805 (04010824)	411500.00	3990000.00	1.83691 (04010824)
411500.00	3989500.00	1.84901 (04010824)	411500.00	3989000.00	1.65268 (04010824)
411500.00	3988500.00	1.29294 (04010824)	411500.00	3988000.00	1.06786 (04010824)
411500.00	3987500.00	1.02554 (04071924)	411500.00	3987000.00	1.03904c (04092524)
411500.00	3986500.00	1.04671c (04092524)	411500.00	3986000.00	1.04301c (04092524)
411500.00	3985500.00	1.04631c (04092524)	411500.00	3985000.00	1.05083 (04020224)
411500.00	3984500.00	1.01643 (04090224)	411500.00	3984000.00	1.02479 (04090224)
411500.00	3983500.00	1.01841 (04090224)	412000.00	3997500.00	1.02946c (04081024)
412000.00	3997000.00	1.30171c (04081024)	412000.00	3996500.00	1.77413 (04021024)
412000.00	3996000.00	4.67494c (04012324)	412000.00	3995500.00	6.32280 (04010824)
412000.00	3995000.00	3.80769c (04111724)	412000.00	3994500.00	7.21132 (04090224)
412000.00	3994000.00	6.31125c (04111524)	412000.00	3993500.00	3.95713c (04111524)
412000.00	3993000.00	3.44880 (04010824)	412000.00	3992500.00	9.94055c (04110724)
412000.00	3992000.00	4.20430 (04100324)	412000.00	3991500.00	3.37614 (04100324)
412000.00	3991000.00	2.81536 (04100324)	412000.00	3990500.00	2.76027 (04010824)
412000.00	3990000.00	2.83329 (04010824)	412000.00	3989500.00	2.69254 (04010824)
412000.00	3989000.00	2.35677 (04010824)	412000.00	3988500.00	2.23103 (04010824)



412000.00	3988000.00	2.11695	(04010824)	412000.00	3987500.00	1.61698	(04010824)
412000.00	3987000.00	1.31594	(04100324)	412000.00	3986500.00	1.34464c	(04092524)
412000.00	3986000.00	1.33135c	(04092524)	412000.00	3985500.00	1.27724c	(04092524)
412000.00	3985000.00	1.23241c	(04092524)	412000.00	3984500.00	1.21364c	(04092524)
412000.00	3984000.00	1.15436	(04090224)	412000.00	3983500.00	1.12243	(04090224)
412000.00	3983000.00	1.04251	(04090224)	412000.00	3982500.00	0.97189	(04090224)
412000.00	3982000.00	0.89610	(04090224)	412500.00	3997500.00	2.36648c	(04012324)
412500.00	3997000.00	2.41669c	(04012324)	412500.00	3996500.00	1.53591c	(04012324)
412500.00	3996000.00	2.16792c	(04010524)	412500.00	3995500.00	1.97961c	(04010524)
412500.00	3995000.00	1.71815	(04120524)	412500.00	3994500.00	1.68084	(04122124)
412500.00	3994000.00	2.18238c	(04011524)	412500.00	3993500.00	1.62060	(04012624)
412500.00	3993000.00	1.36851	(04012624)	412500.00	3992500.00	1.53253	(04012624)
412500.00	3992000.00	2.56005	(04122124)	412500.00	3991500.00	8.32945	(04010824)
412500.00	3991000.00	3.27790	(04020224)	412500.00	3990500.00	2.58785	(04010824)
412500.00	3990000.00	2.53604	(04010824)	412500.00	3989500.00	2.79411	(04010824)
412500.00	3989000.00	3.21166	(04010824)	412500.00	3988500.00	3.70534	(04010824)
412500.00	3988000.00	3.75160	(04010824)	412500.00	3987500.00	3.11307	(04010824)
412500.00	3987000.00	2.86565	(04010824)	412500.00	3986500.00	2.10206	(04010824)
412500.00	3986000.00	1.78531c	(04092524)	412500.00	3985500.00	1.68955c	(04092524)
412500.00	3985000.00	1.56247c	(04092524)	412500.00	3984500.00	1.43675c	(04092524)
412500.00	3984000.00	1.34062c	(04092524)	412500.00	3983500.00	1.21769c	(04092524)
412500.00	3983000.00	1.08788	(04100324)	412500.00	3982500.00	1.04288c	(04021324)
412500.00	3982000.00	0.98391	(04100324)	412500.00	3981500.00	0.94511	(04100324)
412500.00	3981000.00	0.93661	(04100324)	412500.00	3980500.00	0.91656	(04100324)
413000.00	3997500.00	1.21006c	(04010524)	413000.00	3997000.00	1.21524c	(04010524)
413000.00	3996500.00	0.95581c	(04010524)	413000.00	3996000.00	0.84627c	(04012324)
413000.00	3995500.00	0.97069c	(04012324)	413000.00	3995000.00	1.03457c	(04012324)
413000.00	3994500.00	1.21178c	(04012324)	413000.00	3994000.00	1.26802c	(04012324)
413000.00	3993500.00	1.37948c	(04012324)	413000.00	3993000.00	1.53830c	(04012324)
413000.00	3992500.00	1.77969c	(04012324)	413000.00	3992000.00	2.08631c	(04012324)
413000.00	3991500.00	2.63885c	(04012324)	413000.00	3991000.00	3.57808	(04021024)
413000.00	3990500.00	4.64531c	(04020324)	413000.00	3990000.00	5.61853c	(04081024)
413000.00	3989500.00	4.27479	(04090224)	413000.00	3989000.00	4.31339	(04090224)
413000.00	3988500.00	4.29645	(04090224)	413000.00	3988000.00	4.32051	(04090224)
413000.00	3987500.00	4.66675	(04010824)	413000.00	3987000.00	5.25254	(04010824)
413000.00	3986500.00	7.11534	(04010824)	413000.00	3986000.00	4.91875	(04010824)
413000.00	3985500.00	3.20921	(04090224)	413000.00	3985000.00	2.64569	(04090224)
413000.00	3984500.00	2.43193c	(04111524)	413000.00	3984000.00	2.13662c	(04111524)
413000.00	3983500.00	2.01189	(04100324)	413000.00	3983000.00	1.88628	(04100324)
413000.00	3982500.00	1.76949	(04100324)	413000.00	3982000.00	1.68040	(04100324)
413000.00	3981500.00	1.61592	(04100324)	413000.00	3981000.00	1.52665	(04100324)
413000.00	3980500.00	1.45575	(04100324)	413000.00	3980000.00	1.39121	(04100324)
413000.00	3979500.00	1.33259	(04100324)	413500.00	3997500.00	0.67081c	(04010524)
413500.00	3997000.00	0.57593c	(04012324)	413500.00	3996500.00	0.59470c	(04012324)
413500.00	3996000.00	0.61875c	(04012324)	413500.00	3995500.00	0.66116c	(04012324)
413500.00	3995000.00	0.75732c	(04012324)	413500.00	3994500.00	0.80481c	(04012324)
413500.00	3994000.00	0.96944c	(04012324)	413500.00	3993500.00	1.06652c	(04012324)
413500.00	3993000.00	1.24664c	(04012324)	413500.00	3992500.00	1.53980c	(04012324)
413500.00	3992000.00	1.81598c	(04012324)	413500.00	3991500.00	1.87916c	(04012324)
413500.00	3991000.00	1.95630c	(04012324)	413500.00	3990500.00	2.02978c	(04012324)
413500.00	3990000.00	2.31880	(04120524)	413500.00	3989500.00	2.16051	(04120524)
413500.00	3989000.00	3.49137c	(04110724)	413500.00	3988500.00	3.63490c	(04011524)
413500.00	3988000.00	2.98558	(04011024)	413500.00	3987500.00	2.60174	(04012624)
413500.00	3987000.00	2.44408	(04012624)	413500.00	3986500.00	2.36661	(04012624)
413500.00	3986000.00	2.35821	(04012624)	413500.00	3985500.00	2.76076	(04010824)
413500.00	3985000.00	4.58930	(04010824)	413500.00	3984500.00	7.02299	(04010824)
413500.00	3984000.00	3.65276	(04082224)	413500.00	3983500.00	2.71341c	(04101924)
413500.00	3983000.00	2.51302c	(04101924)	413500.00	3982500.00	2.31756c	(04101924)
413500.00	3982000.00	2.08882c	(04101924)	413500.00	3981500.00	1.87277c	(04101924)
413500.00	3981000.00	1.77086	(04100324)	413500.00	3980500.00	1.68790	(04100324)
413500.00	3980000.00	1.60896	(04100324)	413500.00	3979500.00	1.53459	(04100324)
413500.00	3979000.00	1.46348	(04100324)	413500.00	3978000.00	1.35106	(04100324)
413500.00	3977500.00	1.31627	(04100324)	413500.00	3977000.00	1.28716	(04100324)
413500.00	3976500.00	1.25483	(04100324)	413500.00	3976000.00	1.18387	(04100324)
413500.00	3975500.00	1.14146	(04100324)	413500.00	3975000.00	1.10349	(04100324)
413500.00	3974500.00	1.06496	(04100324)	414000.00	3997500.00	0.66943c	(04012324)
414000.00	3997000.00	0.72238c	(04012324)	414000.00	3996500.00	0.78776c	(04012324)
414000.00	3996000.00	0.86729c	(04012324)	414000.00	3995500.00	0.95922c	(04012324)
414000.00	3995000.00	1.10983c	(04012324)	414000.00	3994500.00	1.18225c	(04012324)
414000.00	3994000.00	1.20786c	(04012324)	414000.00	3993500.00	1.27690c	(04012324)
414000.00	3993000.00	1.24838c	(04012324)	414000.00	3992500.00	1.21034c	(04012324)
414000.00	3992000.00	1.18800c	(04012324)	414000.00	3991500.00	1.13987c	(04012324)
414000.00	3991000.00	1.08595c	(04012324)	414000.00	3990500.00	1.15664	(04110624)
414000.00	3990000.00	1.45419	(04110624)	414000.00	3989500.00	1.71369	(04120524)
414000.00	3989000.00	1.63181	(04120524)	414000.00	3988500.00	1.20760	(04110624)
414000.00	3988000.00	1.79201	(04010324)	414000.00	3987500.00	1.94398c	(04110724)
414000.00	3987000.00	2.19469c	(04011524)	414000.00	3986500.00	2.09323c	(04011524)
414000.00	3986000.00	1.86671	(04011024)	414000.00	3985500.00	1.77254	(04012624)
414000.00	3985000.00	1.74734	(04012624)	414000.00	3984500.00	1.87627	(04012624)
414000.00	3984000.00	2.87091c	(04112324)	414000.00	3983500.00	5.83204	(04010824)
414000.00	3983000.00	4.72737	(04020224)	414000.00	3982500.00	2.61543	(04082224)

414000.00	3982000.00	2.36302 (04082224)	414000.00	3981500.00	2.35559 (04010824)
414000.00	3981000.00	2.25079 (04010824)	414000.00	3980500.00	2.07705 (04010824)
414000.00	3980000.00	1.79524 (04010824)	414000.00	3979500.00	1.44496 (04010824)
414000.00	3979000.00	1.26995 (04010824)	414000.00	3978500.00	1.10212 (04020224)
414000.00	3978000.00	1.12071c (04101924)	414000.00	3977500.00	1.13720c (04101924)
414000.00	3977000.00	1.16175c (04101924)	414000.00	3976500.00	1.12971c (04011624)
414000.00	3976000.00	1.12240c (04011624)	414000.00	3975500.00	1.03982c (04101924)
414000.00	3975000.00	1.00894c (04101924)	414000.00	3974500.00	0.97717c (04101924)
414000.00	3974000.00	1.04869 (04062224)	414000.00	3973500.00	1.21548 (04090224)
414000.00	3973000.00	1.31808 (04090224)	414500.00	3992500.00	0.80840c (04012324)
414500.00	3992000.00	0.82133 (04110624)	414500.00	3991500.00	0.84440 (04110624)
414500.00	3991000.00	0.86830 (04110624)	414500.00	3990500.00	0.89866 (04110624)
414500.00	3990000.00	0.97575 (04110624)	414500.00	3989500.00	1.17919 (04110624)
414500.00	3989000.00	1.38733 (04122124)	414500.00	3988500.00	1.40012 (04120524)
414500.00	3988000.00	1.05546 (04110624)	414500.00	3987500.00	0.99121 (04110624)
414500.00	3987000.00	1.23886 (04010324)	414500.00	3986500.00	1.50404c (04110724)
414500.00	3986000.00	1.49468c (04011524)	414500.00	3985500.00	1.64225c (04011524)
414500.00	3985000.00	1.68018c (04011524)	414500.00	3984500.00	1.63792c (04011524)
414500.00	3984000.00	1.57181c (04011524)	414500.00	3983500.00	1.79959 (04012624)
414500.00	3983000.00	2.27281 (04122124)	414500.00	3982500.00	3.22121 (04122124)
414500.00	3982000.00	15.06340c (04110724)	414500.00	3981500.00	3.17884c (04101524)
414500.00	3981000.00	2.69543c (04092524)	414500.00	3980500.00	2.55362 (04010824)
414500.00	3980000.00	2.94485 (04010824)	414500.00	3979500.00	2.86246 (04010824)
414500.00	3979000.00	2.57502 (04010824)	414500.00	3978500.00	1.99739 (04010824)
414500.00	3978000.00	1.71880 (04010824)	414500.00	3977500.00	1.43246 (04010824)
414500.00	3977000.00	1.26532c (04021324)	414500.00	3976500.00	1.17969c (04092524)
414500.00	3976000.00	1.11379c (04092524)	414500.00	3975500.00	1.21459c (04092524)
414500.00	3975000.00	1.60611 (04062224)	414500.00	3974500.00	1.92177 (04090224)
414500.00	3974000.00	1.52638 (04090224)	414500.00	3973500.00	1.25134 (04092224)
414500.00	3973000.00	0.96799 (04092224)	414500.00	3972500.00	0.86217 (04100324)
414500.00	3972000.00	0.84731 (04100324)	414500.00	3971500.00	0.82794 (04100324)
415000.00	3991000.00	0.75679c (04020324)	415000.00	3990500.00	0.80271c (04020324)
415000.00	3990000.00	0.82155c (04020324)	415000.00	3989500.00	0.85268 (04110624)
415000.00	3989000.00	0.97500 (04110624)	415000.00	3988500.00	1.17402 (04122124)
415000.00	3988000.00	1.25365 (04120524)	415000.00	3987500.00	1.02267 (04110624)
415000.00	3987000.00	0.92851 (04110624)	415000.00	3986500.00	0.91915 (04110624)
415000.00	3986000.00	0.96078 (04122124)	415000.00	3985500.00	1.16958c (04110724)
415000.00	3985000.00	1.18808c (04110724)	415000.00	3984500.00	1.29636c (04011524)
415000.00	3984000.00	1.43563c (04011524)	415000.00	3983500.00	1.55434c (04011524)
415000.00	3983000.00	1.59491c (04011524)	415000.00	3982500.00	1.67757 (04012624)
415000.00	3982000.00	1.91979 (04122124)	415000.00	3981500.00	2.56050 (04122124)
415000.00	3981000.00	4.67546 (04122124)	415000.00	3980500.00	5.78890c (04011524)
415000.00	3980000.00	3.06591c (04101524)	415000.00	3979500.00	2.26190 (04010824)
415000.00	3979000.00	2.43775 (04010824)	415000.00	3978500.00	3.73871 (04010824)
415000.00	3978000.00	4.40856 (04010824)	415000.00	3977500.00	3.68930 (04010824)
415000.00	3977000.00	2.79469 (04010824)	415000.00	3976500.00	2.21944 (04020224)
415000.00	3976000.00	3.46064 (04090224)	415000.00	3975500.00	2.43086 (04092224)
415000.00	3975000.00	1.45152c (04092524)	415000.00	3974500.00	1.30087c (04092524)
415000.00	3974000.00	1.17370c (04092524)	415000.00	3973500.00	1.10717c (04092524)
415000.00	3973000.00	1.00852c (04092524)	415000.00	3972500.00	0.92128c (04092524)
415000.00	3972000.00	0.86848c (04092524)	415000.00	3971500.00	0.87660c (04111524)
415000.00	3971000.00	0.88256c (04111524)	415000.00	3970500.00	0.88480c (04111524)
415000.00	3970000.00	0.88357c (04111524)	415500.00	3985500.00	0.97413c (04012324)
415500.00	3985000.00	1.01955c (04012324)	415500.00	3984500.00	1.06875c (04012324)
415500.00	3984000.00	1.13076c (04012324)	415500.00	3983500.00	1.21992c (04012324)
415500.00	3983000.00	1.27485c (04012324)	415500.00	3982500.00	1.38201c (04012324)
415500.00	3982000.00	1.49488c (04011524)	415500.00	3981500.00	1.57216c (04011524)
415500.00	3981000.00	1.72761 (04110624)	415500.00	3980500.00	2.17403 (04122124)
415500.00	3980000.00	3.13952 (04122124)	415500.00	3979500.00	7.11205c (04110724)
415500.00	3979000.00	4.10117c (04081024)	415500.00	3978500.00	3.10614c (04081024)
415500.00	3978000.00	3.11685c (04081024)	415500.00	3977500.00	4.93464 (04090224)
415500.00	3977000.00	3.82557c (04012324)	415500.00	3976500.00	9.06401 (04010824)
415500.00	3976000.00	7.15472 (04010824)	415500.00	3975500.00	3.86332 (04100324)
415500.00	3975000.00	3.18584 (04100324)	415500.00	3974500.00	2.72171 (04100324)
415500.00	3974000.00	2.33461 (04100324)	415500.00	3973500.00	2.11030 (04100324)
415500.00	3973000.00	1.93902 (04100324)	415500.00	3972500.00	1.80052 (04100324)
415500.00	3972000.00	1.68243 (04100324)	415500.00	3971500.00	1.57782 (04100324)
415500.00	3971000.00	1.48949 (04100324)	415500.00	3970500.00	1.41094 (04100324)
415500.00	3970000.00	1.34084 (04100324)	415500.00	3969500.00	1.27885 (04100324)
415500.00	3969000.00	1.22740 (04100324)	415500.00	3968500.00	1.18105 (04100324)
415500.00	3968000.00	1.13940 (04100324)	416000.00	3984500.00	0.84626 (04110624)
416000.00	3984000.00	0.87807 (04110624)	416000.00	3983500.00	0.98760c (04010224)
416000.00	3983000.00	1.05743c (04010224)	416000.00	3982500.00	1.14720c (04010224)
416000.00	3982000.00	1.33999c (04010224)	416000.00	3981500.00	1.59925c (04010224)
416000.00	3981000.00	1.84444c (04010224)	416000.00	3980500.00	2.41393c (04012324)
416000.00	3980000.00	3.84624c (04012324)	416000.00	3979500.00	7.50297c (04012324)
416000.00	3979000.00	10.87634 (04120524)	416000.00	3978500.00	6.01816c (04110724)
416000.00	3978000.00	4.48420c (04011524)	416000.00	3977500.00	3.67352c (04011524)
416000.00	3977000.00	2.79787 (04011024)	416000.00	3976500.00	2.37601 (04011024)
416000.00	3976000.00	2.32238 (04012624)	416000.00	3975500.00	2.59585c (04110724)
416000.00	3975000.00	3.49925c (04110724)	416000.00	3974500.00	6.73186 (04010824)

416000.00	3974000.00	4.46315	(04010824)	416000.00	3973500.00	2.97934	(04100324)
416000.00	3973000.00	2.53302	(04100324)	416000.00	3972500.00	2.28295	(04100324)
416000.00	3972000.00	2.09796	(04100324)	416000.00	3971500.00	1.95918	(04100324)
416000.00	3971000.00	1.85036	(04100324)	416000.00	3970500.00	1.75629	(04100324)
416000.00	3970000.00	1.66428	(04100324)	416000.00	3969500.00	1.58574	(04100324)
416000.00	3969000.00	1.51502	(04100324)	416000.00	3968500.00	1.44699	(04100324)
416000.00	3968000.00	1.38217	(04100324)	416000.00	3967500.00	1.32280	(04100324)
416000.00	3967000.00	1.26852	(04100324)	416000.00	3966500.00	1.22208	(04100324)
416500.00	3983000.00	1.66975c	(04012324)	416500.00	3982500.00	1.84879c	(04012324)
416500.00	3982000.00	1.77542c	(04012324)	416500.00	3981500.00	1.36669c	(04012324)
416500.00	3981000.00	1.51128	(04110624)	416500.00	3980500.00	2.09006c	(04010524)
416500.00	3980000.00	1.73852c	(04010524)	416500.00	3979500.00	1.58338	(04110624)
416500.00	3979000.00	1.80051	(04110624)	416500.00	3978500.00	3.25030	(04122124)
416500.00	3978000.00	1.41554	(04110624)	416500.00	3977500.00	2.70757c	(04110724)
416500.00	3977000.00	3.02037c	(04110724)	416500.00	3976500.00	2.86518c	(04011524)
416500.00	3976000.00	2.60051	(04011024)	416500.00	3975500.00	2.26127c	(04011524)
416500.00	3975000.00	1.95305	(04011024)	416500.00	3974500.00	2.01724	(04012624)
416500.00	3974000.00	2.34329	(04012624)	416500.00	3973500.00	2.80095	(04122124)
416500.00	3973000.00	6.56785c	(04020924)	416500.00	3972500.00	5.69486	(04010824)
416500.00	3972000.00	2.79369	(04020224)	416500.00	3971500.00	2.13564	(04020224)
416500.00	3971000.00	1.75355	(04100324)	416500.00	3970500.00	1.57670	(04100324)
416500.00	3970000.00	1.44948	(04100324)	416500.00	3969500.00	1.35739	(04100324)
416500.00	3969000.00	1.28358	(04100324)	416500.00	3968500.00	1.22688	(04100324)
416500.00	3968000.00	1.18502	(04100324)	416500.00	3967500.00	1.15379	(04100324)
416500.00	3967000.00	1.12961	(04100324)	416500.00	3966500.00	1.10584	(04100324)
416500.00	3966000.00	1.08000	(04100324)	416500.00	3965500.00	1.05662	(04100324)
416500.00	3965000.00	1.03556	(04100324)	417000.00	3982000.00	1.19431	(04110624)
417000.00	3981500.00	1.15037c	(04010524)	417000.00	3981000.00	1.10137c	(04010524)
417000.00	3980500.00	1.11426	(04110624)	417000.00	3980000.00	1.22111	(04110624)
417000.00	3979500.00	1.31131	(04110624)	417000.00	3979000.00	1.49793	(04110624)
417000.00	3978500.00	1.38066	(04110624)	417000.00	3978000.00	2.06942	(04122124)
417000.00	3977500.00	1.52127	(04120524)	417000.00	3977000.00	1.11909c	(04120824)
417000.00	3976500.00	1.71221c	(04110724)	417000.00	3976000.00	2.19673c	(04110724)
417000.00	3975500.00	2.17863c	(04011524)	417000.00	3975000.00	2.31113c	(04011524)
417000.00	3974500.00	2.17022c	(04011524)	417000.00	3974000.00	1.98164	(04011024)
417000.00	3973500.00	1.89068	(04012624)	417000.00	3973000.00	2.04121	(04012624)
417000.00	3972500.00	2.23132	(04012624)	417000.00	3972000.00	3.02414	(04122124)
417000.00	3971500.00	5.90230c	(04020924)	417000.00	3971000.00	8.23833	(04010824)
417000.00	3970500.00	3.41553	(04020224)	417000.00	3970000.00	2.35306	(04020224)
417000.00	3969500.00	1.84893	(04100324)	417000.00	3969000.00	1.62751	(04100324)
417000.00	3968500.00	1.47931	(04100324)	417000.00	3968000.00	1.35814	(04100324)
417000.00	3967500.00	1.26267	(04100324)	417000.00	3967000.00	1.18493	(04100324)
417000.00	3966500.00	1.12383	(04100324)	417000.00	3966000.00	1.07108	(04100324)
417000.00	3965500.00	1.02809	(04100324)	417000.00	3965000.00	0.99523	(04100324)
417000.00	3964500.00	0.96683	(04100324)	417000.00	3964000.00	0.94018	(04100324)
417000.00	3963500.00	0.91848	(04100324)	417500.00	3980500.00	0.94338	(04110624)
417500.00	3980000.00	1.02285	(04110624)	417500.00	3979500.00	1.12153	(04110624)
417500.00	3979000.00	1.29366	(04110624)	417500.00	3978500.00	1.35548	(04110624)
417500.00	3978000.00	1.27053	(04110624)	417500.00	3977500.00	1.61749	(04122124)
417500.00	3977000.00	1.57067	(04120524)	417500.00	3976500.00	1.02486	(04110624)
417500.00	3976000.00	1.00063c	(04120824)	417500.00	3975500.00	1.27512c	(04110724)
417500.00	3975000.00	1.71972c	(04110724)	417500.00	3974500.00	1.74601c	(04110724)
417500.00	3974000.00	1.91537c	(04011524)	417500.00	3973500.00	1.94343c	(04011524)
417500.00	3973000.00	1.91362c	(04011524)	417500.00	3972500.00	1.85004c	(04011524)
417500.00	3972000.00	1.85866	(04012624)	417500.00	3971500.00	1.95063	(04012624)
417500.00	3971000.00	2.18688	(04012624)	417500.00	3970500.00	2.90438c	(04110724)
417500.00	3970000.00	4.57554c	(04110724)	417500.00	3969500.00	18.72365	(04010824)
417500.00	3969000.00	4.35570	(04020224)	417500.00	3968500.00	2.73137	(04020224)
417500.00	3968000.00	2.01173	(04100324)	417500.00	3967500.00	1.74007	(04100324)
417500.00	3967000.00	1.54243	(04100324)	417500.00	3966500.00	1.40174	(04100324)
417500.00	3966000.00	1.29375	(04100324)	417500.00	3965500.00	1.21085	(04100324)
417500.00	3965000.00	1.14608	(04100324)	417500.00	3964500.00	1.09166	(04100324)
417500.00	3964000.00	1.03530	(04100324)	417500.00	3963500.00	0.99374	(04100324)
417500.00	3963000.00	0.96289	(04100324)	417500.00	3962500.00	0.93536	(04100324)
417500.00	3962000.00	0.91150	(04100324)	417500.00	3961500.00	0.88892	(04100324)
417500.00	3961000.00	0.87194	(04100324)	418000.00	3979500.00	0.97135	(04110624)
418000.00	3979000.00	1.10250	(04110624)	418000.00	3978500.00	1.23575	(04110624)
418000.00	3978000.00	1.14716	(04110624)	418000.00	3977500.00	1.19779	(04110624)
418000.00	3976000.00	1.06104	(04110624)	418000.00	3975500.00	0.94735	(04110624)
418000.00	3975000.00	0.90521	(04110624)	418000.00	3974500.00	1.04562c	(04110724)
418000.00	3974000.00	1.40875c	(04110724)	418000.00	3973500.00	1.58824c	(04110724)
418000.00	3973000.00	1.54011c	(04011524)	418000.00	3972500.00	1.68497c	(04011524)
418000.00	3972000.00	1.74903c	(04011524)	418000.00	3971500.00	1.74340c	(04120824)
418000.00	3971000.00	1.72850c	(04120824)	418000.00	3970500.00	1.74632	(04012624)
418000.00	3970000.00	1.90967	(04012624)	418000.00	3969500.00	2.24738c	(04110724)
418000.00	3969000.00	2.80021c	(04110724)	418000.00	3968500.00	3.98408c	(04110724)
418000.00	3968000.00	8.21561c	(04110724)	418000.00	3967500.00	5.37119	(04020224)
418000.00	3967000.00	3.06410	(04020224)	418000.00	3966500.00	2.15115	(04020224)
418000.00	3966000.00	1.74309	(04100324)	418000.00	3965500.00	1.54811	(04100324)
418000.00	3965000.00	1.41033	(04100324)	418000.00	3964500.00	1.30486	(04100324)
418000.00	3964000.00	1.22962	(04100324)	418000.00	3963500.00	1.16356	(04100324)

418000.00	3963000.00	1.10960	(04100324)	418000.00	3962500.00	1.05771	(04100324)
418000.00	3962000.00	1.01072	(04100324)	418000.00	3961500.00	0.97336	(04100324)
418000.00	3961000.00	0.94649	(04100324)	418000.00	3960500.00	0.92040	(04100324)
418000.00	3960000.00	0.88999	(04100324)	418000.00	3959500.00	0.85925	(04100324)
418000.00	3959000.00	0.74873c	(04111524)	418000.00	3958500.00	0.72964c	(04111524)
418500.00	3974000.00	0.87515	(04110624)	418500.00	3973500.00	0.94118	(04110624)
418500.00	3973000.00	1.21004c	(04110724)	418500.00	3972500.00	1.40368c	(04110724)
418500.00	3972000.00	1.36283c	(04110724)	418500.00	3971500.00	1.47083c	(04011524)
418500.00	3971000.00	1.54810c	(04011524)	418500.00	3970500.00	1.58219c	(04120824)
418500.00	3970000.00	1.63902c	(04120824)	418500.00	3969500.00	1.62271c	(04120824)
418500.00	3969000.00	1.67940	(04012624)	418500.00	3968500.00	1.87923	(04012624)
418500.00	3968000.00	2.20368c	(04110724)	418500.00	3967500.00	2.69890c	(04110724)
418500.00	3967000.00	3.50122c	(04110724)	418500.00	3966500.00	6.21678c	(04011524)
418500.00	3966000.00	6.81937	(04010824)	418500.00	3965500.00	3.38962	(04020224)
418500.00	3965000.00	2.36577	(04020224)	418500.00	3964500.00	1.75435	(04020224)
418500.00	3964000.00	1.55675	(04100324)	418500.00	3963500.00	1.41055	(04100324)
418500.00	3963000.00	1.30446	(04100324)	418500.00	3962500.00	1.21862	(04100324)
418500.00	3962000.00	1.15595	(04100324)	418500.00	3961500.00	1.11192	(04100324)
418500.00	3961000.00	1.06817	(04100324)	418500.00	3960500.00	1.02553	(04100324)
418500.00	3960000.00	0.97592	(04100324)	418500.00	3959500.00	0.90779	(04100324)
418500.00	3959000.00	0.80737c	(04111524)	418500.00	3958500.00	0.80432c	(04111524)
418500.00	3958000.00	0.79636c	(04111524)	419000.00	3972500.00	0.96503	(04110624)
419000.00	3972000.00	1.05572c	(04110724)	419000.00	3971500.00	1.22604c	(04110724)
419000.00	3971000.00	1.28137c	(04110724)	419000.00	3970500.00	1.26397c	(04011524)
419000.00	3970000.00	1.37406c	(04011524)	419000.00	3969500.00	1.42078c	(04011524)
419000.00	3969000.00	1.47384c	(04120824)	419000.00	3968500.00	1.52954c	(04120824)
419000.00	3968000.00	1.57556c	(04120824)	419000.00	3967500.00	1.63263	(04012624)
419000.00	3967000.00	1.86555c	(04110724)	419000.00	3966500.00	2.17819c	(04110724)
419000.00	3966000.00	2.56545c	(04110724)	419000.00	3965500.00	3.25667c	(04110724)
419000.00	3965000.00	5.25901c	(04011524)	419000.00	3964500.00	16.69925	(04010824)
419000.00	3964000.00	3.89673	(04020224)	419000.00	3963500.00	2.59212	(04020224)
419000.00	3963000.00	1.96315	(04020224)	419000.00	3962500.00	1.69145	(04100324)
419000.00	3962000.00	1.52342	(04100324)	419000.00	3961500.00	1.39839	(04100324)
419000.00	3961000.00	1.31054	(04100324)	419000.00	3960500.00	1.23656	(04100324)
419000.00	3960000.00	1.17774	(04100324)	419000.00	3959500.00	1.00237	(04090224)
419000.00	3959000.00	0.94132c	(04111524)	419000.00	3958500.00	0.90527c	(04111524)
419000.00	3958000.00	0.87506c	(04111524)	419000.00	3957500.00	0.80732	(04100324)
419500.00	3971000.00	1.00802	(04110624)	419500.00	3970500.00	1.09429c	(04110724)
419500.00	3970000.00	1.19753c	(04110724)	419500.00	3969500.00	1.19405	(04110624)
419500.00	3969000.00	1.22571	(04110624)	419500.00	3968500.00	1.25344c	(04011524)
419500.00	3968000.00	1.32835c	(04120824)	419500.00	3967500.00	1.41461c	(04120824)
419500.00	3967000.00	1.45701c	(04120824)	419500.00	3966500.00	1.52053c	(04120824)
419500.00	3966000.00	1.62402c	(04110724)	419500.00	3965500.00	1.86290c	(04110724)
419500.00	3965000.00	2.12534c	(04110724)	419500.00	3964500.00	2.42583c	(04110724)
419500.00	3964000.00	3.09208c	(04110724)	419500.00	3963500.00	4.23091c	(04110724)
419500.00	3963000.00	8.72278c	(04011524)	419500.00	3962500.00	4.85091	(04010824)
419500.00	3962000.00	2.98640	(04020224)	419500.00	3961500.00	2.27612	(04020224)
419500.00	3961000.00	1.94520	(04100324)	419500.00	3960500.00	1.75521	(04100324)
419500.00	3960000.00	1.57983	(04100324)	419500.00	3959500.00	1.24138c	(04111524)
419500.00	3959000.00	1.18234c	(04111524)	419500.00	3958500.00	0.99634	(04100324)
419500.00	3958000.00	0.79359c	(04111524)	419500.00	3957500.00	0.76404c	(04111524)
419500.00	3957000.00	0.74232c	(04111524)	420000.00	3969000.00	1.13636	(04110624)
420000.00	3968500.00	1.17014	(04110624)	420000.00	3968000.00	1.19169	(04110624)
420000.00	3967500.00	1.21894	(04110624)	420000.00	3967000.00	1.24893	(04110624)
420000.00	3966500.00	1.27898c	(04120824)	420000.00	3966000.00	1.35221c	(04120824)
420000.00	3965500.00	1.42219c	(04120824)	420000.00	3965000.00	1.48754c	(04120824)
420000.00	3964500.00	1.64349c	(04110724)	420000.00	3964000.00	1.80921c	(04110724)
420000.00	3963500.00	2.02668c	(04110724)	420000.00	3963000.00	2.35187c	(04110724)
420000.00	3962500.00	2.83143c	(04110724)	420000.00	3962000.00	3.64136c	(04110724)
420000.00	3961500.00	5.34548c	(04011524)	420000.00	3961000.00	6.90124c	(04011524)
420000.00	3960500.00	10.28403c	(04110724)	420000.00	3960000.00	5.15399c	(04111524)
420000.00	3959500.00	2.53721	(04100324)	420000.00	3959000.00	1.93018	(04100324)
420000.00	3958500.00	1.51897	(04100324)	420000.00	3958000.00	1.25694	(04100324)
420000.00	3957500.00	1.07938	(04100324)	420000.00	3957000.00	0.95125	(04100324)
420500.00	3967500.00	1.14944	(04110624)	420500.00	3967000.00	1.17082	(04110624)
420500.00	3966500.00	1.19195	(04110624)	420500.00	3966000.00	1.20819	(04110624)
420500.00	3965500.00	1.23321	(04110624)	420500.00	3965000.00	1.26959	(04110624)
420500.00	3964500.00	1.34408	(04110624)	420500.00	3964000.00	1.40572	(04110624)
420500.00	3963500.00	1.45123c	(04110724)	420500.00	3963000.00	1.60375c	(04110724)
420500.00	3962500.00	1.76874c	(04110724)	420500.00	3962000.00	1.95595c	(04110724)
420500.00	3961500.00	2.24563c	(04110724)	420500.00	3961000.00	2.52514c	(04110724)
420500.00	3960500.00	2.97724c	(04110724)	420500.00	3960000.00	3.71012c	(04011524)
420500.00	3959500.00	3.43594c	(04011524)	420500.00	3959000.00	3.15826	(04011024)
420500.00	3958500.00	1.87441	(04011024)	420500.00	3958000.00	0.90012	(04011024)
420500.00	3957500.00	0.58472	(04012624)	420500.00	3957000.00	0.45182	(04012624)
421000.00	3966000.00	1.17129	(04110624)	421000.00	3965500.00	1.19242	(04110624)
421000.00	3965000.00	1.20434	(04110624)	421000.00	3964500.00	1.22879	(04110624)
421000.00	3964000.00	1.25998	(04110624)	421000.00	3963500.00	1.27957	(04110624)
421000.00	3963000.00	1.28916c	(04120824)	421000.00	3962500.00	1.34106c	(04120824)
421000.00	3962000.00	1.44339c	(04110724)	421000.00	3961500.00	1.56186c	(04110724)
421000.00	3961000.00	1.71311c	(04110724)	421000.00	3960500.00	1.87166c	(04110724)

421000.00	3960000.00	1.86910c (04110724)	421000.00	3959500.00	2.09288c (04110724)
421000.00	3959000.00	2.26867c (04110724)	421000.00	3958500.00	2.31292c (04011524)
421000.00	3958000.00	2.49471c (04011524)	421000.00	3957500.00	2.19895c (04011524)
421000.00	3957000.00	1.67862 (04011024)	421500.00	3964000.00	1.04125 (04110624)
421500.00	3963500.00	1.05725 (04110624)	421500.00	3963000.00	1.08093 (04110624)
421500.00	3962500.00	1.12748c (04120824)	421500.00	3962000.00	1.18969c (04120824)
421500.00	3961500.00	1.25190c (04120824)	421500.00	3961000.00	1.29473c (04110724)
421500.00	3960500.00	1.40573c (04110724)	421500.00	3960000.00	1.41625c (04110724)
421500.00	3959500.00	1.46807c (04110724)	421500.00	3959000.00	1.59678c (04110724)
421500.00	3958500.00	1.73393c (04110724)	421500.00	3958000.00	1.62890c (04110724)
421500.00	3957500.00	1.75427c (04011524)	421500.00	3957000.00	1.92403c (04011524)
422000.00	3962000.00	1.05829 (04110624)	422000.00	3961500.00	1.07239 (04110624)
422000.00	3961000.00	1.09069c (04120824)	422000.00	3960500.00	1.14213c (04120824)
422000.00	3960000.00	1.19399c (04120824)	422000.00	3959500.00	1.23699c (04120824)
422000.00	3959000.00	1.23604c (04110724)	422000.00	3958500.00	1.31673c (04110724)
422000.00	3958000.00	1.41563c (04110724)	422000.00	3957500.00	1.37792c (04110724)
422000.00	3957000.00	1.37198c (04110724)	422500.00	3959500.00	1.05623c (04120824)
422500.00	3959000.00	1.01553c (04120824)	422500.00	3958500.00	1.05065c (04110724)
422500.00	3958000.00	1.11379c (04110724)	422500.00	3957500.00	1.19773c (04110724)
422500.00	3957000.00	1.20301c (04110724)	423000.00	3959000.00	0.91580 (04110624)
423000.00	3958500.00	0.84392 (04122124)	423000.00	3958000.00	0.88946c (04110724)
423000.00	3957500.00	0.94315c (04110724)	423000.00	3957000.00	1.01774c (04110724)
423500.00	3959000.00	0.93260 (04110624)	423500.00	3958500.00	0.80710 (04122124)
423500.00	3958000.00	0.77235 (04122124)	423500.00	3957500.00	0.76882c (04110724)
423500.00	3957000.00	0.80583c (04110724)	424000.00	3958500.00	0.80506 (04110624)
424000.00	3958000.00	0.75798 (04122124)	424000.00	3957500.00	0.73674 (04122124)
424000.00	3957000.00	0.71664 (04122124)	424500.00	3958000.00	0.75559 (04122124)
424500.00	3957500.00	0.73103 (04122124)	424500.00	3957000.00	0.71615 (04122124)
425000.00	3958000.00	0.74589 (04122124)	425000.00	3957500.00	0.72007 (04122124)
425000.00	3957000.00	0.71079 (04122124)	425500.00	3958000.00	0.77088 (04110624)
425500.00	3957500.00	0.70094 (04122124)	425500.00	3957000.00	0.69237 (04110624)

**Output Data for Particulate Matter (VOC)**

\*\*\* THE ANNUAL ( 1 YRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*

\*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

** CONC OF CO		IN MICROGRAMS/M**3		**	
X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
411000.00	3997500.00	0.26050	411000.00	3997000.00	0.39961
411000.00	3996500.00	0.48870	411000.00	3996000.00	0.86279
411000.00	3995500.00	1.46336	411000.00	3995000.00	1.58008
411000.00	3994500.00	1.48796	411000.00	3994000.00	1.60978
411000.00	3993500.00	1.77755	411000.00	3993000.00	1.92371
411000.00	3992500.00	1.80977	411000.00	3992000.00	1.77878
411000.00	3991500.00	1.81911	411000.00	3991000.00	1.71906
411000.00	3990500.00	1.45258	411000.00	3990000.00	1.24753
411000.00	3989500.00	1.13756	411000.00	3989000.00	1.10518
411000.00	3988500.00	1.09453	411000.00	3988000.00	1.10960
411000.00	3987500.00	1.12263	411000.00	3987000.00	1.12491
411000.00	3986500.00	1.12793	411000.00	3986000.00	1.12563
411000.00	3985500.00	1.11677	411000.00	3985000.00	1.10353
411500.00	3997500.00	0.19781	411500.00	3997000.00	0.35903
411500.00	3996500.00	0.37827	411500.00	3996000.00	0.96563
411500.00	3995500.00	1.96564	411500.00	3995000.00	1.97659
411500.00	3994500.00	2.56754	411500.00	3994000.00	3.03021
411500.00	3993500.00	2.94232	411500.00	3993000.00	3.49984
411500.00	3992500.00	3.22605	411500.00	3992000.00	2.34318
411500.00	3991500.00	1.91991	411500.00	3991000.00	1.76405
411500.00	3990500.00	1.64786	411500.00	3990000.00	1.60271
411500.00	3989500.00	1.56885	411500.00	3989000.00	1.51405
411500.00	3988500.00	1.44676	411500.00	3988000.00	1.40290
411500.00	3987500.00	1.39629	411500.00	3987000.00	1.40631
411500.00	3986500.00	1.41855	411500.00	3986000.00	1.42399
411500.00	3985500.00	1.44765	411500.00	3985000.00	1.41567
411500.00	3984500.00	1.37400	411500.00	3984000.00	1.32364
411500.00	3983500.00	1.20821	412000.00	3997500.00	0.22810
412000.00	3997000.00	0.30342	412000.00	3996500.00	0.46128
412000.00	3996000.00	1.19079	412000.00	3995500.00	8.39463
412000.00	3995000.00	5.62185	412000.00	3994500.00	8.26266
412000.00	3994000.00	7.88707	412000.00	3993500.00	5.76800
412000.00	3993000.00	5.10974	412000.00	3992500.00	14.20232
412000.00	3992000.00	4.89222	412000.00	3991500.00	3.66795
412000.00	3991000.00	2.97066	412000.00	3990500.00	2.62631
412000.00	3990000.00	2.37122	412000.00	3989500.00	2.26184
412000.00	3989000.00	2.20075	412000.00	3988500.00	2.13597
412000.00	3988000.00	2.01620	412000.00	3987500.00	1.89369
412000.00	3987000.00	1.85061	412000.00	3986500.00	1.86677
412000.00	3986000.00	1.85467	412000.00	3985500.00	1.82132
412000.00	3985000.00	1.75920	412000.00	3984500.00	1.71474
412000.00	3984000.00	1.64039	412000.00	3983500.00	1.52488

412000.00	3983000.00	1.38253	412000.00	3982500.00	1.30889
412000.00	3982000.00	1.22287	412500.00	3997500.00	0.20400
412500.00	3997000.00	0.27253	412500.00	3996500.00	0.30802
412500.00	3996000.00	0.50050	412500.00	3995500.00	1.41952
412500.00	3995000.00	2.60025	412500.00	3994500.00	2.41234
412500.00	3994000.00	2.61356	412500.00	3993500.00	2.28254
412500.00	3993000.00	2.12751	412500.00	3992500.00	2.47978
412500.00	3992000.00	4.06862	412500.00	3991500.00	9.35069
412500.00	3991000.00	5.33838	412500.00	3990500.00	3.43972
412500.00	3990000.00	2.78261	412500.00	3989500.00	2.69963
412500.00	3989000.00	2.69115	412500.00	3988500.00	2.78623
412500.00	3988000.00	2.88991	412500.00	3987500.00	2.89028
412500.00	3987000.00	2.79339	412500.00	3986500.00	2.55923
412500.00	3986000.00	2.45976	412500.00	3985500.00	2.32272
412500.00	3985000.00	2.23517	412500.00	3984500.00	2.14202
412500.00	3984000.00	1.97533	412500.00	3983500.00	1.84666
412500.00	3983000.00	1.70560	412500.00	3982500.00	1.54428
412500.00	3982000.00	1.43939	412500.00	3981500.00	1.36349
412500.00	3981000.00	1.35012	412500.00	3980500.00	1.29605
413000.00	3997500.00	0.24187	413000.00	3997000.00	0.25749
413000.00	3996500.00	0.26359	413000.00	3996000.00	0.27931
413000.00	3995500.00	0.68681	413000.00	3995000.00	0.95718
413000.00	3994500.00	1.49639	413000.00	3994000.00	1.56530
413000.00	3993500.00	1.47321	413000.00	3993000.00	1.68219
413000.00	3992500.00	1.88119	413000.00	3992000.00	2.07046
413000.00	3991500.00	2.80718	413000.00	3991000.00	4.09088
413000.00	3990500.00	5.91839	413000.00	3990000.00	8.47252
413000.00	3989500.00	6.71585	413000.00	3989000.00	6.30242
413000.00	3988500.00	5.96847	413000.00	3988000.00	5.70944
413000.00	3987500.00	5.59860	413000.00	3987000.00	5.54375
413000.00	3986500.00	5.66295	413000.00	3986000.00	5.38814
413000.00	3985500.00	4.30986	413000.00	3985000.00	3.72667
413000.00	3984500.00	3.03904	413000.00	3984000.00	2.49292
413000.00	3983500.00	2.49301	413000.00	3983000.00	2.25901
413000.00	3982500.00	2.08192	413000.00	3982000.00	1.91126
413000.00	3981500.00	1.78113	413000.00	3981000.00	1.68533
413000.00	3980500.00	1.61877	413000.00	3980000.00	1.47635
413000.00	3979500.00	1.39467	413500.00	3997500.00	0.18145
413500.00	3997000.00	0.18277	413500.00	3996500.00	0.18823
413500.00	3996000.00	0.21968	413500.00	3995500.00	0.29605
413500.00	3995000.00	0.75472	413500.00	3994500.00	0.74626
413500.00	3994000.00	1.05946	413500.00	3993500.00	1.26701
413500.00	3993000.00	1.12359	413500.00	3992500.00	1.17679
413500.00	3992000.00	1.44687	413500.00	3991500.00	1.61497
413500.00	3991000.00	2.06561	413500.00	3990500.00	2.68285
413500.00	3990000.00	3.28904	413500.00	3989500.00	3.04611
413500.00	3989000.00	3.75061	413500.00	3988500.00	3.75522
413500.00	3988000.00	3.52863	413500.00	3987500.00	3.40257
413500.00	3987000.00	3.35339	413500.00	3986500.00	3.41135
413500.00	3986000.00	3.58295	413500.00	3985500.00	4.33065
413500.00	3985000.00	5.75998	413500.00	3984500.00	9.10693
413500.00	3984000.00	5.30698	413500.00	3983500.00	3.62270
413500.00	3983000.00	2.95826	413500.00	3982500.00	2.65797
413500.00	3982000.00	2.42290	413500.00	3981500.00	2.17039
413500.00	3981000.00	2.01489	413500.00	3980500.00	1.94703
413500.00	3980000.00	1.78506	413500.00	3979500.00	1.63290
413500.00	3979000.00	1.53840	413500.00	3978000.00	1.43145
413500.00	3977500.00	1.44999	413500.00	3977000.00	1.45256
413500.00	3976500.00	1.42364	413500.00	3976000.00	1.33176
413500.00	3975500.00	1.29004	413500.00	3975000.00	1.22049
413500.00	3974500.00	1.17973	414000.00	3997500.00	0.14501
414000.00	3997000.00	0.15014	414000.00	3996500.00	0.17516
414000.00	3996000.00	0.18932	414000.00	3995500.00	0.21910
414000.00	3995000.00	0.56076	414000.00	3994500.00	0.64030
414000.00	3994000.00	0.59701	414000.00	3993500.00	0.83069
414000.00	3993000.00	1.04828	414000.00	3992500.00	1.00974
414000.00	3992000.00	1.09335	414000.00	3991500.00	1.16859
414000.00	3991000.00	1.31351	414000.00	3990500.00	1.57519
414000.00	3990000.00	1.99826	414000.00	3989500.00	2.21862
414000.00	3989000.00	2.16635	414000.00	3988500.00	1.79219
414000.00	3988000.00	2.18816	414000.00	3987500.00	2.38970
414000.00	3987000.00	2.37519	414000.00	3986500.00	2.34879
414000.00	3986000.00	2.32405	414000.00	3985500.00	2.37224
414000.00	3985000.00	2.55457	414000.00	3984500.00	3.01581
414000.00	3984000.00	4.83992	414000.00	3983500.00	7.39965
414000.00	3983000.00	6.88763	414000.00	3982500.00	3.94113
414000.00	3982000.00	3.05221	414000.00	3981500.00	2.64381
414000.00	3981000.00	2.23870	414000.00	3980500.00	2.10394
414000.00	3980000.00	1.99753	414000.00	3979500.00	1.77157
414000.00	3979000.00	1.65590	414000.00	3978500.00	1.59054
414000.00	3978000.00	1.57190	414000.00	3977500.00	1.59534

414000.00	3977000.00	1.63907	414000.00	3976500.00	1.56863
414000.00	3976000.00	1.46579	414000.00	3975500.00	1.38394
414000.00	3975000.00	1.34211	414000.00	3974500.00	1.35367
414000.00	3974000.00	1.40617	414000.00	3973500.00	1.41290
414000.00	3973000.00	1.38446	414500.00	3992500.00	0.91515
414500.00	3992000.00	0.98535	414500.00	3991500.00	1.01302
414500.00	3991000.00	1.05631	414500.00	3990500.00	1.11163
414500.00	3990000.00	1.27676	414500.00	3989500.00	1.55210
414500.00	3989000.00	1.75402	414500.00	3988500.00	1.76857
414500.00	3988000.00	1.44837	414500.00	3987500.00	1.42193
414500.00	3987000.00	1.63352	414500.00	3986500.00	1.82086
414500.00	3986000.00	1.85216	414500.00	3985500.00	1.88321
414500.00	3985000.00	1.94275	414500.00	3984500.00	2.09204
414500.00	3984000.00	2.24110	414500.00	3983500.00	2.84863
414500.00	3983000.00	3.63712	414500.00	3982500.00	5.13287
414500.00	3982000.00	16.07157	414500.00	3981500.00	5.32111
414500.00	3981000.00	3.74928	414500.00	3980500.00	2.81732
414500.00	3980000.00	2.56558	414500.00	3979500.00	2.19494
414500.00	3979000.00	1.97971	414500.00	3978500.00	1.88223
414500.00	3978000.00	1.92088	414500.00	3977500.00	1.92648
414500.00	3977000.00	1.93920	414500.00	3976500.00	1.80448
414500.00	3976000.00	1.67415	414500.00	3975500.00	1.70437
414500.00	3975000.00	1.83912	414500.00	3974500.00	1.81607
414500.00	3974000.00	1.68030	414500.00	3973500.00	1.49120
414500.00	3973000.00	1.36073	414500.00	3972500.00	1.28875
414500.00	3972000.00	1.24066	414500.00	3971500.00	1.19254
415000.00	3991000.00	0.95826	415000.00	3990500.00	0.97528
415000.00	3990000.00	0.97755	415000.00	3989500.00	1.08741
415000.00	3989000.00	1.22428	415000.00	3988500.00	1.45871
415000.00	3988000.00	1.53274	415000.00	3987500.00	1.32437
415000.00	3987000.00	1.21011	415000.00	3986500.00	1.24411
415000.00	3986000.00	1.37654	415000.00	3985500.00	1.52118
415000.00	3985000.00	1.62026	415000.00	3984500.00	1.67787
415000.00	3984000.00	1.81175	415000.00	3983500.00	2.02823
415000.00	3983000.00	2.24705	415000.00	3982500.00	2.67749
415000.00	3982000.00	3.16137	415000.00	3981500.00	4.06351
415000.00	3981000.00	6.63774	415000.00	3980500.00	7.64857
415000.00	3980000.00	4.67946	415000.00	3979500.00	3.23807
415000.00	3979000.00	2.43690	415000.00	3978500.00	2.47610
415000.00	3978000.00	2.69234	415000.00	3977500.00	2.81235
415000.00	3977000.00	3.04254	415000.00	3976500.00	2.79163
415000.00	3976000.00	3.07940	415000.00	3975500.00	2.61782
415000.00	3975000.00	2.15852	415000.00	3974500.00	1.94056
415000.00	3974000.00	1.79094	415000.00	3973500.00	1.67986
415000.00	3973000.00	1.56289	415000.00	3972500.00	1.44852
415000.00	3972000.00	1.37921	415000.00	3971500.00	1.33229
415000.00	3971000.00	1.28562	415000.00	3970500.00	1.24636
415000.00	3970000.00	1.21375	415500.00	3985500.00	1.13441
415500.00	3985000.00	1.24146	415500.00	3984500.00	1.37700
415500.00	3984000.00	1.52096	415500.00	3983500.00	1.60943
415500.00	3983000.00	1.72509	415500.00	3982500.00	1.93051
415500.00	3982000.00	2.21584	415500.00	3981500.00	2.49260
415500.00	3981000.00	2.83598	415500.00	3980500.00	3.46675
415500.00	3980000.00	5.06729	415500.00	3979500.00	8.06185
415500.00	3979000.00	4.51308	415500.00	3978500.00	3.98476
415500.00	3978000.00	4.31293	415500.00	3977500.00	6.75098
415500.00	3977000.00	6.08026	415500.00	3976500.00	9.35072
415500.00	3976000.00	6.40557	415500.00	3975500.00	5.12471
415500.00	3975000.00	4.26334	415500.00	3974500.00	3.51488
415500.00	3974000.00	2.93540	415500.00	3973500.00	2.56703
415500.00	3973000.00	2.29562	415500.00	3972500.00	2.08033
415500.00	3972000.00	1.89466	415500.00	3971500.00	1.76142
415500.00	3971000.00	1.64869	415500.00	3970500.00	1.54709
415500.00	3970000.00	1.46075	415500.00	3969500.00	1.39086
415500.00	3969000.00	1.33717	415500.00	3968500.00	1.29137
415500.00	3968000.00	1.24961	416000.00	3984500.00	1.06847
416000.00	3984000.00	1.17331	416000.00	3983500.00	1.27422
416000.00	3983000.00	1.43578	416000.00	3982500.00	1.52301
416000.00	3982000.00	1.68227	416000.00	3981500.00	1.89871
416000.00	3981000.00	2.12057	416000.00	3980500.00	2.32855
416000.00	3980000.00	2.63650	416000.00	3979500.00	3.53368
416000.00	3979000.00	10.41017	416000.00	3978500.00	5.67496
416000.00	3978000.00	4.69265	416000.00	3977500.00	3.75780
416000.00	3977000.00	3.14688	416000.00	3976500.00	3.04680
416000.00	3976000.00	3.63708	416000.00	3975500.00	4.07555
416000.00	3975000.00	5.08511	416000.00	3974500.00	9.28137
416000.00	3974000.00	6.20736	416000.00	3973500.00	4.29727
416000.00	3973000.00	3.44693	416000.00	3972500.00	2.93510
416000.00	3972000.00	2.55808	416000.00	3971500.00	2.28478
416000.00	3971000.00	2.09921	416000.00	3970500.00	1.92825
416000.00	3970000.00	1.78568	416000.00	3969500.00	1.67413

416000.00	3969000.00	1.58130	416000.00	3968500.00	1.50076
416000.00	3968000.00	1.43048	416000.00	3967500.00	1.36770
416000.00	3967000.00	1.31024	416000.00	3966500.00	1.26106
416500.00	3983000.00	1.10071	416500.00	3982500.00	1.19391
416500.00	3982000.00	1.30423	416500.00	3981500.00	1.44680
416500.00	3981000.00	1.66446	416500.00	3980500.00	1.90380
416500.00	3980000.00	2.03855	416500.00	3979500.00	2.28592
416500.00	3979000.00	2.65599	416500.00	3978500.00	3.61617
416500.00	3978000.00	2.09503	416500.00	3977500.00	2.62766
416500.00	3977000.00	2.75066	416500.00	3976500.00	2.55709
416500.00	3976000.00	2.37387	416500.00	3975500.00	2.53995
416500.00	3975000.00	2.56098	416500.00	3974500.00	2.77188
416500.00	3974000.00	3.56508	416500.00	3973500.00	4.67760
416500.00	3973000.00	7.88873	416500.00	3972500.00	7.06796
416500.00	3972000.00	4.26421	416500.00	3971500.00	3.37068
416500.00	3971000.00	2.82268	416500.00	3970500.00	2.43346
416500.00	3970000.00	2.14948	416500.00	3969500.00	1.95967
416500.00	3969000.00	1.80984	416500.00	3968500.00	1.68334
416500.00	3968000.00	1.58477	416500.00	3967500.00	1.51249
416500.00	3967000.00	1.44684	416500.00	3966500.00	1.38443
416500.00	3966000.00	1.32505	416500.00	3965500.00	1.27218
416500.00	3965000.00	1.22394	417000.00	3982000.00	1.10488
417000.00	3981500.00	1.20412	417000.00	3981000.00	1.32492
417000.00	3980500.00	1.44329	417000.00	3980000.00	1.56119
417000.00	3979500.00	1.72320	417000.00	3979000.00	2.03718
417000.00	3978500.00	1.85871	417000.00	3978000.00	2.42877
417000.00	3977500.00	1.92657	417000.00	3977000.00	1.51111
417000.00	3976500.00	1.80214	417000.00	3976000.00	2.11005
417000.00	3975500.00	2.11039	417000.00	3975000.00	2.20338
417000.00	3974500.00	2.28422	417000.00	3974000.00	2.27763
417000.00	3973500.00	2.51621	417000.00	3973000.00	2.94716
417000.00	3972500.00	3.49816	417000.00	3972000.00	4.62039
417000.00	3971500.00	7.18884	417000.00	3971000.00	9.30697
417000.00	3970500.00	4.97103	417000.00	3970000.00	3.59980
417000.00	3969500.00	2.91900	417000.00	3969000.00	2.50175
417000.00	3968500.00	2.20948	417000.00	3968000.00	1.98641
417000.00	3967500.00	1.81260	417000.00	3967000.00	1.67627
417000.00	3966500.00	1.55851	417000.00	3966000.00	1.46877
417000.00	3965500.00	1.39401	417000.00	3965000.00	1.33590
417000.00	3964500.00	1.28172	417000.00	3964000.00	1.21745
417000.00	3963500.00	1.15575	417500.00	3980500.00	1.12299
417500.00	3980000.00	1.26312	417500.00	3979500.00	1.40076
417500.00	3979000.00	1.64616	417500.00	3978500.00	1.72774
417500.00	3978000.00	1.57024	417500.00	3977500.00	1.92264
417500.00	3977000.00	1.75787	417500.00	3976500.00	1.28881
417500.00	3976000.00	1.33220	417500.00	3975500.00	1.51232
417500.00	3975000.00	1.71423	417500.00	3974500.00	1.90088
417500.00	3974000.00	2.05013	417500.00	3973500.00	2.05395
417500.00	3973000.00	2.14647	417500.00	3972500.00	2.35772
417500.00	3972000.00	2.59776	417500.00	3971500.00	2.88714
417500.00	3971000.00	3.31809	417500.00	3970500.00	4.37207
417500.00	3970000.00	6.45110	417500.00	3969500.00	14.39547
417500.00	3969000.00	5.92908	417500.00	3968500.00	4.04918
417500.00	3968000.00	3.18699	417500.00	3967500.00	2.64850
417500.00	3967000.00	2.28253	417500.00	3966500.00	2.01968
417500.00	3966000.00	1.81735	417500.00	3965500.00	1.68584
417500.00	3965000.00	1.57447	417500.00	3964500.00	1.47477
417500.00	3964000.00	1.39083	417500.00	3963500.00	1.31670
417500.00	3963000.00	1.23696	417500.00	3962500.00	1.16130
417500.00	3962000.00	1.12554	417500.00	3961500.00	1.09491
417500.00	3961000.00	1.00131	418000.00	3979500.00	1.12828
418000.00	3979000.00	1.30372	418000.00	3978500.00	1.50289
418000.00	3978000.00	1.37010	418000.00	3977500.00	1.39907
418000.00	3976000.00	1.29583	418000.00	3975500.00	1.17026
418000.00	3975000.00	1.18725	418000.00	3974500.00	1.31000
418000.00	3974000.00	1.59358	418000.00	3973500.00	1.78510
418000.00	3973000.00	1.84475	418000.00	3972500.00	1.90066
418000.00	3972000.00	2.03668	418000.00	3971500.00	2.16250
418000.00	3971000.00	2.31403	418000.00	3970500.00	2.49724
418000.00	3970000.00	2.75533	418000.00	3969500.00	3.30909
418000.00	3969000.00	3.95013	418000.00	3968500.00	5.39154
418000.00	3968000.00	9.21715	418000.00	3967500.00	7.02885
418000.00	3967000.00	4.51693	418000.00	3966500.00	3.37205
418000.00	3966000.00	2.71253	418000.00	3965500.00	2.32565
418000.00	3965000.00	2.06428	418000.00	3964500.00	1.85124
418000.00	3964000.00	1.69708	418000.00	3963500.00	1.59022
418000.00	3963000.00	1.49846	418000.00	3962500.00	1.36850
418000.00	3962000.00	1.26823	418000.00	3961500.00	1.22260
418000.00	3961000.00	1.17382	418000.00	3960500.00	0.97454
418000.00	3960000.00	0.86295	418000.00	3959500.00	0.76064
418000.00	3959000.00	0.47873	418000.00	3958500.00	0.44998



418500.00	3974000.00	1.10617	418500.00	3973500.00	1.28776
418500.00	3973000.00	1.49863	418500.00	3972500.00	1.63271
418500.00	3972000.00	1.71955	418500.00	3971500.00	1.81510
418500.00	3971000.00	1.89920	418500.00	3970500.00	2.00137
418500.00	3970000.00	2.10291	418500.00	3969500.00	2.18645
418500.00	3969000.00	2.41858	418500.00	3968500.00	2.66800
418500.00	3968000.00	3.07452	418500.00	3967500.00	3.74510
418500.00	3967000.00	4.80912	418500.00	3966500.00	8.10285
418500.00	3966000.00	8.03618	418500.00	3965500.00	4.84398
418500.00	3965000.00	3.58596	418500.00	3964500.00	2.88407
418500.00	3964000.00	2.43124	418500.00	3963500.00	2.10271
418500.00	3963000.00	1.89103	418500.00	3962500.00	1.73455
418500.00	3962000.00	1.58179	418500.00	3961500.00	1.46111
418500.00	3961000.00	1.39978	418500.00	3960500.00	1.16812
418500.00	3960000.00	0.97403	418500.00	3959500.00	0.75141
418500.00	3959000.00	0.52258	418500.00	3958500.00	0.46051
418500.00	3958000.00	0.45023	419000.00	3972500.00	1.24962
419000.00	3972000.00	1.39360	419000.00	3971500.00	1.52635
419000.00	3971000.00	1.62408	419000.00	3970500.00	1.71543
419000.00	3970000.00	1.80594	419000.00	3969500.00	1.85324
419000.00	3969000.00	1.89514	419000.00	3968500.00	2.01588
419000.00	3968000.00	2.14343	419000.00	3967500.00	2.31991
419000.00	3967000.00	2.62192	419000.00	3966500.00	3.03873
419000.00	3966000.00	3.64574	419000.00	3965500.00	4.52941
419000.00	3965000.00	6.80143	419000.00	3964500.00	13.99472
419000.00	3964000.00	5.60637	419000.00	3963500.00	4.02376
419000.00	3963000.00	3.17230	419000.00	3962500.00	2.57862
419000.00	3962000.00	2.21871	419000.00	3961500.00	2.00909
419000.00	3961000.00	1.78888	419000.00	3960500.00	1.63106
419000.00	3960000.00	1.20864	419000.00	3959500.00	0.69466
419000.00	3959000.00	0.57701	419000.00	3958500.00	0.53698
419000.00	3958000.00	0.51253	419000.00	3957500.00	0.44711
419500.00	3971000.00	1.30790	419500.00	3970500.00	1.42902
419500.00	3970000.00	1.54540	419500.00	3969500.00	1.63287
419500.00	3969000.00	1.66832	419500.00	3968500.00	1.70228
419500.00	3968000.00	1.77648	419500.00	3967500.00	1.85217
419500.00	3967000.00	1.94485	419500.00	3966500.00	2.11225
419500.00	3966000.00	2.33282	419500.00	3965500.00	2.61313
419500.00	3965000.00	2.96556	419500.00	3964500.00	3.38293
419500.00	3964000.00	4.16094	419500.00	3963500.00	5.39436
419500.00	3963000.00	9.33407	419500.00	3962500.00	6.60535
419500.00	3962000.00	4.51607	419500.00	3961500.00	3.65627
419500.00	3961000.00	3.11918	419500.00	3960500.00	2.58768
419500.00	3960000.00	1.72551	419500.00	3959500.00	0.83412
419500.00	3959000.00	0.73515	419500.00	3958500.00	0.55157
419500.00	3958000.00	0.38065	419500.00	3957500.00	0.33381
419500.00	3957000.00	0.31746	420000.00	3969000.00	1.45207
420000.00	3968500.00	1.50686	420000.00	3968000.00	1.54247
420000.00	3967500.00	1.58715	420000.00	3967000.00	1.63015
420000.00	3966500.00	1.68400	420000.00	3966000.00	1.77371
420000.00	3965500.00	1.89427	420000.00	3965000.00	2.06317
420000.00	3964500.00	2.27335	420000.00	3964000.00	2.46869
420000.00	3963500.00	2.76375	420000.00	3963000.00	3.16065
420000.00	3962500.00	3.75132	420000.00	3962000.00	4.75389
420000.00	3961500.00	5.70946	420000.00	3961000.00	6.89191
420000.00	3960500.00	9.37036	420000.00	3960000.00	4.44575
420000.00	3959500.00	1.32655	420000.00	3959000.00	0.90470
420000.00	3958500.00	0.66981	420000.00	3958000.00	0.52977
420000.00	3957500.00	0.43845	420000.00	3957000.00	0.37517
420500.00	3967500.00	1.40179	420500.00	3967000.00	1.44258
420500.00	3966500.00	1.47003	420500.00	3966000.00	1.50403
420500.00	3965500.00	1.54695	420500.00	3965000.00	1.60940
420500.00	3964500.00	1.71908	420500.00	3964000.00	1.84516
420500.00	3963500.00	1.95921	420500.00	3963000.00	2.11062
420500.00	3962500.00	2.30203	420500.00	3962000.00	2.52363
420500.00	3961500.00	2.77849	420500.00	3961000.00	2.88245
420500.00	3960500.00	3.17808	420500.00	3960000.00	3.42379
420500.00	3959500.00	2.21679	420500.00	3959000.00	1.50622
420500.00	3958500.00	0.72944	420500.00	3958000.00	0.33510
420500.00	3957500.00	0.21796	420500.00	3957000.00	0.15934
421000.00	3966000.00	1.35155	421000.00	3965500.00	1.37862
421000.00	3965000.00	1.40429	421000.00	3964500.00	1.44650
421000.00	3964000.00	1.50816	421000.00	3963500.00	1.57928
421000.00	3963000.00	1.64112	421000.00	3962500.00	1.71909
421000.00	3962000.00	1.81494	421000.00	3961500.00	1.90067
421000.00	3961000.00	2.04294	421000.00	3960500.00	2.12709
421000.00	3960000.00	2.13848	421000.00	3959500.00	1.70763
421000.00	3959000.00	1.67307	421000.00	3958500.00	1.13201
421000.00	3958000.00	1.14706	421000.00	3957500.00	0.93933
421000.00	3957000.00	0.68260	421500.00	3964000.00	1.30181
421500.00	3963500.00	1.33145	421500.00	3963000.00	1.36414

421500.00	3962500.00	1.40929	421500.00	3962000.00	1.47585
421500.00	3961500.00	1.54730	421500.00	3961000.00	1.57410
421500.00	3960500.00	1.65564	421500.00	3960000.00	1.69951
421500.00	3959500.00	1.49401	421500.00	3959000.00	1.29719
421500.00	3958500.00	1.31636	421500.00	3958000.00	0.95880
421500.00	3957500.00	0.90648	421500.00	3957000.00	0.91702
422000.00	3962000.00	1.28527	422000.00	3961500.00	1.31908
422000.00	3961000.00	1.33428	422000.00	3960500.00	1.35495
422000.00	3960000.00	1.41056	422000.00	3959500.00	1.41803
422000.00	3959000.00	1.04109	422000.00	3958500.00	1.06847
422000.00	3958000.00	1.08101	422000.00	3957500.00	0.84637
422000.00	3957000.00	0.75349	422500.00	3959500.00	1.24109
422500.00	3959000.00	1.01469	422500.00	3958500.00	0.90448
422500.00	3958000.00	0.92063	422500.00	3957500.00	0.92064
422500.00	3957000.00	0.75164	423000.00	3959000.00	1.00675
423000.00	3958500.00	0.81911	423000.00	3958000.00	0.80923
423000.00	3957500.00	0.81731	423000.00	3957000.00	0.80485
423500.00	3959000.00	0.98481	423500.00	3958500.00	0.79468
423500.00	3958000.00	0.74134	423500.00	3957500.00	0.73700
423500.00	3957000.00	0.74036	424000.00	3958500.00	0.80250
424000.00	3958000.00	0.69185	424000.00	3957500.00	0.68865
424000.00	3957000.00	0.68221	424500.00	3958000.00	0.67912
424500.00	3957500.00	0.64598	424500.00	3957000.00	0.64728
425000.00	3958000.00	0.68003	425000.00	3957500.00	0.60992
425000.00	3957000.00	0.61150	425500.00	3958000.00	0.66847
425500.00	3957500.00	0.58686	425500.00	3957000.00	0.56982

\*\*\* THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL \*\*\*  
 \*\*\* DISCRETE CARTESIAN RECEPTOR POINTS \*\*\*

		** CONC OF CO IN MICROGRAMS/M**3			
X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
411000.00	3997500.00	5.27085 (04010824)	411000.00	3997000.00	6.68936 (04010824)
411000.00	3996500.00	8.48666 (04010824)	411000.00	3996000.00	10.20602 (04010824)
411000.00	3995500.00	10.59884 (04010824)	411000.00	3995000.00	10.94628 (04010824)
411000.00	3994500.00	8.40483 (04010824)	411000.00	3994000.00	8.27470 (04010824)
411000.00	3993500.00	8.46840 (04010824)	411000.00	3993000.00	8.53124 (04010824)
411000.00	3992500.00	7.91219 (04010824)	411000.00	3992000.00	7.17060 (04010824)
411000.00	3991500.00	6.60414 (04010824)	411000.00	3991000.00	6.94850 (04090224)
411000.00	3990500.00	6.26342 (04010824)	411000.00	3990000.00	5.33990 (04010824)
411000.00	3989500.00	4.22132 (04010824)	411000.00	3989000.00	3.53755 (04010824)
411000.00	3988500.00	3.42889 (04071924)	411000.00	3988000.00	3.48884c (04092524)
411000.00	3987500.00	3.65906c (04092524)	411000.00	3987000.00	3.60718c (04092524)
411000.00	3986500.00	3.53632c (04092524)	411000.00	3986000.00	3.54481c (04092524)
411000.00	3985500.00	3.40004c (04092524)	411000.00	3985000.00	3.26790 (04090624)
411500.00	3997500.00	3.79021 (04010824)	411500.00	3997000.00	5.71265 (04010824)
411500.00	3996500.00	4.62855 (04010824)	411500.00	3996000.00	6.12831 (04010824)
411500.00	3995500.00	9.30118 (04010824)	411500.00	3995000.00	11.74857 (04010824)
411500.00	3994500.00	15.72888 (04010824)	411500.00	3994000.00	17.71837 (04010824)
411500.00	3993500.00	10.07084 (04010824)	411500.00	3993000.00	11.29964c (04092524)
411500.00	3992500.00	12.87687 (04090224)	411500.00	3992000.00	9.94772 (04010824)
411500.00	3991500.00	9.64877 (04010824)	411500.00	3991000.00	8.93304 (04010824)
411500.00	3990500.00	7.88688 (04010824)	411500.00	3990000.00	7.36135 (04010824)
411500.00	3989500.00	7.40985 (04010824)	411500.00	3989000.00	6.62306 (04010824)
411500.00	3988500.00	5.18139 (04010824)	411500.00	3988000.00	4.27939 (04010824)
411500.00	3987500.00	4.10981 (04071924)	411500.00	3987000.00	4.16392c (04092524)
411500.00	3986500.00	4.19467c (04092524)	411500.00	3986000.00	4.17984c (04092524)
411500.00	3985500.00	4.19305c (04092524)	411500.00	3985000.00	4.21115 (04020224)
411500.00	3984500.00	4.07331 (04090224)	411500.00	3984000.00	4.10682 (04090224)
411500.00	3983500.00	4.08123 (04090224)	412000.00	3997500.00	4.12551c (04081024)
412000.00	3997000.00	5.21657c (04081024)	412000.00	3996500.00	7.10978 (04021024)
412000.00	3996000.00	18.73466c (04012324)	412000.00	3995500.00	25.33838 (04010824)
412000.00	3995000.00	15.25918c (04111724)	412000.00	3994500.00	28.89908 (04090224)
412000.00	3994000.00	25.29209c (04111524)	412000.00	3993500.00	15.85806c (04111524)
412000.00	3993000.00	13.82093 (04010824)	412000.00	3992500.00	39.83640c (04110724)
412000.00	3992000.00	16.84859 (04100324)	412000.00	3991500.00	13.52975 (04100324)
412000.00	3991000.00	11.28246 (04100324)	412000.00	3990500.00	11.06168 (04010824)
412000.00	3990000.00	11.35431 (04010824)	412000.00	3989500.00	10.79028 (04010824)
412000.00	3989000.00	9.44464 (04010824)	412000.00	3988500.00	8.94078 (04010824)
412000.00	3988000.00	8.48360 (04010824)	412000.00	3987500.00	6.48000 (04010824)
412000.00	3987000.00	5.27360 (04100324)	412000.00	3986500.00	5.38858c (04092524)
412000.00	3986000.00	5.33535c (04092524)	412000.00	3985500.00	5.11850c (04092524)
412000.00	3985000.00	4.93885c (04092524)	412000.00	3984500.00	4.86362c (04092524)
412000.00	3984000.00	4.62603 (04090224)	412000.00	3983500.00	4.49811 (04090224)
412000.00	3983000.00	4.17783 (04090224)	412000.00	3982500.00	3.89480 (04090224)
412000.00	3982000.00	3.59110 (04090224)	412500.00	3997500.00	9.48359c (04012324)
412500.00	3997000.00	9.68482c (04012324)	412500.00	3996500.00	6.15509c (04012324)
412500.00	3996000.00	8.68785c (04010524)	412500.00	3995500.00	7.93322c (04010524)
412500.00	3995000.00	6.88541 (04120524)	412500.00	3994500.00	6.73588 (04122124)
412500.00	3994000.00	8.74581c (04011524)	412500.00	3993500.00	6.49448 (04012624)
412500.00	3993000.00	5.48424 (04012624)	412500.00	3992500.00	6.14157 (04012624)

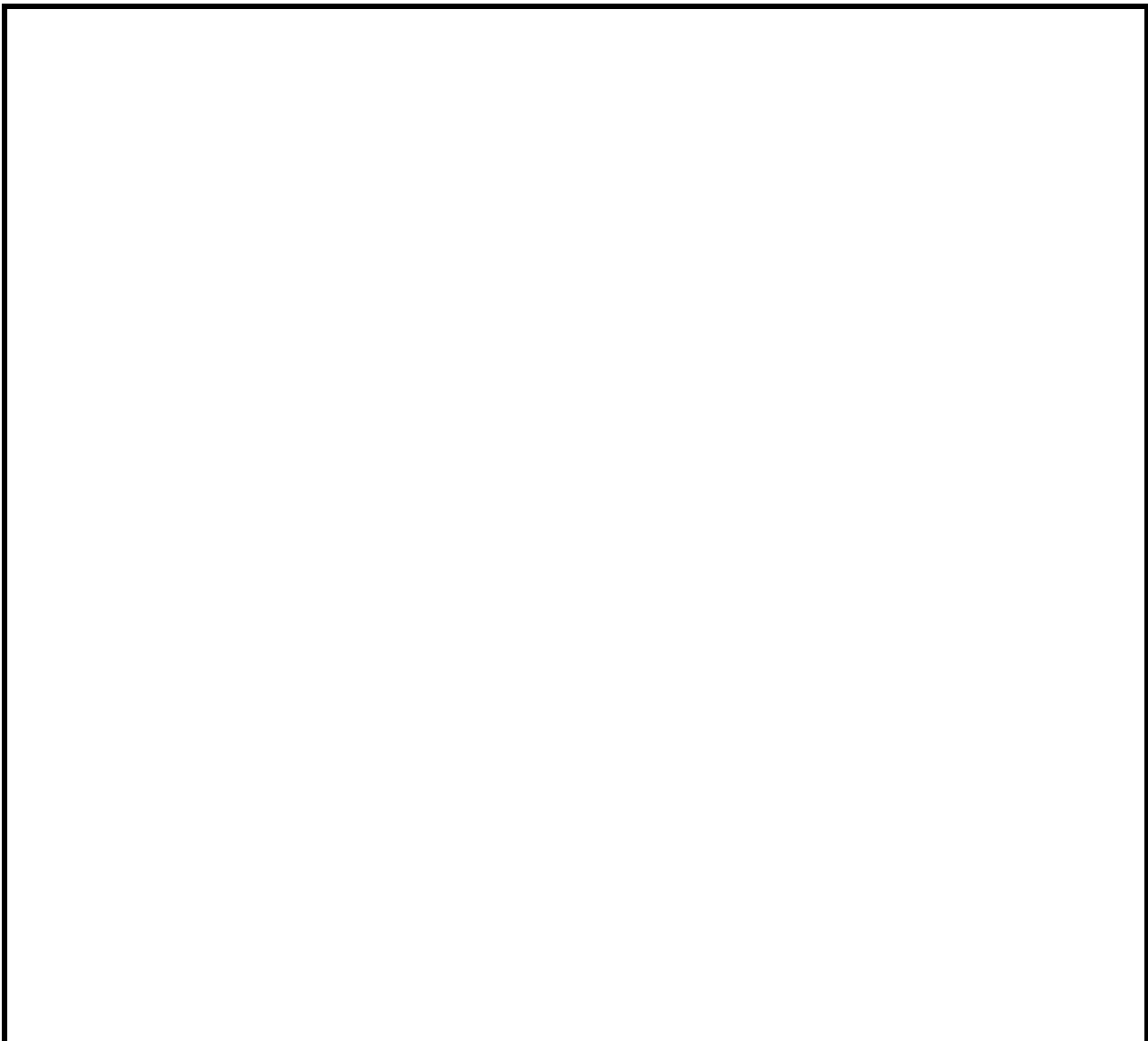
412500.00	3992000.00	10.25929	(04122124)	412500.00	3991500.00	33.37999	(04010824)
412500.00	3991000.00	13.13605	(04020224)	412500.00	3990500.00	10.37070	(04010824)
412500.00	3990000.00	10.16307	(04010824)	412500.00	3989500.00	11.19730	(04010824)
412500.00	3989000.00	12.87065	(04010824)	412500.00	3988500.00	14.84899	(04010824)
412500.00	3988000.00	15.03440	(04010824)	412500.00	3987500.00	12.47553	(04010824)
412500.00	3987000.00	11.48399	(04010824)	412500.00	3986500.00	8.42393	(04010824)
412500.00	3986000.00	7.15457c	(04092524)	412500.00	3985500.00	6.77080c	(04092524)
412500.00	3985000.00	6.26153c	(04092524)	412500.00	3984500.00	5.75772c	(04092524)
412500.00	3984000.00	5.37248c	(04092524)	412500.00	3983500.00	4.87984c	(04092524)
412500.00	3983000.00	4.35963	(04100324)	412500.00	3982500.00	4.17929c	(04021324)
412500.00	3982000.00	3.94296	(04100324)	412500.00	3981500.00	3.78748	(04100324)
412500.00	3981000.00	3.75343	(04100324)	412500.00	3980500.00	3.67306	(04100324)
413000.00	3997500.00	4.84928c	(04010524)	413000.00	3997000.00	4.87003c	(04010524)
413000.00	3996500.00	3.83039c	(04010524)	413000.00	3996000.00	3.39141c	(04012324)
413000.00	3995500.00	3.88999c	(04012324)	413000.00	3995000.00	4.14598c	(04012324)
413000.00	3994500.00	4.85616c	(04012324)	413000.00	3994000.00	5.08153c	(04012324)
413000.00	3993500.00	5.52821c	(04012324)	413000.00	3993000.00	6.16470c	(04012324)
413000.00	3992500.00	7.13204c	(04012324)	413000.00	3992000.00	8.36082c	(04012324)
413000.00	3991500.00	10.57510c	(04012324)	413000.00	3991000.00	14.33903	(04021024)
413000.00	3990500.00	18.61591c	(04020324)	413000.00	3990000.00	22.51604c	(04081024)
413000.00	3989500.00	17.13106	(04090224)	413000.00	3989000.00	17.28576	(04090224)
413000.00	3988500.00	17.21788	(04090224)	413000.00	3988000.00	17.31430	(04090224)
413000.00	3987500.00	18.70186	(04010824)	413000.00	3987000.00	21.04935	(04010824)
413000.00	3986500.00	28.51450	(04010824)	413000.00	3986000.00	19.71168	(04010824)
413000.00	3985500.00	12.86078	(04090224)	413000.00	3985000.00	10.60250	(04090224)
413000.00	3984500.00	9.74586c	(04111524)	413000.00	3984000.00	8.56242c	(04111524)
413000.00	3983500.00	8.06259	(04100324)	413000.00	3983000.00	7.55917	(04100324)
413000.00	3982500.00	7.09115	(04100324)	413000.00	3982000.00	6.73415	(04100324)
413000.00	3981500.00	6.47574	(04100324)	413000.00	3981000.00	6.11800	(04100324)
413000.00	3980500.00	5.83388	(04100324)	413000.00	3980000.00	5.57522	(04100324)
413000.00	3979500.00	5.34030	(04100324)	413500.00	3997500.00	2.68823c	(04010524)
413500.00	3997000.00	2.30801c	(04012324)	413500.00	3996500.00	2.38323c	(04012324)
413500.00	3996000.00	2.47961c	(04012324)	413500.00	3995500.00	2.64957c	(04012324)
413500.00	3995000.00	3.03494c	(04012324)	413500.00	3994500.00	3.22523c	(04012324)
413500.00	3994000.00	3.88501c	(04012324)	413500.00	3993500.00	4.27404c	(04012324)
413500.00	3993000.00	4.99587c	(04012324)	413500.00	3992500.00	6.17068c	(04012324)
413500.00	3992000.00	7.27748c	(04012324)	413500.00	3991500.00	7.53067c	(04012324)
413500.00	3991000.00	7.83981c	(04012324)	413500.00	3990500.00	8.13430c	(04012324)
413500.00	3990000.00	9.29250	(04120524)	413500.00	3989500.00	8.65814	(04120524)
413500.00	3989000.00	13.99154c	(04110724)	413500.00	3988500.00	14.56670c	(04011524)
413500.00	3988000.00	11.96458	(04011024)	413500.00	3987500.00	10.42639	(04012624)
413500.00	3987000.00	9.79455	(04012624)	413500.00	3986500.00	9.48411	(04012624)
413500.00	3986000.00	9.45042	(04012624)	413500.00	3985500.00	11.06364	(04010824)
413500.00	3985000.00	18.39150	(04010824)	413500.00	3984500.00	28.14436	(04010824)
413500.00	3984000.00	14.63828	(04082224)	413500.00	3983500.00	10.87390c	(04101924)
413500.00	3983000.00	10.07084c	(04101924)	413500.00	3982500.00	9.28755c	(04101924)
413500.00	3982000.00	8.37086c	(04101924)	413500.00	3981500.00	7.50507c	(04101924)
413500.00	3981000.00	7.09667	(04100324)	413500.00	3980500.00	6.76418	(04100324)
413500.00	3980000.00	6.44786	(04100324)	413500.00	3979500.00	6.14980	(04100324)
413500.00	3979000.00	5.86485	(04100324)	413500.00	3978000.00	5.41432	(04100324)
413500.00	3977500.00	5.27490	(04100324)	413500.00	3977000.00	5.15826	(04100324)
413500.00	3976500.00	5.02870	(04100324)	413500.00	3976000.00	4.74431	(04100324)
413500.00	3975500.00	4.57438	(04100324)	413500.00	3975000.00	4.42219	(04100324)
413500.00	3974500.00	4.26779	(04100324)	414000.00	3997500.00	2.68274c	(04012324)
414000.00	3997000.00	2.89491c	(04012324)	414000.00	3996500.00	3.15693c	(04012324)
414000.00	3996000.00	3.47563c	(04012324)	414000.00	3995500.00	3.84406c	(04012324)
414000.00	3995000.00	4.44761c	(04012324)	414000.00	3994500.00	4.73782c	(04012324)
414000.00	3994000.00	4.84045c	(04012324)	414000.00	3993500.00	5.11713c	(04012324)
414000.00	3993000.00	5.00286c	(04012324)	414000.00	3992500.00	4.85040c	(04012324)
414000.00	3992000.00	4.76088c	(04012324)	414000.00	3991500.00	4.56799c	(04012324)
414000.00	3991000.00	4.35191c	(04012324)	414000.00	3990500.00	4.63517	(04110624)
414000.00	3990000.00	5.82763	(04110624)	414000.00	3989500.00	6.86756	(04120524)
414000.00	3989000.00	6.53941	(04120524)	414000.00	3988500.00	4.83943	(04110624)
414000.00	3988000.00	7.18141	(04010324)	414000.00	3987500.00	7.79044c	(04110724)
414000.00	3987000.00	8.79515c	(04011524)	414000.00	3986500.00	8.38855c	(04011524)
414000.00	3986000.00	7.48075	(04011024)	414000.00	3985500.00	7.10340	(04012624)
414000.00	3985000.00	7.00241	(04012624)	414000.00	3984500.00	7.51908	(04012624)
414000.00	3984000.00	11.50507c	(04112324)	414000.00	3983500.00	23.37173	(04010824)
414000.00	3983000.00	18.94476	(04020224)	414000.00	3982500.00	10.48124	(04082224)
414000.00	3982000.00	9.46973	(04082224)	414000.00	3981500.00	9.43994	(04010824)
414000.00	3981000.00	9.01995	(04010824)	414000.00	3980500.00	8.32371	(04010824)
414000.00	3980000.00	7.19436	(04010824)	414000.00	3979500.00	5.79064	(04010824)
414000.00	3979000.00	5.08927	(04010824)	414000.00	3978500.00	4.41671	(04020224)
414000.00	3978000.00	4.49121c	(04101924)	414000.00	3977500.00	4.55728c	(04101924)
414000.00	3977000.00	4.65565c	(04101924)	414000.00	3976500.00	4.52728c	(04011624)
414000.00	3976000.00	4.49799c	(04011624)	414000.00	3975500.00	4.16705c	(04101924)
414000.00	3975000.00	4.04328c	(04101924)	414000.00	3974500.00	3.91596c	(04101924)
414000.00	3974000.00	4.20260	(04062224)	414000.00	3973500.00	4.87100	(04090224)
414000.00	3973000.00	5.28216	(04090224)	414500.00	3992500.00	3.23964c	(04012324)
414500.00	3992000.00	3.29144	(04110624)	414500.00	3991500.00	3.38391	(04110624)
414500.00	3991000.00	3.47967	(04110624)	414500.00	3990500.00	3.60136	(04110624)

414500.00	3990000.00	3.91029	(04110624)	414500.00	3989500.00	4.72557	(04110624)
414500.00	3989000.00	5.55967	(04122124)	414500.00	3988500.00	5.61091	(04120524)
414500.00	3988000.00	4.22972	(04110624)	414500.00	3987500.00	3.97224	(04110624)
414500.00	3987000.00	4.96466	(04010324)	414500.00	3986500.00	6.02739c	(04110724)
414500.00	3986000.00	5.98987c	(04011524)	414500.00	3985500.00	6.58128c	(04011524)
414500.00	3985000.00	6.73326c	(04011524)	414500.00	3984500.00	6.56389c	(04011524)
414500.00	3984000.00	6.29897c	(04011524)	414500.00	3983500.00	7.21181	(04012624)
414500.00	3983000.00	9.10819	(04122124)	414500.00	3982500.00	12.90889	(04122124)
414500.00	3982000.00	60.36596c	(04110724)	414500.00	3981500.00	12.73907c	(04101524)
414500.00	3981000.00	10.80182c	(04092524)	414500.00	3980500.00	10.23354	(04010824)
414500.00	3980000.00	11.80139	(04010824)	414500.00	3979500.00	11.47120	(04010824)
414500.00	3979000.00	10.31931	(04010824)	414500.00	3978500.00	8.00448	(04010824)
414500.00	3978000.00	6.88803	(04010824)	414500.00	3977500.00	5.74052	(04010824)
414500.00	3977000.00	5.07074c	(04021324)	414500.00	3976500.00	4.72758c	(04092524)
414500.00	3976000.00	4.46346c	(04092524)	414500.00	3975500.00	4.86741c	(04092524)
414500.00	3975000.00	6.43642	(04062224)	414500.00	3974500.00	7.70142	(04090224)
414500.00	3974000.00	6.11688	(04090224)	414500.00	3973500.00	5.01469	(04092224)
414500.00	3973000.00	3.87920	(04092224)	414500.00	3972500.00	3.45512	(04100324)
414500.00	3972000.00	3.39556	(04100324)	414500.00	3971500.00	3.31796	(04100324)
415000.00	3991000.00	3.03282c	(04020324)	415000.00	3990500.00	3.21683c	(04020324)
415000.00	3990000.00	3.29233c	(04020324)	415000.00	3989500.00	3.41708	(04110624)
415000.00	3989000.00	3.90726	(04110624)	415000.00	3988500.00	4.70482	(04122124)
415000.00	3988000.00	5.02397	(04120524)	415000.00	3987500.00	4.09833	(04110624)
415000.00	3987000.00	3.72097	(04110624)	415000.00	3986500.00	3.68347	(04110624)
415000.00	3986000.00	3.85030	(04122124)	415000.00	3985500.00	4.68704c	(04110724)
415000.00	3985000.00	4.76120c	(04110724)	415000.00	3984500.00	5.19509c	(04011524)
415000.00	3984000.00	5.75324c	(04011524)	415000.00	3983500.00	6.22895c	(04011524)
415000.00	3983000.00	6.39156c	(04011524)	415000.00	3982500.00	6.72279	(04012624)
415000.00	3982000.00	7.69350	(04122124)	415000.00	3981500.00	10.26112	(04122124)
415000.00	3981000.00	18.73672	(04122124)	415000.00	3980500.00	23.19877c	(04011524)
415000.00	3980000.00	12.28651c	(04101524)	415000.00	3979500.00	9.06446	(04010824)
415000.00	3979000.00	9.76920	(04010824)	415000.00	3978500.00	14.98275	(04010824)
415000.00	3978000.00	17.66714	(04010824)	415000.00	3977500.00	14.78472	(04010824)
415000.00	3977000.00	11.19962	(04010824)	415000.00	3976500.00	8.89434	(04020224)
415000.00	3976000.00	13.86838	(04090224)	415000.00	3975500.00	9.74157	(04092224)
415000.00	3975000.00	5.81692c	(04092524)	415000.00	3974500.00	5.21321c	(04092524)
415000.00	3974000.00	4.70358c	(04092524)	415000.00	3973500.00	4.43693c	(04092524)
415000.00	3973000.00	4.04160c	(04092524)	415000.00	3972500.00	3.69200c	(04092524)
415000.00	3972000.00	3.48039c	(04092524)	415000.00	3971500.00	3.51296c	(04111524)
415000.00	3971000.00	3.53681c	(04111524)	415000.00	3970500.00	3.54582c	(04111524)
415000.00	3970000.00	3.54088c	(04111524)	415500.00	3985500.00	3.90379c	(04012324)
415500.00	3985000.00	4.08580c	(04012324)	415500.00	3984500.00	4.28296c	(04012324)
415500.00	3984000.00	4.53150c	(04012324)	415500.00	3983500.00	4.88877c	(04012324)
415500.00	3983000.00	5.10891c	(04012324)	415500.00	3982500.00	5.53834c	(04012324)
415500.00	3982000.00	5.99069c	(04011524)	415500.00	3981500.00	6.30036c	(04011524)
415500.00	3981000.00	6.92333	(04110624)	415500.00	3980500.00	8.71237	(04122124)
415500.00	3980000.00	12.58151	(04122124)	415500.00	3979500.00	28.50131c	(04110724)
415500.00	3979000.00	16.43531c	(04081024)	415500.00	3978500.00	12.44775c	(04081024)
415500.00	3978000.00	12.49065c	(04081024)	415500.00	3977500.00	19.77539	(04090224)
415500.00	3977000.00	15.33083c	(04012324)	415500.00	3976500.00	36.32375	(04010824)
415500.00	3976000.00	28.67226	(04010824)	415500.00	3975500.00	15.48211	(04100324)
415500.00	3975000.00	12.76712	(04100324)	415500.00	3974500.00	10.90716	(04100324)
415500.00	3974000.00	9.35587	(04100324)	415500.00	3973500.00	8.45695	(04100324)
415500.00	3973000.00	7.77053	(04100324)	415500.00	3972500.00	7.21554	(04100324)
415500.00	3972000.00	6.74230	(04100324)	415500.00	3971500.00	6.32306	(04100324)
415500.00	3971000.00	5.96907	(04100324)	415500.00	3970500.00	5.65428	(04100324)
415500.00	3970000.00	5.37337	(04100324)	415500.00	3969500.00	5.12497	(04100324)
415500.00	3969000.00	4.91876	(04100324)	415500.00	3968500.00	4.73300	(04100324)
415500.00	3968000.00	4.56611	(04100324)	416000.00	3984500.00	3.39137	(04110624)
416000.00	3984000.00	3.51883	(04110624)	416000.00	3983500.00	3.95778c	(04010224)
416000.00	3983000.00	4.23760c	(04010224)	416000.00	3982500.00	4.59736c	(04010224)
416000.00	3982000.00	5.36996c	(04010224)	416000.00	3981500.00	6.40895c	(04010224)
416000.00	3981000.00	7.39151c	(04010224)	416000.00	3980500.00	9.67374c	(04012324)
416000.00	3980000.00	15.41367c	(04012324)	416000.00	3979500.00	30.06788c	(04012324)
416000.00	3979000.00	43.58651	(04120524)	416000.00	3978500.00	24.11756c	(04110724)
416000.00	3978000.00	17.97026c	(04011524)	416000.00	3977500.00	14.72154c	(04011524)
416000.00	3977000.00	11.21234	(04011024)	416000.00	3976500.00	9.52177	(04011024)
416000.00	3976000.00	9.30687	(04012624)	416000.00	3975500.00	10.40276c	(04110724)
416000.00	3975000.00	14.02310c	(04110724)	416000.00	3974500.00	26.97765	(04010824)
416000.00	3974000.00	17.88590	(04010824)	416000.00	3973500.00	11.93960	(04100324)
416000.00	3973000.00	10.15098	(04100324)	416000.00	3972500.00	9.14885	(04100324)
416000.00	3972000.00	8.40752	(04100324)	416000.00	3971500.00	7.85134	(04100324)
416000.00	3971000.00	7.41524	(04100324)	416000.00	3970500.00	7.03826	(04100324)
416000.00	3970000.00	6.66954	(04100324)	416000.00	3969500.00	6.35480	(04100324)
416000.00	3969000.00	6.07140	(04100324)	416000.00	3968500.00	5.79875	(04100324)
416000.00	3968000.00	5.53899	(04100324)	416000.00	3967500.00	5.30106	(04100324)
416000.00	3967000.00	5.08356	(04100324)	416000.00	3966500.00	4.89744	(04100324)
416500.00	3983000.00	6.69146c	(04012324)	416500.00	3982500.00	7.40897c	(04012324)
416500.00	3982000.00	7.11495c	(04012324)	416500.00	3981500.00	5.47696c	(04012324)
416500.00	3981000.00	6.05641	(04110624)	416500.00	3980500.00	8.37585c	(04010524)
416500.00	3980000.00	6.96704c	(04010524)	416500.00	3979500.00	6.34535	(04110624)


416500.00	3979000.00	7.21548	(04110624)	416500.00	3978500.00	13.02547	(04122124)
416500.00	3978000.00	5.67274	(04110624)	416500.00	3977500.00	10.85047c	(04110724)
416500.00	3977000.00	12.10399c	(04110724)	416500.00	3976500.00	11.48211c	(04011524)
416500.00	3976000.00	10.42144	(04011024)	416500.00	3975500.00	9.06194c	(04011524)
416500.00	3975000.00	7.82676	(04011024)	416500.00	3974500.00	8.08400	(04012624)
416500.00	3974000.00	9.39064	(04012624)	416500.00	3973500.00	11.22470	(04122124)
416500.00	3973000.00	26.32045c	(04020924)	416500.00	3972500.00	22.82193	(04010824)
416500.00	3972000.00	11.19562	(04020224)	416500.00	3971500.00	8.55850	(04020224)
416500.00	3971000.00	7.02730	(04100324)	416500.00	3970500.00	6.31857	(04100324)
416500.00	3970000.00	5.80871	(04100324)	416500.00	3969500.00	5.43970	(04100324)
416500.00	3969000.00	5.14390	(04100324)	416500.00	3968500.00	4.91667	(04100324)
416500.00	3968000.00	4.74894	(04100324)	416500.00	3967500.00	4.62376	(04100324)
416500.00	3967000.00	4.52686	(04100324)	416500.00	3966500.00	4.43160	(04100324)
416500.00	3966000.00	4.32806	(04100324)	416500.00	3965500.00	4.23435	(04100324)
416500.00	3965000.00	4.14997	(04100324)	417000.00	3982000.00	4.78617	(04110624)
417000.00	3981500.00	4.61005c	(04010524)	417000.00	3981000.00	4.41370c	(04010524)
417000.00	3980500.00	4.46537	(04110624)	417000.00	3980000.00	4.89355	(04110624)
417000.00	3979500.00	5.25503	(04110624)	417000.00	3979000.00	6.00291	(04110624)
417000.00	3978500.00	5.53296	(04110624)	417000.00	3978000.00	8.29314	(04122124)
417000.00	3977500.00	6.09643	(04120524)	417000.00	3977000.00	4.48472c	(04120824)
417000.00	3976500.00	6.86160c	(04110724)	417000.00	3976000.00	8.80329c	(04110724)
417000.00	3975500.00	8.73078c	(04011524)	417000.00	3975000.00	9.26176c	(04011524)
417000.00	3974500.00	8.69706c	(04011524)	417000.00	3974000.00	7.94133	(04011024)
417000.00	3973500.00	7.57683	(04012624)	417000.00	3973000.00	8.18006	(04012624)
417000.00	3972500.00	8.94193	(04012624)	417000.00	3972000.00	12.11914	(04122124)
417000.00	3971500.00	23.65327c	(04020924)	417000.00	3971000.00	33.01480	(04010824)
417000.00	3970500.00	13.68758	(04020224)	417000.00	3970000.00	9.42981	(04020224)
417000.00	3969500.00	7.40950	(04100324)	417000.00	3969000.00	6.52216	(04100324)
417000.00	3968500.00	5.92827	(04100324)	417000.00	3968000.00	5.44270	(04100324)
417000.00	3967500.00	5.06012	(04100324)	417000.00	3967000.00	4.74857	(04100324)
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425500.00	3957500.00	2.80898 (04122124)	425500.00	3957000.00	2.77467 (04110624)



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		ORIGINATOR			

	Document Title	
	<b>ERBIL-ALTUNKOPRI HIGHWAY ROAD REHABILITATION PROJECT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN</b>	
	Document No.	Total pages (without attachments)
<b>CNR-REP-(ERBIL-ALTUNKOPRI)-ESMP</b>		<b>43</b>



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# ERBIL-ALTUNKOPRI HIGHWAY ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN



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## 1 ABBREVIATIONS

<b>PROTEK:</b>	Protek Project Consultants Engineering Design & CAD Services Ltd.
<b>ÇINAR:</b>	Çınar Engineering Consultancy and Project Services LTD.
<b>YILMAZER:</b>	Yılmaz Education and Engineering Ltd.
<b>Project:</b>	Erbil-Altunkopri (Perdi) Highway Rehabilitation Project
<b>IDA:</b>	International Development Association
<b>GDRB:</b>	General Directorate of Roads and Bridges
<b>ESMP:</b>	Environmental and Social Management Plan
<b>EMS:</b>	Environmental Management System
<b>ESA:</b>	Environmental and Social Assessment
<b>HSER:</b>	Health, Safety and Environmental Representative
<b>PM:</b>	Particulate Matter
<b>SO<sub>2</sub>:</b>	Sulphur Dioxide
<b>NO<sub>x</sub>:</b>	Nitrogen Oxides
<b>CO:</b>	Carbon Monoxide
<b>US EPA:</b>	United States Environmental Protection Agency
<b>WCP:</b>	Waste Collection Point

## **2 INTRODUCTION**

### **2.1 Overview**

The Government of Iraq has applied for a credit from the International Development Association (IDA) to finance among other things emergency Highway repairs and improvements on the national highway network, in particular the Highway from Erbil to Altun Kopri (Perdi) in Erbil Governorate. The 38.5 km Highway section from Erbil to Perdi is part of the Erbil-Baghdad Highway and the lifeline of the economy of the Kurdistan Region. The existing two lane carriageway has a capacity of approximately 6,500 vehicles a day, and due to the deterioration of the pavement, there are about 12 serious road crashes each day and many injuries and fatalities every year. The highway is connecting a number of villages (25) and secondary roads and provides access to not less than 80 villages on both sides at various distances from the road. The Erbil Government intends to first widen the existing highway by constructing a parallel carriageway alongside the existing highway. When this new carriageway is completed, all traffic will be transferred to the new carriageway, while the old carriageway is repaired and rehabilitated. When all works are completed, the highway will be opened for four lane traffic on the full length.

Erbil-Altunkopri (Perdi) Highway is currently owned and operated by the General Directorate of Roads and Bridges (GDRB). PROTEK has undertaken the widening the existing road by constructing a parallel carriageway alongside the existing road. After the construction of the parallel carriage way alongside the existing road, the road will be operated by GDRB.

In order to assess and report the environmental and social impacts associated with the construction of Erbil-Altunkopri (Perdi) Highway, an Environmental and Social Assessment has been conducted. PROTEK has employed ÇINAR and YILMAZER for conduction of the assessment study as a part of the project which is under the responsibility of PROTEK.

The environmental and social assessment study was conducted by ÇINAR and YILMAZER to describe the baseline environmental and social conditions, to identify both the positive and negative potential impacts during construction stage and road operation in the future, and to describe the proposed mitigation measures to reduce the potential impacts associated with these stages.

An Environmental and Social Management Plan (ESMP) has been developed to consider both the needs of road safety and environmental conservation throughout the construction and the operation phases of Erbil-Altunkopri (Perdi) Highway Improvement Project. It establishes a five-year plan for managing the environmental issues arising from the construction and the operation activities at 38.5 km section of Erbil-Altunkopri (Perdi) Highway. After the first 5 years of operation, the monitoring results should be evaluated and considered for development of the life time EMP.

In ESMP some of the mitigation measures should be considered under the responsibility of PROTEK while some of them should be governed by GDRB. These mitigations will be indicated.

## **2.2 Scope and Purpose**

The overall objective of ESMP is to eliminate potential environmental and social impacts, or to reduce them to acceptable levels, comply with regulatory requirements, and continuously improve the environmental management at Erbil-Altunkopri (Perdi) Highway.

The plan consists of mitigation, management, monitoring and institutional measures to be taken during construction and operation stages. The plan also includes the actions needed to implement these measures.

The components of the current ESMP are summarized below;

- identification of feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels,
- identification of monitoring objectives and specification of the type of monitoring, with links to the impacts assessed in the ESA Report and the mitigation measures described in the ESMP,
- implementation of the project components and mitigation measures timely and effectively,
- assignment of the responsible bodies for implementation of the environmental plan,
- formation of an implementation schedule for measures to be carried out as a part of the project.

### **3 ENVIRONMENTAL MANAGEMENT FRAMEWORK**

#### **3.1 Environmental Management System**

This Environmental Management System (EMS) is developed as a management tool which allows the improvement and rehabilitation of the road to develop, maintain and implement a systematic approach towards managing the impacts of its activities on human health and the environment.

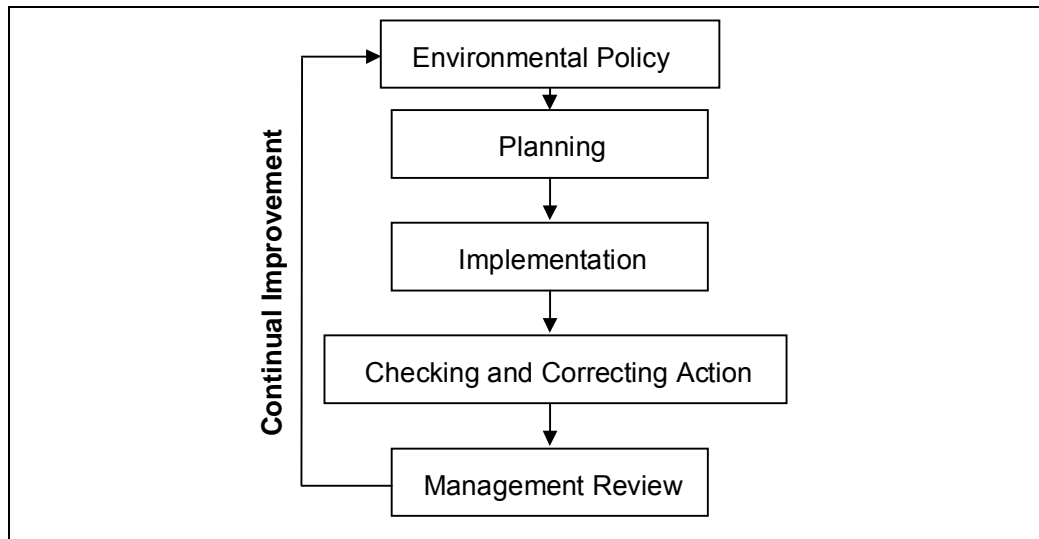
EMS includes organizational structure, planning activities, responsibilities, practices, procedures and processes for developing, implementing, reviewing and maintaining the environmental policy. This environmental policy covers all the environmental issues under the responsibility of PROTEK, GDRB and Construction Contractor.

EMS procedures will cover issues such as staff training, elements of the environmental monitoring of the construction and road operation phases such as air quality and, noise level measurements etc., and the emergency response planning. For further consultation, related consultancy will be supplied from appropriate consultancy firms whenever needed. Routine environmental auditing of the contractor activities will be provided by the HSER.

Environmental management is considered to be an integral part of the overall Project Management System. PROTEK will maintain an effective EMS in order to ensure that the protection of the environment is given a high priority throughout the construction and operation of the road. The aim of the EMS will be to ensure that environmental requirements are identified, planned, achieved, maintained, documented and, where appropriate, improved.

This ESMP sets out the basic principles for environmental management of the road over the next 5 years. It provides a responsible and structured management approach to monitor, to report and to prevent or to minimize adverse environmental impacts.

The management system was modeled as in the following figure. A diagrammatic representation of the environmental management structure to be used at Erbil-Altunkopri (Perdi) Highway is given in Figure 1.



**Figure 1.** Environmental Management Structure to be used at Erbil-Altunkopri (Perdi) Highway

### **3.2 Environmental and Social Management and Monitoring Plan**

This ESMP is intended to be an overview document that guides the environmental management and monitoring of all aspects of the improving the road. This document addresses project wide issues and requirements that will be handled throughout the construction and operation of the road.

The ESMP is the implementation vehicle for the Environmental Management System. It provides a structure for the coordination and implementation of specific environmental plans and environmental guidelines. These environmental plans address:

- potential adverse environmental impacts that may occur during the construction stage and road operations,
- protection of the baseline environmental conditions, and
- mitigation of potential impacts that may result from planned development at Erbil-Altunkopri (Perdi) Highway .

Within the context of ESMP, environmental plans were studied for the construction stage and road operations including the following subject areas:

- cultural heritage,
- biodiversity,
- solid wastes,
- hazardous materials and wastes,
- liquid discharges,

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- air emissions,
- noise impact,
- landscape and visual,
- water quality,
- soil quality,
- resource use, and
- socio economy.

Finally, a plan has been developed to ensure sustainable environmental management, and to identify opportunities for improvement based on the results of environmental monitoring and auditing of road activities.



## **4 ENVIRONMENTAL POLICIES AND STANDARDS**

### **4.1 Introduction**

It is aimed with this ESMP to develop an environmental policy peculiar to Erbil-Altunkopri (Perdi) Highway in order to achieve the objective of managing the environment both on and adjacent to the road site.

### **4.2 Environmental Policy**

The environmental policy established for Erbil-Altunkopri (Perdi) Highway states the importance of maintaining and enhancing the quality of the environment with these objectives:

- identify, prevent, control and minimize adverse environmental impacts associated with construction activities and road operations;
- comply with relevant environmental legislation and regulations;
- responsibly manage resources and wastes;
- preventing pollution through using best available technology, where cost effective, promoting open discussions among all stakeholders about the environmental aspects of operations and developments,
- training, supporting and motivating employees and business partners to be aware of and meet their environmental responsibilities, and
- continuously measure, monitor, report and improve the environmental performance.

### **4.3 Standards**

Erbil-Altunkopri (Perdi) Highway Improvement Project was developed in accordance with the guidelines and standards set by the following organizations for interpretation of the environmental quality standards and requirements to the project:

- World Bank Operational Directives and Guidance (World Bank Pollution Prevention and Abatement Handbook), and
- US EPA standards.

## **5 ROLES AND RESPONSIBILITIES**

PROTEK, GDRB and Construction Contractor will be responsible for implementation of, and adherence to, the mitigation measures outlined in the ESA. It will be PROTEK, GDRB and Construction Contractors responsibility to ensure that no unnecessary disturbance is caused to local communities or to the environment within the project area. PROTEK, GDRB, Construction Contractor and their sub-contractors will adopt the provisions of the ESMP. The responsibilities of PROTEK, GDRB and Construction Contractor will be indicated clearly for mitigations stated.

The project activities will comply with

- Iraqi Regulations,
- World Bank Regulations and Guidelines, and
- The mitigation measures outlined in the ESA and ESMP.

PROTEK, GDRB and Construction Contractor will also be responsible for securing all additional applicable permits and licenses not provided for through the ESA approval process.

PROTEK, GDRB and Construction Contractor will ensure that:

- weekly/monthly activity reports are provided, the reports are stored in the record keeping system and will be available for possible audits of top management of PROTEK and GDRB and for future reference,
- seasonal (four times a year) environmental self inspection and audit is developed and implemented and the results are filed for external audits,
- appropriately experienced and qualified personnel are employed as HSER.

### **5.1 Organizational Structure**

During the construction phase, Construction Contractor's management structure will include the dedicated role of HSER. The HSER will be adequately supported by the construction team of Construction Contractor. In addition to this support, PROTEK and Construction Contractor will provide it's own expertise in related matters to HSER.

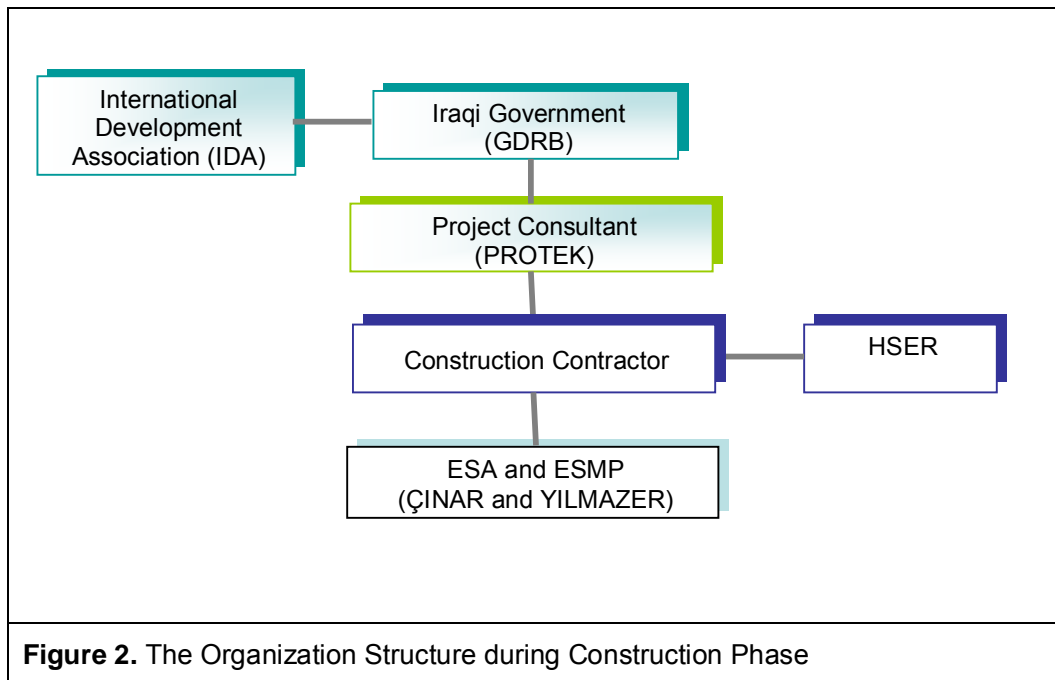
The Organizational Structures during construction phase of the project are shown in Figure 2.

**GDRB** is responsible for maintaining a monitoring, auditing and reviewing role to ensure that the construction and operation activities are undertaken in compliance with environmental standards, and health and safety standards.

**PROTEK** is responsible for monitoring, auditing and reviewing the Construction Contractor of the project activities during the construction phase and to ensure that all activities are implemented in compliance with the provisions of the ESMP. This role will

include the monitoring of all contractors' performances. In addition to these PROTEK will be responsible for:

- Having the overall responsibility for the environmental performance of the Erbil-Altunkopri (Perdi) Highway Improvement Project,
- Ensuring compliance with the ESMP,
- Appointment of 24-hour emergency contacts, and
- The designation of appropriate personnel to act in his/her absence during periods of leave, sickness, etc.



**Construction Contractor** is responsible for the effective re-sourcing of staff to ensure the environmental requirements identified in the ESMP are undertaken and for implementation of the construction activities in compliance with the provisions of the ESMP.

**Health, Safety and Environmental Representative (HSER)** will be responsible for the following;

- Assessment, monitoring and auditing the implementation of the provisions of ESA and ESMP those are within the responsibilities of Construction Contractor throughout the construction stage,
- Preparation, review and update of the ESMP and specialist procedures as appropriate,

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- To act as the main point of contact for environmental matters between the regulatory authorities and other third party consultants and the project team on environmental issues,
- Holding regular environmental trainings at site and toolbox talks with appropriate personnel on the project,
- Liaison with the community groups,
- Assisting with the development of emergency and safety procedures and training of staff in the use and disposal of spill control equipment, and
- Environmental incident and non-compliance monitoring and reporting.

**ÇINAR and YILMAZER** are the subcontractors providing consultancy for the preparation of ESA and ESMP Reports and supplying further consultancy related with these issues.

There is no organizational structure during the operation of the Erbil-Altunkopri Road. Since, only GDRB will be responsible for the operation of the road.

## **6 GENERAL PRINCIPLES OF ENVIRONMENTAL MANAGEMENT PROGRAM**

The general principles of environmental management program will include site inspection and environmental monitoring activities, auditing and documentation of these issues.

In addition to that Environmental Awareness Training will be delivered to all staff on site during the construction stages by the HSER.

### **6.1 Community Consultation and Complaints Procedure**

The first phase of public consultation meetings was organized by ÇINAR with the support of YILMAZER at the beginning of the Environmental Assessment Phase of the Project.

The purpose of these meetings was to inform public about the project activities, and to obtain their opinions and suggestions about the project.

These meetings were conducted within the first week of February at 4 villages (Baghamra Afandi, Murka Ali, Qushtapa and Sherava Gaura) where residents of these villages attended. Public was invited to this meetings through announcements. Brochure attached to this section including general information about the project was distributed to the participants.

Second set of meetings will be conducted at the same villages right before the construction operation will be started. These meetings will be organized by a team of sociologists as indicated in the Public Consultation and Disclosure Plan of The Environmental Impact Assessment Report.

A third set of meetings should again be organized by the same sociologist experts at the same villages during the construction to understand the possible complaints about the construction activities.

PROTEK, Construction Contractor and GDRB personnel will be participating to the meeting as the responsible body. At the beginning of the meeting, brochures explaining positive and negative potential impacts of the project, how and in which ways the public will be affected, will be distributed to the participants, and a brief description of the project will be given to inform the residents about the outcomes of the project. Then PROTEK, Construction Contractor and GDRB will respond the addressed questions. Of these questions the ones having environmental significance will be included in the priority list of PROTEK, Construction Contractor or GDRB to be issued during the construction and operation studies.

Furthermore, PROTEK will develop a public relations procedure in order to facilitate working with the community.

## **6.2 Inspection and Monitoring**

Throughout the construction phase, PROTEK and GDRB and road operation phase GDRB will ensure that an appropriate inspection and monitoring program to the satisfaction of residents and road users is implemented.

The environmental inspection and monitoring will be accomplished by an HSER appointed by the Construction Contractor during the construction phase and will be approved by PROTEK and GDRB. The HSER will be responsible for auditing and the implementation of the ESA Report and ESMP requirements throughout the construction stage within the responsibilities of PROTEK.

The inspections will be accomplished by the HSER by use of an environmental compliance checklist. In order to ensure a subjective inspection study, a checklist for the construction phase was developed and provided in Annex 1. The contents of the checklist will be expanded with HSER's opinion. In the course of inspections, the HSER will handle and fill out the checklist provided. Afterwards, regarding that checklist the environmental activities conducted at construction site will be reported. These reports will be recorded and kept by the HSER.

During the **construction phase**, weekly inspection report including the environmental activities conducted within that period of time, will be prepared by HSER and submitted to the construction manager or equivalent. Topics for environmental inspection and monitoring during construction phase will include the following:

<b>Item:</b>	<b>Responsible Party:</b>
Cultural Heritage	Construction Contractor
Biodiversity	Construction Contractor
Solid Waste Management Procedures	Construction Contractor and GDRB
Hazardous Waste Management Procedures	Construction Contractor and GDRB
Liquid Discharges	Construction Contractor and GDRB
Water Quality	Construction Contractor and GDRB
Air Emissions	Construction Contractor
Noise Levels at Sensitive Receptors	Construction Contractor
Landscape and Visual	Construction Contractor and GDRB
Socio-Economy	Construction Contractor and GDRB
Soil Quality	Construction Contractor
Resource use	Construction Contractor

During the **operation phase**, monthly inspection report including the environmental activities conducted within that period of time, will be prepared by GDRB Representative and submitted to the operation manager or equivalent. Topics for environmental inspection and monitoring during operation will include the following:

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<b>Item:</b>	<b>Responsible Party:</b>
Biodiversity	GDRB
Solid Waste Management Procedures	GDRB
Hazardous Waste Management Procedures	GDRB
Water Quality	GDRB
Soil Quality	GDRB
Air Emissions	GDRB
Landscape and Visual	GDRB
Noise Levels At Sensitive Receptors	GDRB
Socio-economy	GDRB
Resource use	GDRB

Not only environmental activities, but also environmental incidents will also be reported and submitted immediately both for construction and operation phases.

### **6.3 Auditing**

PROTEK and GDRS will demonstrate how the requirements of the ESMP and ESA are being complied with. This will include a program of inspections and audits conducted by qualified PROTEK or GDRB staff.

Both the Construction Contractor and its sub-Contractors shall be required to demonstrate how environmental requirements are being complied with. PROTEK will reassure itself that the Construction Contractor is complying with the requirements of the ESA, ESMP through a program of site inspections.

### **6.4 Documentation**

The environmental management activities will be documented and followed to effectively manage the environmental performance of the project. Non-compliance observations, decisions on identified issues, solutions, corrective and preventive actions taken and the results of these actions will be documented.

The environmental activities conducted at construction site will be reported by HSER by the use of environmental compliance checklists filled out. In addition to that, the reports will include the site observations of HSER.

The reporting of monitoring results should involve presentation and summary of monitoring results, related information and compliance findings in an effective way. While reporting scope of the report, responsibility for producing the report, legal aspects and quality of the reports should be considered as well.

The recording of these reports will be the responsibility of the HSER. Weekly reports will be produced by the HSER and GDRB Representative and submitted to the manager for the construction phase.

## **7 MONITORING PROGRAM**

### **7.1 Scope of the Monitoring Program**

This section describes an outline for monitoring program for the construction and operation phases of the project, and subsequent implementation of mitigation measures in compliance with the EMS objectives as well as the regulatory requirements.

Elements of the construction and the road operation monitoring programs have been examined separately and are given in the following sections. Potential environmental and social impacts are considered and related management; monitoring and mitigation approaches are presented.

### **7.2 Monitoring Philosophy**

The goal in implementing an inspection and monitoring program is to ensure the detection of environmental impacts and to propose environmental actions with regard to mitigation measures and requirements. The methods and procedures presented in this document are intended to assure the completion of an effective monitoring program.

It is neither necessary, nor practical, to continuously monitor all potentially affected environmental parameters. Ultimately a monitoring program is a compromise that can effectively serve to characterize existing environmental conditions and sustain these characteristic properties.

Baseline measurements designating the existing environmental conditions of the region have been reported in the ESA report. The objective of the following monitoring program will be the detection of deviation with respect to existing environmental conditions. In order to accomplish that, sampling and measurement programs are adjusted for both construction and operation phases.

### **7.3 Elements of the Construction Monitoring Program**

In the following sections, monitoring programs for cultural heritage, biodiversity, solid wastes, hazardous materials and wastes, liquid discharges, water quality, air emissions, noise impact, soil quality, socio-economy, landscape and visual impacts of the construction phase have been developed.

The environmental issues related with the project construction activities will be monitored by the HSER nominated by the Construction Contractor.

#### **7.3.1 Cultural Heritage**

Initial assessments of project activities, as well as the land likely to be physically or visually disturbed by the road, was conducted at the beginning of the project activities. It brought to light potential historical or archaeological issues. Public consultation or knowledge of prior archaeological or cultural finds in the region was conducted to identify the existence of such issues.



As mentioned in cultural heritage section of ESA Report, there exists no sign of an archaeological or a cultural finding along the Erbil-Altunkopri road. There is only a graveyard approximately at KP: 31+000 and a tumulus at KP: 12+000, these two archeological sites are located next to the existing road. Second constructed carriage way will not pass close to these archeological sites. Therefore, no negative impact of road construction is expected on these sites.

During the construction activities and excavation works, road construction should avoid any alignment that cuts through known cultural sites. If an important site is uncovered during road works, possible realignment of the road should be considered.

In some unusual cases it is preferable to leave a cultural site buried beneath the road. This may involve raising the level of the road.

A cooperative relationship between road builders and archaeological specialists is essential during construction works.

Nevertheless, in case of archeological site detection, the person who finds the asset is responsible for informing the GDRB. Considering that statement, in case such an asset is discovered during the construction activities, Construction Contractor will inform HSER. HSER is going to stop the work immediately and inform the relevant governmental organizations and GDRB. In addition to that an archeologist will be ready to monitor the earthworks during the whole earthwork construction activity.

### **7.3.2 Biodiversity**

A detailed flora and fauna study was carried out and discussed in ESA Report by ÇINAR. According to that study, no significant flora and fauna species was identified along the road area.

The consumption of land, and the consequent loss of natural habitat, is inherent in road development. Where new roads intersect habitat, the area occupied by the road itself, borrow pits, and quarries is subtracted from the total habitat area available to flora and fauna.

Most animal species tend to follow established patterns in their daily and seasonal movements. The areas, through which they travel on their way to and from feeding, breeding and birthing grounds, and between their seasonal ranges, are known as corridors. When a road intersects or blocks a wildlife corridor, the result is either cessation of the use of the corridor because animals are reluctant to cross the road, an increase in mortality because of collisions with vehicles, or a delay in migration which may result in the weakening or disappearance of an entire generation of the population. Unfortunately, some animals are attracted to roads for various reasons, including protection from predators, good food supplies, better travel conditions, and so forth. This often leads to accidental death and poaching.

The potential impacts that alteration of the biogeochemical cycle may have on an ecosystem can be very roughly estimated once the nature of the alteration has been established, based on data on soil erodibility, soil fertility, and anticipated human activity, among other things. An understanding of the nutrient regime and energy flow of the affected ecosystem is essential.

Desert ecosystems are characterized by extreme temperature fluctuations, low annual rainfall, and high evaporation. As a result, their species diversity tends to be low and vegetation is usually sparse. For climatic reasons, recovery or re-colonization of damaged areas tend to be slow.

Throughout the construction activities, the natural soil characteristics which enable the existence of flora species were lost. Extra topsoil, which contains seed bank and the fertile material supporting plant growth, will be transferred from another place where no irreversible impact is expected. Appropriate maintenance and handling practices will be accomplished.

Once the disturbed areas have been re-contoured and compacted, topsoil should be distributed over the surface of the entire disturbed areas. All disturbed areas should be subject to final grading; however, measures should be taken prior to seeding to ensure disturbed areas remain in rough condition to help to protect the stability of topsoil after it is spread. When the construction activities are completed, the new vegetative cover will be formed by bulbs, rhizomes and seeds, etc.

Intense, focused construction activities lasting for a short period of time generally have far less effect than those which may be less intense but are spread over long periods. As a general rule, construction periods which do not exceed the annual reproduction cycle of key organisms usually have less impact than projects which stretch over generations.

Road cross-section can be modified to reduce the impact on the environment, for example, by using narrower widths, lower vertical alignments, smaller cuts and fills, flatter side slopes, and less clearing of existing vegetation. Narrower rights-of-way and lower vertical alignment may make crossing easier for animals that find roads a physical or psychological barrier. Also, providing longer sight lines for drivers can reduce collisions with animals by allowing more reaction time.

Planting in road rights-of-way and adjacent areas can help to support local flora and fauna. In some cases, planting may provide additional habitats and migration routes for local animals, while also guarding against erosion. Planting should be done wherever possible with native species, which are likely to require little maintenance and may prove beneficial in maintaining ecosystem integrity.

### **7.3.3 Solid Wastes**

The Waste Management System objectives are specified as follows;

- Prevention: waste production should be minimized and avoided as far as practically possible,
- Polluter Pays Principle: those who contaminate the environment will be fined for their actions,
- Precautionary Principle: potential waste problems should be avoided, and
- Proximity Principle: waste should be disposed of as closely to the source of production.

#### Roles and Responsibilities

Construction Contractor will be deemed to be the 'Holder' of all wastes arising from the construction activities (inclusive of domestic wastes) and will be responsible for the proper management of those wastes.

Construction Contractor will ensure that all wastes generated are correctly identified, and stored pending collection/transfer for reuse, recovery, recycling and/or disposal in an environmentally sound manner.

Construction Contractor will provide sufficient training to all the staff to ensure that they are aware of the relevant aspects of the waste management practices and are able to fulfill their waste management roles and functions.

#### Waste Generation

All reasonable steps will be taken to avoid waste generation and minimize both quantities and hazards of waste generated. All wastes generated will be identified, classified and documented in accordance with the prevailing local legislation.

#### Waste Collection and Storage

Wastes will be collected and temporarily stored at the Waste Collection Points (WCP) located at each construction camp site in a safe and environmentally sound manner prior to the collection and transfer. Suitable waste containers will be provided at that location to facilitate safe and environmentally sound temporary storage. All containers will be clearly marked according to its contents and waste containers shall ensure that waste is effectively contained and is not accessible by vermin.

WCP will have separate storage containers for prime recyclables (plastics, glass, ferrous metals and non-ferrous metals) and separate containers for other wastes.

Wastes received at the WCP may either be transferred for reuse, recovery, recycling or disposal. Collections will be scheduled as frequent as necessary to prevent over-accumulation.

### Waste Recycling Programs

The following wastes will be recycled to comply with the local regulations.

- *Paper and card recycling*
- *Plastics recycling*
- *Metals recycling*

### Disposal

Other wastes will be disposed of in a safe and environmentally sound manner. Where possible waste should be reused and recycled, other waste should be disposed of at a facility that is licensed or equivalently approved by the government.

Inert construction wastes will be deposited at a suitable area during the construction activity, then the metal wastes will be sold to third party companies for recycling if available and cement type of wastes will be used for land leveling after covered by subsoil and topsoil, respectively.

### Monitoring Waste Management Activities

The control system will include the documentation of waste collection, waste processing and disposal, and transfer of wastes. The control system will include monitoring and inspection activities.

The HSER will be responsible for the control system which includes the documentation of waste collection, waste processing, disposal and transfer of wastes.

The movement of waste from WCP for reuse, recovery, recycling or disposal should be documented and monitored and the following information will be recorded:

- date and time of collection and transfer,
- waste type(s) being transferred,
- waste description including chemical/physical properties and relative proportions as necessary,
- quantity(ies) of waste(s) including numbers of each type of containers, and
- name and address of organization to which waste is being transferred.

#### **7.3.4 Hazardous Materials and Wastes**

To minimize hazardous waste and to ensure its safe temporary storage, waste identification and record keeping is necessary. The hazardous waste storage will have spill control bunding.

The hazardous wastes will be deposited on a hard standing bunded area. Spills will be prevented by depositing the hazardous wastes in drums that does not leak.

Oily wastes will also be considered as hazardous waste. In case of oil or fuel spills to soil, the contaminated soil will be stripped until there is no sign of contamination and deposited in drums to be sent for suitable disposal.

Collection of hazardous wastes that are under the responsibility of Construction Contractor will be managed upon a schedule in order to prevent over-accumulation of wastes at the WCP. Collected hazardous wastes will be sent and incinerated in a hazardous waste incinerator at legally approved company in Iraq.

Vehicles delivering hazardous substances will be printed with unified signs.

The control system will include the documentation of waste collection and transfer of wastes. The control system will include monitoring and inspection activities.

The movement of waste from WCP to licensed company should be documented by waste transport forms and monitored, and the following information will be recorded:

- date and time of collection and transfer,
- waste type(s) being transferred,
- waste description including chemical/physical properties and relative proportions as necessary,
- quantity(ies) of waste(s) including numbers of each type of containers, and
- name and address of organization to which waste is being transferred.

### **7.3.5 Liquid Discharges**

Liquid discharges will be generated during the construction phase due to camp activities. All necessary precautions should be taken to prevent the pollution of ephemeral surface waters and groundwater resources due to the wastewater produced from the camp activities.

Waste water produced due to the camp activities will be collected in permeable septic tanks. The HSER will be responsible for monitoring the septic tank and discharge activities.

### **7.3.6 Water Quality**

Project is implemented on dry area. Baseline surface and groundwater quality could not be determined along the Erbil-Altunkopri (Perdi) Highway. Because, there was no surface water source intersecting the Erbil-Altunkopri (Perdi) Highway and there was no ground water well along the project site.

Measures used to avoid severe impacts on local hydrological environment may include:

- avoiding alignments which are susceptible to erosion, such as those crossing steep slopes;
- minimizing the number of water crossings wherever possible;

- using only “clean” fill materials around watercourses, such as quarried rock containing no fine soil; and
- leaving buffer zones of undisturbed vegetation (width increased in proportion to slope) between road sites and bodies of water.

Since there was no surface water source intersecting the Erbil-Altunkopri (Perdi) Highway and there was no ground water well along the project site these issues have less impact on water resources.

All justifiable measures will be taken to prevent the waste water produced in construction from entering into water resources and irrigation system.

### **7.3.7 Soil Quality**

Soil is an important component of the natural environment, and is a primary medium for many biological and human activities, including agriculture. Its protection in relation to road development deserves considerable attention.

The most immediate and obvious effect of road development on soil is the elimination of the productive capacity of the soil covered by roads. Soil productivity can also be reduced significantly as a result of compaction with heavy machinery during construction.

Disturbance during construction can upset the balance between stabilizing factors, such as vegetation, and others which seek to destabilize, such as running water.

Slope stability can be set up by the creation of road cuts or embankments. Excessive steepness of cut slopes, deficiency of drainage, modification of water flows, and excessive slope loading can result in landslides.

Spoil material from road cuttings can kill vegetation and add to erosion and slope stability problems. Diversion of natural surface water flows is often inevitable in road projects.

The likelihood of serious environmental impacts on soil as a result of road project can be reduced by:

- minimizing the area of ground clearance;
- avoiding sensitive alignments, such as those which include steep hillsides;
- balancing filling and cutting requirements through route choice, so as to avoid the production of excess spoil material and reduce the need for borrow pits;
- avoiding previously contaminated sites;
- avoiding the creation of cut slopes and embankments which are of an angle greater than the natural angle of repose for the local soil type; and

- replanting disturbed areas immediately after disturbance has stopped, not after construction has been completed.

On sections with high filling and deep cutting, their slopes should be covered by stone walls and planted with grass, etc. If existing irrigation and drainage system ponds are damaged, they will be rebuilt or recovered by suitable methods.

In case of fuel spills to soil, the contaminated soil will be stripped until there is no sign of contamination and deposited in drums to be sent for suitable disposal.

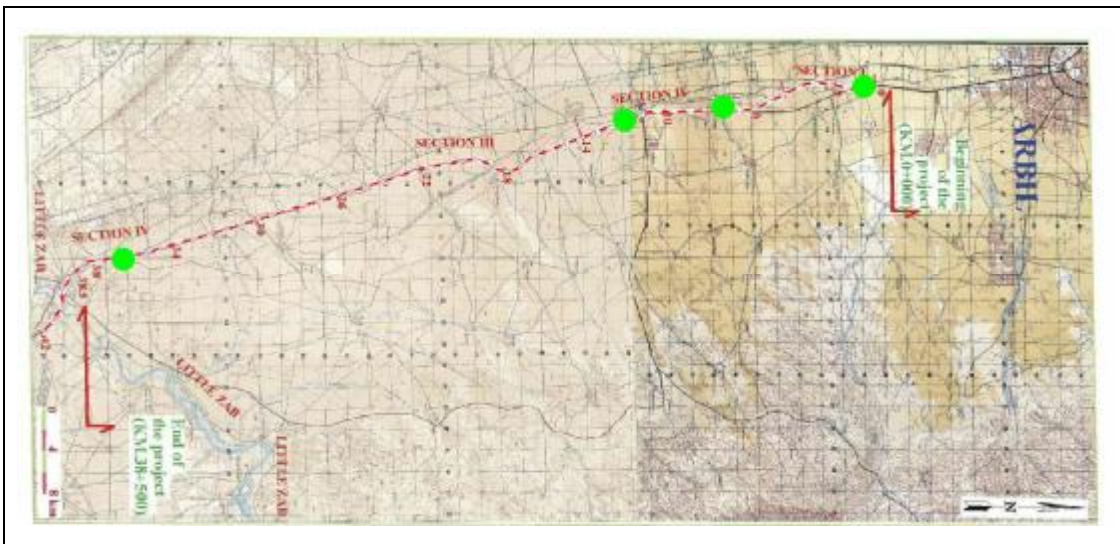
### **7.3.8 Air Emissions**

The primary air quality issue during the construction phase is dust. Dust monitoring will primarily be addressed through site inspection to ensure that good site practice with respect to dust control is being effectively implemented on site.

The emission of pollutants by vehicles has worldwide impacts and contributes greatly to the total atmospheric pollution generated by people. Impacts of motor vehicle air pollution can be prevented by routing traffic away from populated areas and reducing traffic congestion.

An air quality assessment study was performed along the road site and presented in the Air Quality Section of the ESA Report. Baseline air quality measurements were conducted for Erbil-Altunkopri (Perdi) Highway project site and its close vicinity in order to observe the existing air quality. Measurements were conducted at totally 4 locations including the nearest receptors to the Erbil-Altunkopri (Perdi) Highway. The pollutants focused at this survey are Particulate Matter (PM<sub>10</sub>), Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), and Sulphur Dioxides (SO<sub>2</sub>).

The measurement stations could be seen in Figure 3.



**Figure 3. Air and Noise Quality Measurement Locations**

Dust sampling is not considered to be an effective means of monitoring dust during construction due to the delay between sampling and the receipt of sampling results. A much more immediate means of identifying unacceptable levels of dust is visual observation, so that remedial measures should be implemented immediately. The HSER will constantly assess the level of dust generation during construction activities and appropriate mitigation measures such as water spraying will be implemented as required.

The use of best practicable means to control dust and other emissions to air will be adopted in relation to all project activities and will include the following:

- measures for the control of site operations;
- measures for the avoidance of nuisance from exhaust emissions;
- measures for the control of vehicle movements on site.

Measures for the Control of Site Operations:

- Land transfers and stockpile of material will be carefully managed (e.g. by use of a suitable sheeting material) to minimize the risk of wind blown material and dust.
- Water spraying will be used for dust-control.
- All vehicles delivering dusty construction materials to the site or removing spoil will be enclosed and covered to prevent escape of dust.
- In areas where the soil contain large quantities of silt and fine sand, which has a tendency to blow in dry conditions, particular attention will be paid to dust suppression.
- Vehicle wheels will be washed when leaving the construction site whenever necessary.

Measures to Avoid the Nuisance from Exhaust Emissions:

- Best control technology will be adopted to reduce combustion emissions from engines and any other temporary equipment.
- Vehicle engines will not be left running unnecessarily.
- All vehicle and equipment engines and exhaust systems will be maintained so that exhaust emissions do not breach limits set for that vehicle/equipment type and mode of operation, and that all vehicles and equipment are maintained in accordance with manufacturers' guidance.
- All vehicles will be maintained so that their noise and exhaust emissions do not cause nuisance to workers or local people.



- Regular maintenance of vehicles will be undertaken to ensure that vehicles are safe and emissions and noise are minimized by cleaning fuel injectors in diesel engines and so on.

In order to assess and maintain the ambient air quality in the region, a monitoring program to be followed was developed for the construction phase. The ambient air quality measurements seasonal basis will be conducted within a year. Each measurement period will be composed will be conducted by passive diffusion tubes. Totally 4 measurements in a year for each 3 sets of measurements and each set will consist of 20 days while total period will cover 60 days.

The measurement results should be reported. The ambient air quality assessment reports should include the location, date, time and duration of the measurement in addition to the measurement results. Those reports should be submitted to and stored by the HSER. The HSER should also be responsible with the evaluation of the reports and the consecutive environmental actions to be implemented.

#### **7.3.9 Noise Impact**

Noise during construction phase will be generated from the operation of construction machinery as well as from auxiliary equipment and various man-made activities. Noise will be monitored during various phases of construction by Construction Contractor. Noise monitoring will focus on those activities having the greatest potential to generate nuisance due to the type of activity undertaken or due to the duration or timing of the activity.

According to the model results given in ESA Report, the majority of noise levels associated with construction activities is expected to be relatively low. Noise monitoring during construction will focus on activities that occur close to receptors and when night-time working is involved.

At the road site, the most probable receptors will be the workers. In addition to that, the road users will be exposed to noise instantly.

#### *The Mitigation Measures to be applied for Control of Noise*

The mitigation measures described in the following paragraphs will be employed during all construction activities in the vicinity of noise-sensitive receptors, to ensure that adverse noise impacts are avoided.

- A limited number of construction activities will have to continue on a 24-hour basis. Noise-reduction techniques will be implemented in order to minimize the disturbance.
- Inherently quiet plants will be selected for use on site. Each item of powered machinery used on site will be properly maintained and serviced so as to prevent unnecessary noise emissions.

- All items of plants operating on the site in intermittent use will be shut down in the intervening periods between periods of use.
- Routine checks will be undertaken to identify equipment that is emitting unacceptably high noise levels which could be reduced through appropriate repair or general servicing.
- Any item of plant or equipment found to be emitting excessive noise levels will immediately be taken out of service and be adequately serviced, repaired or replaced.
- Plants will be sited in locations as far from possible receptors as practicable will be utilized where necessary to reduce noise levels at receptors.
- Plants known to emit noise strongly in one direction will, whenever possible, be orientated so that the noise is directed away from noise sensitive areas.
- Road design should avoid steep grades and sharp corners to reduce noise resulting from acceleration, braking, gear changes, and the use of engine brakes by heavy trucks at critical locations.

It is considered that the above measures will adequately protect the majority of receptors from noise and vibration, as routine construction activities will take place during the daytime.

Suggested measurement locations are the same locations given in the ESA report and Air Quality Monitoring points indicated in Figure 3. The measurement location is recommended to be selected as the nearest receptor facing to the road at those sites.

According to monitoring results, at places with excessive noise, sound barriers or other measures will be adopted.

Noise complaints constitute an understanding of public perception that allows the responsible bodies to focus their efforts in noise management. In this regard, HSER should study every complaint, including location and times. All complaints should be recorded, stored by HSER. Complaint summaries should be tabulated and the information should be used to correlate noise abatement initiatives. The HSER will be responsible with the implementation of these activities related to construction noise and incase required report the complaints and inconvenient applications to the Construction Manager and/or top management of Construction Contractor including the suggestions for solution.

### **7.3.10 Natural Resources and Energy**

- The ideology of minimal energy consumption should be adopted in order not to assist in the formation of greenhouse gases.
- Sustainable use of water should be encouraged.

- As mentioned in Section 7.3.3, waste reduction, recycling and reuse strategies should be implemented continuously.
- Excavated soil will be reused for only land contouring purposes.
- Use of sustainable materials and waste minimization techniques will be applied all through the project where possible.

In addition, the HSER will encourage the application of such activities and train the staff for related applications.

### **7.3.11 Landscape and Visual Impacts**

It is not possible to prevent the presence of a road from affecting the surrounding landscape. Even maintenance and rehabilitation works can change the appearance of a road, for example through the use of vegetation and shaping of the roadside.

Alignment characteristics can be selected to best fit the route into the landscape. Vertical and horizontal alignment will follow the natural relief as closely as possible within technical constraints such as slopes and radius of curvature.

Curves can accentuate views, while ensuring adequate safety for passing. Coming into close proximity with a natural feature of special interest, such as a rock face, is often better than avoiding it.

Slopes on either side of the road can be varied to match the site's natural topography.

Landscaping proposed for the route will;

- fit in with local vegetation (trees, shrubs, avenue trees, hedges),
- make use of vegetation to harmonize with or improve the existing landscape,
- be representative of the road's category and function,
- respect views and not be planted systematically just to fill in space,
- take advantage of natural openings in the existing vegetation,
- frame and underscore the various landscape units crossed,
- suit and underscore the various engineering structures,
- ensure user safety by using the landscape to signal changes in the route, for example, by decreasing the space between avenue trees before entering a curve or village; and
- pay attention to the aesthetics of engineering structures by selecting materials that adopt local colors and textures and which give the structure a simple shape.

Maintenance of roadside vegetation, slopes, and structures can greatly affect visual appearance and can be enhanced by involving maintenance workers in the planning and management of the roadside environment.

Indigenous wildflowers and grasses will be planted for a low maintenance roadside.

The use of best practicable means to maintain or enhance the existing landscape and visual condition in relation to construction activities will include the following:

- In order to avoid the adverse impacts on vegetative cover, the fertile topsoil should have to be stripped during the construction activities and stockpiled properly.
- The carried topsoil should never be handled under wet conditions. Topsoil will not be placed on a sub-grade that is excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or proposed planting.
- The landscaping specifications are required to implement plantation plan defining the role of the parties involved in landscaping works, quality of the landscaping materials, implementation techniques and landscape management (maintenance) criteria.

#### **7.3.11.1. Socio-Economy**

A public consultation meeting was organized by ÇINAR with the support of YILMAZER at the beginning of the Project

- to inform public about the project activities, and
- to obtain their opinions and suggestions about the project.

Public was invited to this meeting through announcements. The meeting was conducted on 4<sup>th</sup> of February where residents of surrounding villages were joined. Brochures including general information about the project were distributed to the participants.

During the construction stage of the project, some local people should be employed by subcontractors as a worker, but there is no definite number of workers to be employed from the surrounding residential areas.

During the construction of road, the individuals and groups will be identified and will be involved in consultations. Typically, they include beneficiaries of the project; potential losers, i.e. those at risk of experiencing disadvantages; other stakeholders or parties with an interest in the project, such as governments and elected officials, experts, and non-government organizations; and others whose local knowledge may assist in identifying potential impacts and assessing the viability of alternatives.

### **7.4 Elements of the Road Operations Monitoring Program**

#### **7.4.1.1. Biodiversity**

A detailed flora and fauna study was carried out and discussed in ESA Report by ÇINAR. According to that study, no environmentally significant area was identified within the project area. Therefore, the management of flora, fauna and habitat has been limited to landscaping. The objective in relation to flora, fauna and habitat is to maintain and

enhance the landscape area of the road and to assist in improving the ecology of its surrounds.

In this respect, the road operation activities do not have harmful affect on the populations of vertebrate species and flora both at the road and its environs.

The operation activities would not have direct harmful effect on the populations of flora and fauna species both at road and its environs. Flora and fauna species would be affected indirectly from the road activities such as noise, air emissions etc.

Animal crossings can be used to assist the migration of animals at residential areas having crowded animal herd. At important crossing points, animal tunnels or bridges have sometimes been used to reduce collision rates, especially for protected or endangered species. Tunnels are sometimes combined with culverts or other hydraulic structures.

Fencing or plant barriers can reduce the risk of collisions between animals and vehicles. In some cases, semi-permeable fencing is used, which excludes species that are more likely to be involved in collisions while letting less problematic species through. Fences may interfere with the migratory patterns of animals, or may simply shift the points where migratory patterns conflict with traffic patterns along the route.

Reduction of the speed limit may reduce the rate of collisions between vehicles and animals. Some jurisdictions apply lower speed limits, particularly at night and in areas of frequent animal crossings. Signs warning motorists of the presence of animals in places where animal corridors cross the road may also help to reduce collisions. Roadside reflectors may be used to scare animals away from the roadway when vehicles approach at night.

#### **7.4.1.2. Solid Wastes**

Small amounts of solid wastes mainly consist of paper, cards, packages, plastics and glass will be produced during operation of road. These wastes will be collected, stored and segregated at containers located along the road. Wastes should be, as far as practicable, be segregated and the ones available should be sent for recycling or reuse. The remaining part will be transported to the solid waste landfill areas.

#### **7.4.1.3. Hazardous Materials and Wastes**

No special production of hazardous wastes is expected during the operation phase. Only in case of an accident oil and fuel spills might occur. Or a hazardous material transportation vehicle is incorporated to an accident; the load might spill through soil. In such a case the spilled material and polluted soil will be scraped and send to the proper disposal site accepted by the local government.

#### **7.4.1.4. Water Quality**

Project is implemented on dry area. Baseline surface and groundwater quality could not be determined along the Erbil-Altunkopri (Perdi) Highway. Because, there was no

surface water source intersecting the Erbil-Altunkopri (Perdi) Highway and there was no ground water well along the project site.

The road drainage system will be periodically cleared so as to ensure rain water flow. Since there was no surface water source intersecting the Erbil-Altunkopri (Perdi) Highway and there was no ground water well along the project site these issues have less impact on water resources.

#### **7.4.1.5. Soil Quality**

Soil contamination can arise from daily traffic operation on very busy roads. Metals such as chromium, lead, and zinc have been deposited in the soil for hundreds of years. Pollutants settling in roadside soil can impair the growth of vegetation and the success of soil organisms, thus increasing the likelihood of erosion.

In colder climates, salting of roads can lead to soil contamination and subsequent decreases in fertility. Since the area is dry this issue has no impact on soil. Pollution risks also arise from transportation of hazardous products during road construction and subsequent traffic operations.

In case of fuel spills to soil, the contaminated soil will be stripped until there is no sign of contamination and deposited in drums to be sent to a licensed company.

#### **7.4.1.6. Air Emissions**

The emission of pollutants by vehicles has worldwide impacts and contributes greatly to the total atmospheric pollution generated by people.

No regular monitoring of air quality is suggested for the construction phase.

#### **7.4.1.7. Noise Impact**

Noise associated with road development has four main sources: a) vehicles; b) friction between vehicles and the road surface; c) driver behavior; and d) construction and maintenance activity.

A comprehensive study that includes the baseline noise level survey as well as the future projection of noise levels peculiar to road traffic was carried out and presented in ESA Report.

The purpose of this current noise management plan is an attempt to minimize the level of disturbance to residents living in the vicinity of the road.

The challenge in implementation of a management and monitoring plan for the road site is balancing the demand for safe, convenient, 24-hour road services and keep residents in peace. This balance may be accomplished through the following practices;

- The operation of the road should be arranged responding to public concerns.
- Further settlement in the vicinity of the crowded section of road should be avoided by the Municipality.

- Regular noise monitoring should be conducted and the monitoring results should be compared with the regulatory levels for determination of the necessity of excessive mitigation measures such as noise protection walls etc.

Regular noise level measurements are suggested to be performed at the nearest settlement areas in order to assess the impacts of traffic on the surrounding community. In addition to that seasonal variation should also be assessed.

Suggested measurement locations are the same locations given in the ESA report as seen in Figure 3. The measurement location is recommended to be selected as the nearest receptor facing to the road at those sites.

According to monitoring results, at places with excessive noise, sound barriers or other measures will be adopted.

#### **7.4.1.8. Natural Resources and Energy**

Roads can generate large quantities of litter and consume large amounts of energy from lighting and fueling. Road users can generate significant quantities of litter, such as corrugated cardboard, paperboard, wooden pallets, aluminum, plastic, and glass containers.

The issues stated in Section 7.3.10 should be implemented during the operation of road. The proposed energy efficient design and use of sustainable materials and waste minimization techniques should be applied all through the project when feasible.

#### **7.4.1.9. Landscape and Visual Impacts**

The use of best practicable means to maintain or enhance the existing landscape and visual condition in relation to operation activities will include the following:

- Qualitative landscaping throughout the road site should be ensured and a high standard of landscaping should be maintained.
- Careful planting should be carried out along the road in order to control wind erosion; reduce water and energy usage.
- Disruption of the natural landscape systems should be minimized by proper site and design works.
- Native vegetation should be maintained to encourage self-sustaining development of the ecosystem.
- The screening of the project area from the surrounding villages should be considered.

The maintenance of the improved landscape will be conducted under the supervision of the GDRB.

#### **7.4.1.10. Socio-economy**

A set of public consultation meeting will be organized during the operation stage to understand the public complaints during the operation phase.

In rural areas, the normal links between villagers and their farmlands (i.e., their economic space) may be cut by a new road or increased traffic. On the scale of the individual farm, the same phenomenon may disrupt existing farming patterns and connections between fields. The ensuing impact on economic activity could be a loss of agricultural productivity or increased travel costs.

In project location, every effort will be made to facilitate the maintenance of existing patterns of movement and the continued use of existing modes of transportation and communication.

Permanent occupancy of the open space of a publicly owned right-of-way quite commonly invites encroachment of local community activities onto the roadside, the footpaths, the bus stops, and even the road surface itself.

In addition to that social activities associated with the roadside which are far from illegal. In rural areas and at entrances to towns and villages, the roadside provides a social venue.

Gentrification is a term sometimes applied to situations in which the value of land in a particular area is increased by infra-structural improvements, leading to higher rental values, a turnover in occupancy, and a replacement of lower-income tenants and residents by those who can afford the higher rents. This is a distributional issue, in that, overall, development projects can harm some segments of the community.

## **7.5 Implementation of the Monitoring Program**

Monitoring activities will commence as this ESMP comes in force and will continue throughout the construction and operation activities. During the construction stage, the HSER will be responsible from the implementation of Construction Contractor's responsibilities indicated in this ESMP throughout the construction, and GDRB Representative will be responsible during the operation phases of the project.

The HSER will be trained in sample collection techniques, sample labeling and transport, record keeping, tracking waste movements, and reporting procedures. In addition to that he/she will be trained for training of the personnel.

Appropriate equipment will be employed in the measurement program, including sampling devices (such as containers, storage, data recorders etc.).

A record keeping system for monitoring data will be developed. The database should include the results and official reports of all the environmental activities mentioned in the ESMP. Also, all original assessment reports prepared both by the HSER and by other parties should be maintained in the data centre for possible audits and for future reference. The HSER should be responsible from the database and its constituents.



## **7.6 Audit and Review**

The performance of the monitoring program will be under the responsibility of PROTEK, Construction Contractor and GDRB as indicated under each heading. GDRB will maintain an oversight and audit role for all aspects of the monitoring program. This will include independent monitoring throughout construction and operation to verify the results of monitoring programs.

Monitoring results will indicate whether the ESMP standards are being met or not. A corrective course of action will be followed during both the construction and operation phases by PROTEK and Construction Contractor in line with the suggestions of the HSER. With respect to the findings of the monitoring, immediate implementation of corrective action and additional monitoring to confirm the success or failure of the corrective action is required.

Self-monitoring should be another issue to be maintained by the HSER throughout the implementation of the ESMP. Self-monitoring has potential advantages, because it can use the HSER's own knowledge, it encourages the HSER to take responsibility for environmental issues.

It is the responsibility of PROTEK and Construction Contractor to establish and set appropriate quality requirements, and to consider a range of safeguards.

## **8 RISK MANAGEMENT**

This Risk Management is developed for the construction and operation phases as a strategic level of environmental management. The aim is to minimize the environmental risks to which road site is possible to be exposed due to its current and future activities.

Risk treatment involves identifying options for managing the risk, selecting appropriate options, preparing risk treatment plans, defining performance criteria and implementing the plans. Risk treatment options are:

- avoid exposing the environment to a hazard—do not undertake the potentially harmful activity,
- reduce the likelihood of harm,
- reduce the impact of the risk (e.g. emergency management and contingency plans or plans which minimize consequences of change), and
- transfer risks (this normally only relates to risks to the organization rather than risks to the environment itself, e.g. the risks associated with dealing with hazardous waste can be transferred to a contractor).

*The possible risks associated with the road construction activity are as follows:*

- Possibility of fuel or chemical leakages or spills from the construction vehicles or depots.
- Natural disasters such as earthquake, flood, etc. will affect both the work of Constructor Contractor and GDRB.
- Traffic accidents are under the responsibility of PROTEK, Construction Contractor and GDRB.

The above stated issues except leakages and spills will be governed by making use of the available resources of both parties involved and their existing tools and action plans for handling. In some cases consultancy could also be supplied from 3<sup>rd</sup> parties and private consultancy firms for handling of the environmental hazard associated with the accidents, terrorist actions and natural disasters.

For management of the risks associated with spills and leakages the following procedure will be applied;

- In case a spill or leakage is detected,
- The body detected the spill will immediately inform the HSER,
- Immediately the source of spill will be determined and stopped,
- The HSER will determine the significance of spill and possible handling method,
- Accordingly, he will involve the application of spill kits, absorbent pads or similar tools to stop the penetration of spill to deeper layers of soil,

- Contaminated soil will be stripped to adequate depth and transferred to the hazardous waste containers,
- The containers will be moved to the Waste Storage Point for further transfer to appropriate disposal facility, and
- The source of spill will be corrected for future re-occurrence.

*The possible risks associated with the road operation activity are as follows:*

- Spill of hazardous substances during transport.
- Natural disasters such as earthquake, flood, etc.
- Terrorist actions to the road.
- Traffic accidents.

The above stated issues will be governed by making use of the available resources of mainly GDRB with their existing tools and action plans for handling. In some cases consultancy could also be supplied from 3<sup>rd</sup> parties and private consultancy firms for handling of the environmental hazards.

#### **8.1 Occupational Health and Safety Management**

Health and Safety issues will be handled in a separate report by Construction Contractor during construction and by GDRB during the operation phase.

#### **8.2 Pollution Incidents Reporting**

The environmental activities will be reported weekly during the construction by the HSER. In addition to those, both for construction and operation phases, the environmental incidents will also be reported and submitted immediately to top management of Construction Contractor and GDRB. Thus, related actions or contingency plans could be implemented as soon as possible.

These records will be kept by the HSER in regular files to be audited and controlled by the Construction Manager/Operation Manager.

## **9 DOCUMENT CONTROL AND RECORD KEEPING**

The environmental management activities will be documented and followed to effectively manage the environmental performance of the project. Non-compliance observations, decisions on identified issues, solutions, corrective and preventive actions taken and the results of these actions will be documented.

The recording of these reports will be the responsibility of the HSER. Weekly reports for the construction phase will be produced by the HSER and submitted to the construction manager for construction phase.

The environmental activities will be reported by HSER by filling Environmental Compliance Checklist (Annex 1). In addition to that, the reports will include the site observations of HSER.

The reporting of monitoring results should include presentation and summary, related information and compliance findings in an effective way. While reporting scope of the report, responsibility for producing the report, legal aspects and quality of the reports should be considered as well.

A record keeping system for monitoring data will be developed. The database should include the results and official reports of all the environmental activities mentioned in the ESMP. Also, all original assessment reports prepared both by the HSER and by other parties should be maintained in the data centre for possible audits and for future reference. The HSER should be responsible from the database and its constituents.

These records will be kept by the HSER in regular files to be audited and controlled by the Construction Manager/Operation Manager.

## **10 SUMMARY AND CONCLUSIONS**

An ESMP has been developed for the rehabilitation of Erbil-Altunkopri (Perdi) Highway. The management plan considers both the needs of road safety and environmental conservation throughout the construction and the operation phases of the Project.

This ESMP establishes a five-year plan for managing the environmental issues arising from the construction and the operation activities at Erbil-Altunkopri (Perdi) Highway. After the first 5 years of operation, the monitoring results should be evaluated and considered for development of the life time ESMP.

ESMP serves for the objective of eliminating potential environmental and social impacts, or to reduce them to acceptable levels, comply with regulatory requirements, and continuously improve the environmental management at Erbil-Altunkopri (Perdi) Highway.

The plan consists of mitigation, management, monitoring and institutional measures to be taken during construction and operation stages. The plan also includes the actions needed to implement these measures.

The responsible bodies for these actions have been indicated for each stage of the activities. A part of the responsibilities are assigned to PROTEK, Construction Contractor while the other part is assigned to GDRB.

Within the context of the ESMP, the construction stage and road operations were studied including the following subject areas:

- Cultural heritage, ecology, solid and hazardous wastes, liquid discharges, water quality, soil quality, air emissions, noise impact, natural resources and energy, landscape and visual impacts, social impacts.

Finally, a plan has been developed to ensure sustainable environmental management, and to identify opportunities for improvement based on the results of environmental monitoring and auditing of road activities.

The overall environmental management and monitoring plan have been developed and presented as an Environmental Matrix in the next section.

### **10.1 Environmental Matrix**

The potential environmental impact, mitigation plan and monitoring plan are emphasized in the matrices given in Table 1 and Table 2 concerning various environmental issues of construction and operation stages of the project.

**Table 1. Construction Phase of the Project**

ISSUE	POTENTIAL CONSTRUCTION IMPACT	MITIGATING MEASURE	MONITORING PLAN	RESPONSIBLE ORGANIZATION-PERSON
Cultural Heritage	Possible existence of an archaeological or cultural asset.	Stop the work. Inform the related organization.	-	Construction Contractor - Construction Manager
Biodiversity	Disturbance of some fauna species. Disturbance of natural soil characteristics.	Personnel to be involved in construction works should be informed and trained about protection of the flora and fauna species. Top soil, containing the seed bank and fertile material should be maintained through appropriate handling practices.	Visual observation should be conducted at site. Protective actions should be implemented whenever needed.	Construction Contractor – HSER
Solid Waste	Wastes arising from the construction activities (inclusive of domestic wastes).	Following issues should be adopted; § waste avoidance, § minimization of quantities and minimization of hazards of waste generated, § reuse, recovery and recycling of waste, § disposal of waste.	Waste collection, waste processing, disposal and transfer of wastes should be monitored and documented.	Construction Contractor – HSER
Hazardous Materials and Wastes	Over accumulation. Inappropriate handling and transportation. Spill occurrence.	Safe and temporary storage of hazardous waste should be ensured. Over-accumulation of wastes should be avoided. Spill control bunding should be established. Waste transport forms will be used.	Waste identification and record keeping should be conducted.	Construction Contractor – HSER
Liquid Discharges	Waste water produced from the existing road and construction facilities.	Waste water produced due to the camp activities will be collected in impermeable septic tank. Waste water will be regularly taken from the tank and transported to the nearest municipal waste water collection facility by vacuum truck.	HSER will monitor the possible leakage from septic tank.	Construction Contractor, GDRB – HSER, GDRB Representative
Water Quality	Possibility of fuel and chemical leakage.	No adverse impact is expected.	HSER will monitor the possible leakage and collect complaints.	Construction Contractor, GDRB – HSER, GDRB Representative

ISSUE	POTENTIAL CONSTRUCTION IMPACT	MITIGATING MEASURE	MONITORING PLAN	RESPONSIBLE ORGANIZATION-PERSON
Soil Quality	Disturbance of natural soil. Loss of fertile topsoil. Soil contamination.	Topsoil and subsoil will be deposited separately. In case of fuel spills to soil, the contaminated soil will be stripped until there is no sign of contamination and deposited in drums to be sent to licensed company.	HSER will monitor the possible leakage and collect complaints.	Construction Contractor – HSER
Air Quality	Exhaust emissions of construction vehicles and dust produced by construction activities.	Water spraying over the unpaved roads to minimize dust formation during spring and summer months. Keeping the stock piles humid that are open to wind or either covering to minimize dust formation Regular air quality checks of the exhausts of construction vehicles.	Dust formation should be observed visually and remedial measures should be implemented immediately. Air Quality should be monitored at potentially affected receptors seasonally.	Construction Contractor, GDRB – HSER, GDRB Representative
Noise Impact	Disturbance of residents and road users.	It is considered that the measures will adequately protect the majority of receptors from noise and vibration, as routine construction activities will take place during the daytime.	Monitoring should be performed when there is a change in construction activity that may result in an increase in noise levels or if any potentially noisy activity occurs during night-time	Construction Contractor, GDRB – HSER, GDRB Representative
Natural Resources and Energy	Inefficient and excessive usage of natural resources.	The ideology of minimal resource consumption should be adopted.	Personnel should be encouraged and trained related to minimal energy and resource consumption continuously.	Construction Contractor, GDRB – HSER, GDRB Representative
Landscape and Visual Impacts	Destruction of some of the existing landscape elements.	The best practicable means should be used to maintain or enhance the existing landscape and visual condition. Adverse impacts should be assessed.	The use of best practicable means to maintain or enhance the existing landscape and visual condition in relation to construction activities	Construction Contractor– HSER
Socio-economy	Employment of local workers.	No adverse impact is expected.	Community Complaints will be monitored and collected by HSER.	Construction Contractor, GDRB – HSER, GDRB Representative

**Table 2. Operation Phase of the Project**

ISSUE	POTENTIAL OPERATION IMPACT	MITIGATING MEASURE	MONITORING PLAN	RESPONSIBLE ORGANIZATION – PERSON
Biodiversity	Indirect effect on flora and fauna species due to the road activities (such as noise, air emissions, water and soil quality deterioration etc.)	Special care should be given to protect these species and contingency plans should be implemented whenever required. The personnel to be involved in the operation works should be warned about the protection of the flora and fauna species.	-	GDRB - GDRB Representative
Solid Wastes	Small amounts of solid waste generation consisting of paper, cards, packages, plastics and glass.	Following issues should be adopted; § waste avoidance, § minimization of quantities and hazards of waste generated, § reuse, recovery and recycling of waste, § collection and disposal of waste.	-	GDRB - GDRB Representative
Hazardous Materials and Wastes	Inappropriate handling and transportation. Spill occurrence.	Safe and temporary storage of hazardous waste should be ensured. Licensed company will be used for transport. Waste transport forms will be used.	-	GDRB - GDRB Representative
Water Quality	Possibility of fuel and chemical leakage.	The quality of water should be protected by stripping the contaminated soil to the required depth and appropriate disposal.	-	GDRB - GDRB Representative
Soil Quality	Soil contamination. (through spills)	The quality of soil should be protected by stripping the contaminated soil to the required depth and appropriate disposal.	-	GDRB - GDRB Representative
Air Emissions	Deterioration of air quality.	-	-	GDRB - GDRB Representative



ISSUE	POTENTIAL OPERATION IMPACT	MITIGATING MEASURE	MONITORING PLAN	RESPONSIBLE ORGANIZATION – PERSON
Noise Impact	Disturbance of road users and the residents.	Noise related complaints should be responded.	Regular noise level measurements should be performed at the nearest settlement areas seasonally.	GDRB - GDRB Representative
Natural Resources and Energy	Inefficient and excessive usage of natural resources.	The ideology of minimal resource consumption should be adopted.	Personnel should be encouraged and trained related to minimal energy and resource consumption continuously.	GDRB - GDRB Representative
Socio-economy	Employment of local workers.	No adverse impact is expected.	Community Complaints will be monitored and collected by HSER.	Construction Contractor, GDRB – HSER, GDRB Representative
Landscape and Visual Impacts	The existing landscape character will remain the same.	The best practicable means should be used to maintain or enhance the existing landscape and visual condition. Adverse impacts should be assessed.	Constant visual observation	GDRB - GDRB Representative

**11 REFERENCES**

- World Bank Roads & Environment Handbook.
- Integrated Pollution Prevention and Control, 2003. Reference Document on the General Principles of Monitoring.

**ERBIL-ALTUNKOPRI HIGHWAY  
ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**



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**ANNEX 1. The Environmental Compliance Checklist**

**PROTEK**  
**PROJE**

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