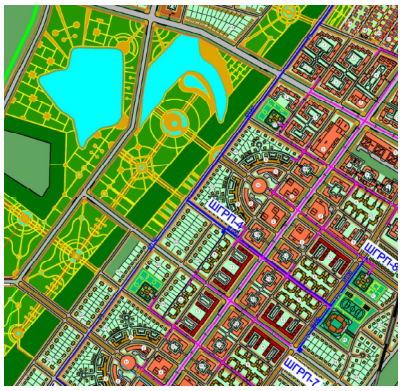
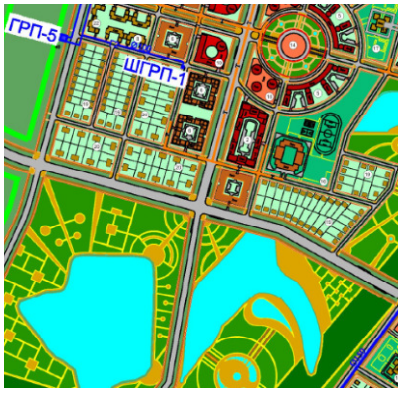
Review of the EIA for the Gate City Project

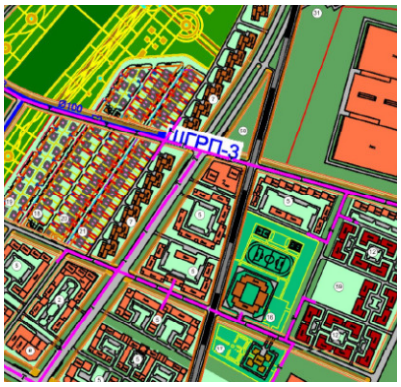
Report

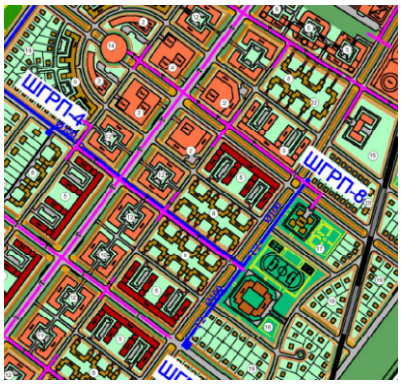
21st December 2012

UNITED KINGDOM & IRELAND









Prepared for:
Hill International (on behalf of Caspian Group, International Communications Group and CS Developments)

REVISION SCHEDULE					
Rev	**Date**	**Details**	**Prepared by**	**Reviewed by**	**Approved by**
1	14 December 2012	Draft Report with Gap Analysis and Provisional ESAP	Fraser Paterson Associate Sustainability Advisor Elena Ivanova Independent EIA Specialist, Kazakhstan	Elodie Bauguen Social Development Specialist	Louise Porteus Director, International Environment
2	21 December 2012	Draft Report with Gap Analysis and Provisional ESAP	Fraser Paterson Associate Sustainability Advisor Joanna Goldsmith Environmental Specialist	Louise Porteus Director, International Environment	Louise Porteus Director, International Environment

URS Infrastructure & Environment UK Limited
6-8 Greencoat Place,
London
SW1P 1PL
United Kingdom
Telephone: +44 (0)20 7798 5000
Fax: +44 (0)20 7798 5001

Limitations

URS Infrastructure & Environment UK Limited ("URS") has prepared this Report for the sole use of **Hill International Ltd** ("Client") **and its client CS Development LLP (part of the Sponsor Group)** in accordance with the Agreement under which our services were performed **(Project No. 47065291)** ("Agreement")**.** No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by URS.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

Whilst the Agreement expressly allows posting of the Final version of this Report in its entirety on the web site of the Overseas Private Investment Corporation (OPIC), no party other than the Clients shall have any rights attaching to, arising out of or inferred from the Report, including, without limitation, the right to rely on the content of the Report. URS shall have no liability to any third party with respect to the information contained in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken in **November-December 2012** and is based on the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

URS disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to URS' attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. URS specifically does not guarantee or warrant any estimate or projections contained in this Report.

Copyright

INTRODUCTION

URS and a locally licensed Environmental Impact Assessment consultant in Kazakhstan have reviewed and summarised the Russian language EIA document prepared for the proposed Gate City Development, within which the pilot **Koyankus Housing Development Project** (herein referred to as the 'Project') is located. The EIA for the Gate City Development was undertaken between 2007 and 2008 and has been formally approved; it remains valid for 5 years.

The Project is the first pilot stage of a broader development known as the G4 Cities Initiative which includes Gate City. The Project, located less than 1.5 kilometres to the north of the existing Almaty City boundary, comprises an area of 181 hectares that will developed as residential and retail space.

G4 Cities Initiative (herein referred to as 'G4 Cities') is made up of four cities 'Gate', 'Golden', 'Growing' and 'Green'. The initiative was conceived with a view to providing sustainable and affordable economic growth in order to establish a 40-year development, growth and implementation framework for the Almaty City Region.

Gate City Development (herein referred to as 'Gate City') is one of the four proposed sustainable urban settlements that make up G4 Cities. Gate City, proposed as a retail and commercial hub, is the southernmost of the four cities and will be the first to be developed.

The Russian language EIA, prepared for Gate City, is a broader, more programmatic document that addresses risks and impacts associated with development of the larger Gate City development; it does not specifically address the risks and impacts associated with the Project.

This document has been prepared in lieu of a complete English language translation of the original Russian language EIA. Note that the Russian language EIA is not available in electronic format, but a hard copy of the document is available for review at the Sponsor Group's offices in Almaty. Tables and figures included in this review have been extracted from the original Gate City EIA and translated into English, thus table and figure numbering reflects the numbering used in the Gate City EIA for ease of reference to the original document.

URS undertook a separate gap analysis of the Gate City EIA, assessing the Project component against 2012 IFC Performance Standards. URS provided the Project Developer with a number of priority actions to address potential gaps in its environmental and social arrangements and provided guidance on developing its management systems for the Project. URS' recommendations have been taken on board the Project Developer.

The following text summarises the contents and conclusions of the Gate City EIA document with regard to its suitability and sufficiency in the context of the Project; it is not intended to be a complete translation of the EIA. Key points for Gate City and the Project are:

1. As part of Gate City, the Project, along with G4 Cities as a whole, will realise considerable socio-economic benefits at the national, regional and local levels;

2. There are no apparent major outstanding environmental or social issues or impacts in regards to the Project site that are considered to be major concerns or 'red flag' issues to prospective lenders or investors in the development;

3. The EIA process involved extensive baseline analysis across the full range of environmental and social topics that are normally considered in such studies. The techniques used to identify and evaluate potential impacts then recommend avoidance and mitigation strategies are also considered to be generally sound in relation to Gate

City, even if the EIA process did not take account of current international standards for development projects (such as the IFC Performance Standards);

4. There are a few potential gaps in the EIA coverage of Gate City's potential impacts, for example in regard to climate change, energy efficiency, optimisation of greenhouse gas emissions and planned measures for adaptation to any effects of global warming. This is a core issue of the 2012 IFC Performance Standards so it will need to be addressed in the future in regard to Gate City, although it is not considered to be an essential stand-alone requirement for the Project.

5. The Gate City EIA does not specifically address the Project. Had this been a stand-alone EIA for the Project, a more granular approach might have identified a need to undertake some more targeted environmental and/or social studies (e.g. an analysis of project-related traffic and its impacts on local transport infrastructure or more detailed research into the surrounding area's possible gender issues and potentially more vulnerable stakeholders such as the aged, disabled, infirm, single-parent families, etc.). However, as is typical in Kazakhstan's centralised planning approach, public authorities and agencies play a key role throughout the EIA process and these organisations may have such information already at their disposal and such studies may not have been necessary.

6. It is noted that the EIA does not always clearly differentiate between the impacts, mitigation actions and monitoring programmes associated with the activities of the various organisations involved in the Project. For example, although construction and related works are being undertaken by the Project Developer, the authorities and utility providers, the EIA does not specify precisely which partner will be responsible for what activities. Nonetheless, it is considered that this minor shortcoming can be quickly rectified.

7. A number of negative impacts have been identified, mainly in relation to environmental and occupational and community health and safety issues, but these can be successfully mitigated through a combination of the Master Plan design process, the recommendations both the Gate City EIA, and the Project Developer's and D&B Contractor's application of good international industry practices.

SUMMARY REVIEW OF THE ENVIRONMENTAL IMPACT ASSESSMENT FOR THE GATE CITY REGIONAL PLANNING PROJECT

TABLE OF CONTENTS

1 CONTEXT

Kazakhstan's development goals are articulated in the Development Strategy of Kazakhstan through to 2030 as well as medium and long term Government strategies such as:

- The Territorial Development Strategy of Kazakhstan until 2015;
- The long-term vision of economic positioning of Almaty city and Almaty region up to 2015;
- The State program of Apartment construction to 2008-2010;
- The strategy of Almaty General Development Plan (AGDP) 2020; and
- The Concept of the Transition of Kazakhstan to Sustainable Development through to 2024.

The country's national development agenda is aimed at two clear goals:

- To become a full member of the global economy through the adoption of international standards for its productive, financial and public sectors, and
- To diversify the economy.

Based on those objectives, the Government identified the following priorities:

i) Increasing public sector effectiveness;
ii) Promoting competitiveness;
iii) Investing in human capital and basic infrastructure; and
iv) Ensuring that future growth will not degrade the environment and that past liabilities are suitably mitigated.

G4 Cities Initiative

G4 Cities aims to provide sustainable and affordable economic growth in order to establish a 40-year development, growth and implementation framework for the Almaty City Region and, in doing so, meeting the vision and objectives set out in the AGDP 2020.

G4 Cities addresses the need to invest in both human capital and the necessary infrastructure to sustain future economic growth. It involves a series of detailed urban development plans of four cities covering an area of around 70,000 hectares of rural land north of Almaty. Refer to Figure 3.4.1.1.

The G4 Cities will comprise of 'Gate', 'Golden', 'Growing' and 'Green' City, which are being designed as sustainable urban settlements, with a total population of approximately 350,000 people, along a 65 kilometre long linear urban growth corridor to the north of Almaty.

Gate City Development

Gate City, an urban centre for retail and commercial activity, will be the southernmost component of the initiative and will be the first phase to be developed. Refer to Figure 1.2.1 below.

Koyankus Housing Development

The Project represents the first, pilot stage in the development of Gate City and is located within the southernmost area of Gate City. Refer to Figure 6.2.1.1 below.

Master Planning

G4 Cities was initiated by the Sponsor Group who commissioned a Design Concept. The principle of developing the four cities was approved by the President of Kazakhstan in 2007

and the development was subjected to the national Master Plan process. Initially, progress was delayed by the global economic crisis and its effects on Kazakhstan's banking system and housing market.

A detailed General Master Plan was submitted in 2009 (reference no. 01-046/09 dated January 30, 2009) and, following review by the various Ministries and Almaty Oblast departments, was subsequently approved and signed off by the Government. An Updated Detailed Master Plan has since been produced to accommodate minor design changes suggested by the D&B Contractor; it has been submitted to the authorities and approval is currently pending.

Figure 3.4.1.1 - The G4 Cities Development Project

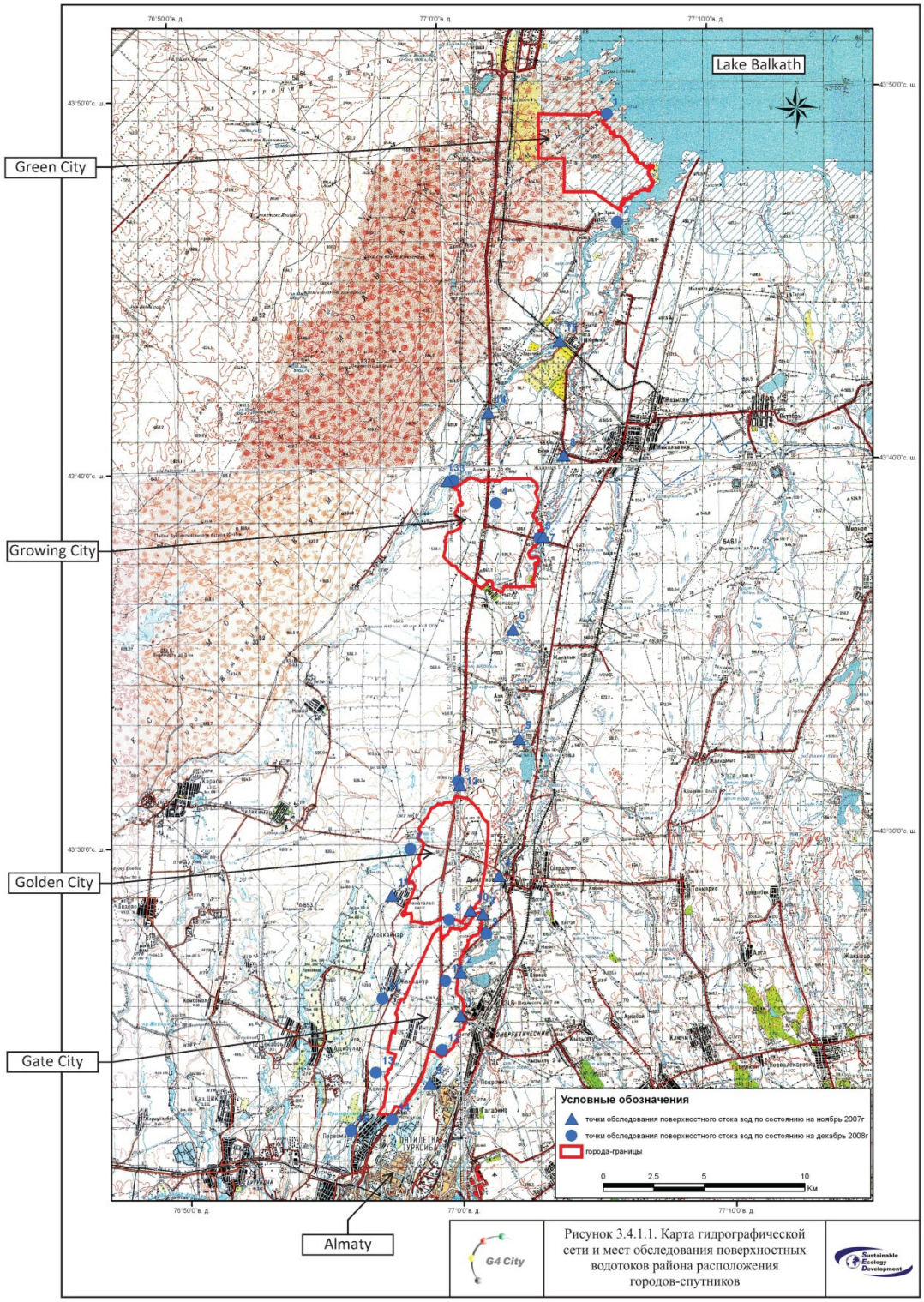


Figure 1.2.1 – Gate City Plan

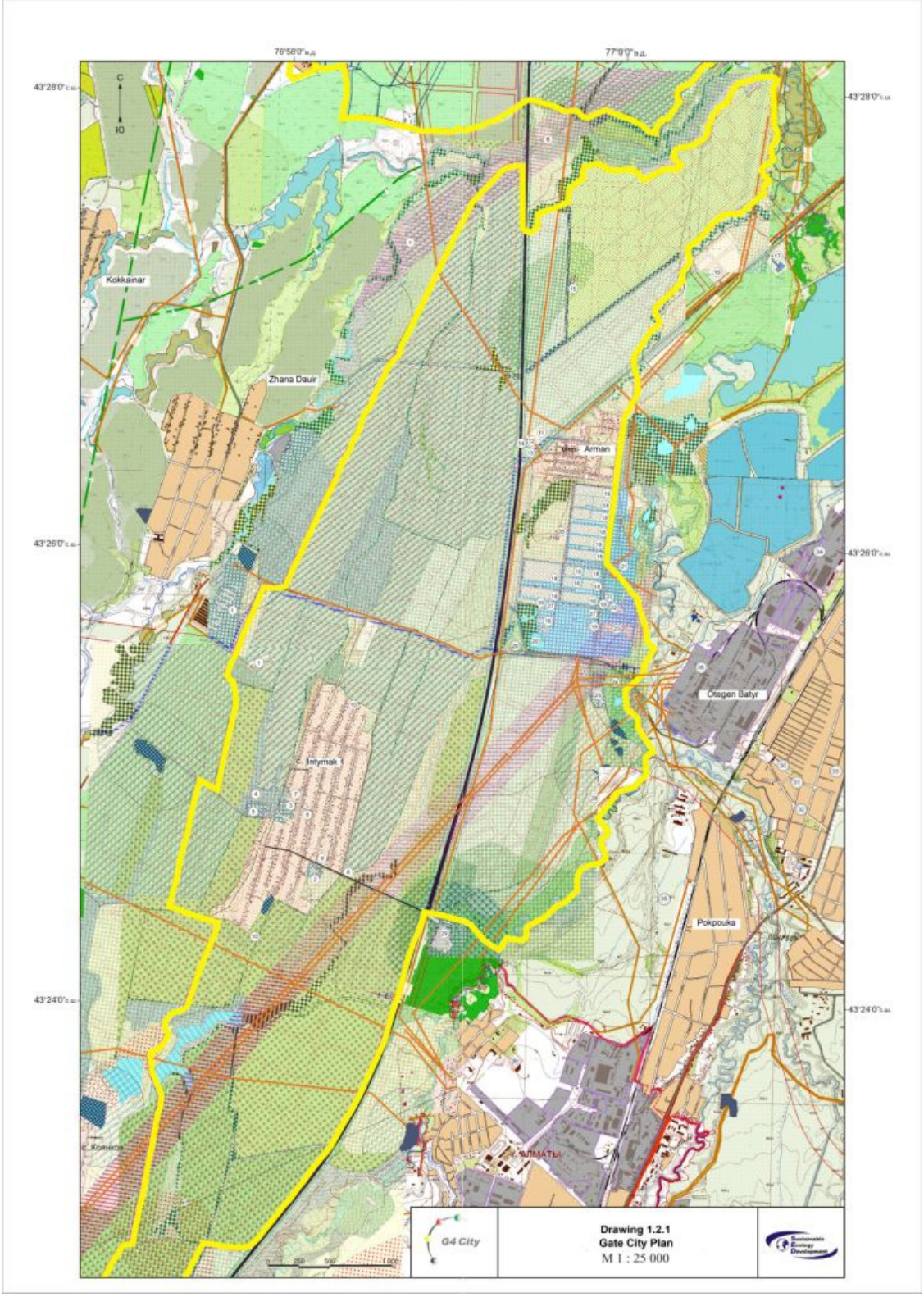


Figure legend corresponding to for Figure 1.2.1

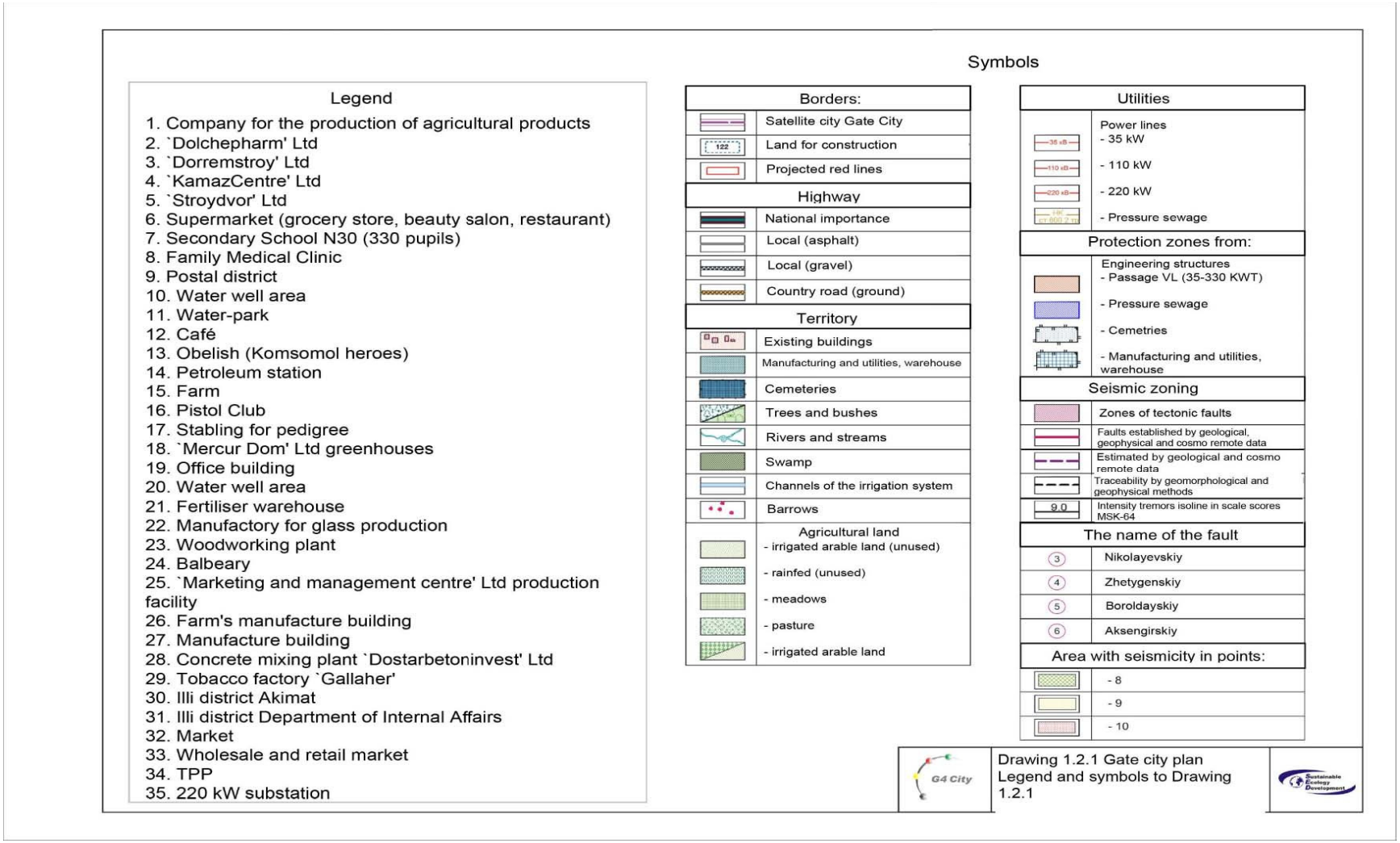


Figure 6.2.1.1 - Koyankus Housing Development Area, Southern part of Gate City

2 KOYANKUS HOUSING DEVELOPMENT - PROJECT DESCRIPTION

Housing and Infrastructure

The Project is part of the first phase of the G4 Cities planned for construction. It is located less than 1.5 kilometres to the north of the existing Almaty City boundary, along and just to the west of the main Almaty to Kapchagay highway. The Project comprises only 181 hectares out of approximately 2,190 hectares of area planned for Gate City. It includes approximately 600,000 m^2 of mixed use net saleable residential area and approximately 10,000 m^2 of retail space.

The anticipated mix of the residential units is as follows:

By net saleable area ("NSA"):

Apartments	Economy Townhouse	Economy+ Townhouse	Detached House	TOTAL
395,044sq.m	129,623sq.m	71,017sq.m	4,313sq.m	599,996sq.m
65.8%	21.6%	11.8%	0.7%	100%

By unit numbers:

Apartments	Economy Townhouse	Economy+ Townhouse	Detached House	TOTAL
6,319 units	1,188 units	547 units	23 units	8,077 units
78.2%	14.7%	6.8%	0.3%	100%

It is anticipated that the Project will be constructed in five sections over a construction period of just less than six years, with the all units released on to the market and anticipated to be sold within seven years from financial close. The product mix is designed to encompass: (i) one (studio), two, three and four room apartments; (ii) "Economy" and "Economy Plus" townhouses; and (iii) a small number of detached (or "individual") houses.

The apartment units are planned to be constructed in low level apartment buildings, six storeys high, with an average NSA per apartment of approximately 63 m^2. "Economy Class" townhouses are expected to have an average NSA per townhouse of approximately 109 m^2 and "Economy Plus Class" townhouses are expected to have an average NSA per townhouse of approximately 130 m^2. The envisaged 32 detached houses are expected to have an average NSA per townhouse of approximately 188 m^2.

The units will, as a minimum, meet the relevant Kazakhstan standards of quality for materials, workmanship and finishing details for developments of this type. The whole of the works will in addition be executed accordance with the style, character and level of finishes expected for an affordable residential development of this nature and in this location.

In order to provide retail facilities for residents, approximately 10,000 m^2 NSA of retail area is being provided. These facilities will be in the form of ground level retail units incorporated within some of the residential apartment blocks (i.e. local retail stores). They will be finished to a 'shell and core' standard only and will be completely segregated (in terms of access) from the remainder of the building.

All of the residential units (including the apartments) will be sold with freehold title, which is standard for residential property sales in Kazakhstan. Kazakh law does not specifically refer to the concept of strata title, instead the sale of apartments are referred to in law on the basis of "condominium schemes". In accordance with this Kazakh legal concept, a condominium is

defined as a special form of ownership over immovable property – a single complex of residential and related facilities, where residential premises are in private ownership of individuals, legal entities or of the State, while the common areas are owned by individual owners as a whole, based on the right of common shared ownership.

Each individual owner in the condominium is entitled to freely dispose of the apartment he/she owns; however, the portion of common property pertaining to such owner's apartment is inseparably vested in the owner of such individual apartment, i.e. if the owner sells the apartment the new owner will automatically be entitled to the relevant portion of the common property. The portion of the common property pertaining to the individual apartment cannot be disposed of separately from the individual apartment.

Infrastructure and Social Infrastructure being provided by the Almaty Government Authorities

In accordance with the agreed General Master Plan, the Almaty Regional Authorities will be funding, designing, procuring and constructing both the "primary infrastructure" (defined as temporary and permanent roads, gas, electricity, sewage, drinking water and fire-fighting water, district heating and telecommunication supplies) and the "social infrastructure" (defined as kindergartens, primary schools, secondary schools, health centres, civic buildings and public amenity spaces). Thus far, the Authorities have expended approximately US $100 million (KZT 15 billion) on preparatory infrastructure to serve the Project (i.e. temporary roads, gas supply, some electrical supply works)

The Almaty Regional Authority plans a further expenditure of approximately US$ 300 million (KZT 45 billion) over the next five years to complete the primary and social infrastructure serving the southern part of the future Gate City, including the Project. The Almaty Regional Government has established a wholly-owned company, Alatau JSC, which is responsible for development of G4 Cities. Alatau JSC was established specifically with the view to financing and procuring the Primary Infrastructure requirements related to G4 Cities.

Whilst primary and social infrastructure are being provided by the Authorities, secondary and tertiary infrastructure are being funded by the Project Developer (from the project financing), and designed and constructed by the D&B Contractor. Such secondary and tertiary infrastructure includes roads and utilities from primary infrastructure (connection points) serving respective development blocks, apartment buildings and individual housing units.

Public Amenities

Landscaping

Public amenity areas will be incorporated into the Project design in accordance with the Kazakhstan's Construction Norms and Rules. The total 'green' area is based upon the legal requirement to provide 13 m^2 per person and is assigned on average in urban communal areas.

The main 'green' zones will be located along tectonic faults, existing streams and around ponds. Trees will be planted along streets and shrubbery will be planted between carriageways and sidewalks to mitigate against dust arising and exhaust fumes from cars. Species will include Cotoneaster, Common Privet, Thunberg's Barberry, etc.

All rivers and streams located within the boundaries of populated areas are being maintained in the Project layout.

Flood protection

The Gate City area is hydro-geologically confined to the large artesian basin, which is characterised by relatively complex conditions in terms of formation, deposition and groundwater discharge. Without implementation of an adequate drainage system, high water table levels may pose flood risks.

Horizontal subsurface drainage has been recommended as an initial proposal following analysis of geological and hydrogeological conditions in the Gate City area. Horizontal drainage includes relief drains and trunk line drainage collectors and channels, which are arranged along the main streets parallel to the existing water infrastructure. Drainage water will be discharged along with rain runoff into storm water settlement ponds. After treatment, it will be used in the summer for cleaning roads and pavements.

Utilities

A full range of public amenities and services will be provided by the authorities. These will include: a central business district, sports and leisure centre, commercial subcentres, residential, green and other public spaces. In addition to the main transport arteries, car parks, service stations and public utilities (such as the central heating system, telecommunications, public transport services, power supply and waste management facilities), current plans envisage a number of kindergartens / schools, healthcare centres, pharmacies, cinemas, laundries, dry-cleaners, post offices, police stations, libraries, restaurants, etc. that will ensure a suitable quality of urban living for the eventual residents.

Some of these components will have to be phased in as G4 Cities evolves, but it is considered that there is existing capacity in local schools, medical and emergency response services to cover needs during the early transitional phase.

Water supplies

There are no restrictions to water availability in the general area. Water for the construction activities as well as Contractor staff consumption / hygiene will be extracted in relatively small quantities from three new boreholes or obtained from the public supply system. Environmental clearance has already been obtained from the Balkhash-Alakol Ecology Department of the Ministry of Environment for water supply (from rivers and boreholes) including pipelines, and waste water treatment and discharge.

Potable water infrastructure for the Project will be provided by the public water utility authority.

Supplies will be partly abstracted from the Pokrovskoye groundwater reserves, which have been approved as meeting potable consumption standards and have operational freshwater reserves of 1,512,000 m/day. Further underground waters will also need to be abstracted to fully meet the water demands of all the G4 cities.

Water will also be earmarked for fire-fighting needs and total demand was calculated at a required rate of 55 litres per second. Firewater supply will therefore be stored in the potable water reservoirs and pumped as/when needed through to fire hydrants, which will be installed at an average of every 150 metres. There will be at least two hydrants to serve each large building.

Wastewater

A storm water collection scheme for Gate City residential areas will be provided from a centralised location for all housing and socio-cultural buildings. This will collect all runoff from residential, public and domestic premises which will be directed to a sewage pumping station (SPS) by aid of gravity, for onward disposal via a wastewater treatment plant.

The sewerage system will be developed as Gate City evolves but will entail sewage collection, treatment and discharge of both municipal and industrial wastewater.

It should be noted that at the time of the EIA, the feasibility study for water supply and wastewater management for Gate City was still being developed, so that these issues are not yet fully addressed.

Waste Management

The public utilities will provides regular cleansing and refuse disposal services.

A waste recycling plant will eventually be developed to North-West side of Growing City and will serve all four satellite cities. The waste recycling plant will handle domestic and commercial wastes, including food waste from public catering establishments. If food waste cannot be used for animal feed, it will be destroyed in the prescribed manner.

Specialised vehicles will be provided for the removal of solid waste and liquid impurities, as well as mechanised street cleaning. Septic tank wastes will be transported by vehicle to sewage treatment facilities.

District Heating / Electricity Supplies

The district heating supply system will serve all multi-storey apartment buildings and will consist of a heating source, pipeline heating distribution systems and thermal energy heat exchangers within respective apartment buildings for distribution among consumers. It will be fed by a 240 MW dual fuel boiler and a 105 MW combined heat and power plant, which will have a heat recovery system and will also provide electricity to the Project.

Decentralised Heat / Gas Supplies

Individual properties not connected to the District Heating System will have their own heat sources, such as gas or liquid fuel boilers.

The Project will therefore have some connections to the gas mains which will be supplied from the Intymak project implementation unit (IPU).

Government Housing Programmes and Low Cost Mortgage support for the Project

The Sponsor Group have worked with the Government of the Republic of Kazakhstan towards increasing the affordability of mortgage loans in the affordable housing sector. This has led to:

(a) The Kazakhstan 2011-2014 home building programme; and

(b) The Kazakhstan home building programme 'Affordable Housing – 2020' (approved by Ruling No. 821 of the Government of Kazakhstan 21 June 2012).

Both specifically refer to the implementation of G4 Cities.

The Sponsor Group has signed a Memorandum of Understanding (MoU) with two State mortgage provider Organisations, the Kazakhstan Mortgage Company (KMC) and the Housing Construction Savings Bank of Kazakhstan (Zhilstroyseberbank) and is also working with the Government of Kazakhstan in relation to their funding of specially allocated mortgage programmes managed by KMC. The programmes managed by KMC are expected to provide low-cost mortgage-based loans typically based on a 10% deposit at annual interest rates of 8% and a loan term of 20 years.

The Sponsor Group is also holding talks on providing low-cost mortgages with the Kazakh subsidiary of Sberbank Rossii, Russia's largest bank. The parties have signed a non-binding MoU with respect to the subsidiary of Sberbank acting as sole provider of mortgages to house buyers in Koyankus. In the future, Sberbank will provide low-cost 'savings and loan' type mortgages designed specifically for the Project.

3 PARTICIPANTS IN THE KOYANKUS HOUSING DEVELOPMENT

Project Developer

CS Development LLP is acting as the Developer. The Developer is the Sponsor Group Company, which will be specially used to develop the Project. The Developer belongs to three Kazakh parties, which own the G4 satellite cities HoldCo:

The Project Team

- G4 (Client team)
- Oppenheimer Investments Jersey Ltd (Organiser)
- Clifford Chance (Sponsor Group legal consultant)
- Salans (Sponsor Group Kazakhstan legal consultant)
- Norton Rose (Organisers / Legal consultant)
- Hill International (Technical consultant)
- Willis Limited (Insurance consultant)

The Authorities Involved in Master Plan Review and Approval

In accordance with the relevant laws and building regulations, public bodies ratifying the Master Plan include:

1. Almaty Oblast (Region)
2. The Ministry of Education and Science
3. The Ministry of Environmental Protection
4. The Ministry of Emergency Situations
5. The Ministry of Internal Affairs
6. The Ministry of Agriculture
7. The Ministry of Trade and Industry
8. The Government of the Republic of Kazakhstan (Maslikhat)

In addition, agreement to the EIA's conclusions is obtained from:

- Provincial sanitary and epidemiological services
- Forestry and game husbandry services

4 ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES

The general methodology for conducting environmental impact assessments is regulated by:

- Environmental Code of the Republic of Kazakhstan dated 9th January 2007.
- "Instructions for performing environmental impact assessments of scheduled industrial and other activities during the development of pre-planning, planning, pre-project and project documentation", which were established by decree No 204-p of the Ministry of Environmental Protection of the Republic of Kazakhstan, dated 28th June 2007.
- "Instructions for the composition, development method, agreement and ratification of urban construction projects in the Republic of Kazakhstan" (Building and Construction Standards for the Republic of Kazakhstan 3.01-07-2007, adopted 01.04.2008).

The EIA was prepared using information contained in the Detailed Planning Projects (DPPs) and the following source documents:

- Master Plans for the Gate City, Golden City, Growing City and Green City satellite cities, G4 Design Institute.
- Technical summaries of engineering surveys "Almaty satellite cities in a 297 km^2 zone of territory along the Almaty-Kapchagay road" in the Technical and Economic Assessment Stage, Karaganda GIIZ and K*.
- Reports by the Institute of Seismology of the Ministry of Education and Science of the Republic of Kazakhstan.

Baseline research into the area was carried out to identify the ambient environmental conditions of the Gate City area, in particular the air, soil, surface / ground water and radiological conditions. An archaeological analysis of the territory was undertaken within the framework of the background research to identify any historical features or cultural monuments. An analysis was also carried out to identify other activities and/or features that could be a potential source of other environmental and socio-economic impacts.

The socio-economic baseline conditions of the city of Kapchagay in the Ili District, to which the future satellite cities will be territorially connected, were characterised in accordance with information received from both the Ili and Kapchagay Municipalities. That information was based on conditions as of the start of 2009.

The work was performed by SED, leading specialists in the sphere of environmental protection, as well as by specialists of the Institute of Botanics and Phytointroduction, the Institute of Soil Science and Agrochemistry and the A. Kh. Margulan Institute of Archaeology. Employees of the G4 Design Institute undertook consultation services in the area of urban construction planning.

5 CONSIDERATION OF ALTERNATIVES

Although no specific alternatives were considered in the EIA for Gate City or the Project, a range of options were considered during the Master Planning approval process, which selected the best design and embedded mitigation solutions and best locations based on environmental and engineering parameters for G4 Cities.

6 GATE CITY BASELINE DATA

The development strategy for the city of Almaty envisages substantial development of the city in a northerly direction. Implementation of road and rail transport infrastructure and the development of other services is planned between Almaty and Kapchagay with the creation of new air transport centres in the region. The Almaty-Kapchagay road is therefore the direct basis for development of G4 Cities.

6.1 Administrative situation

Gate City will be located North of Pervomaisky within the territory of the Ili District, Almaty Province, close to the city of Almaty.

Specially protected natural areas (SPNA)

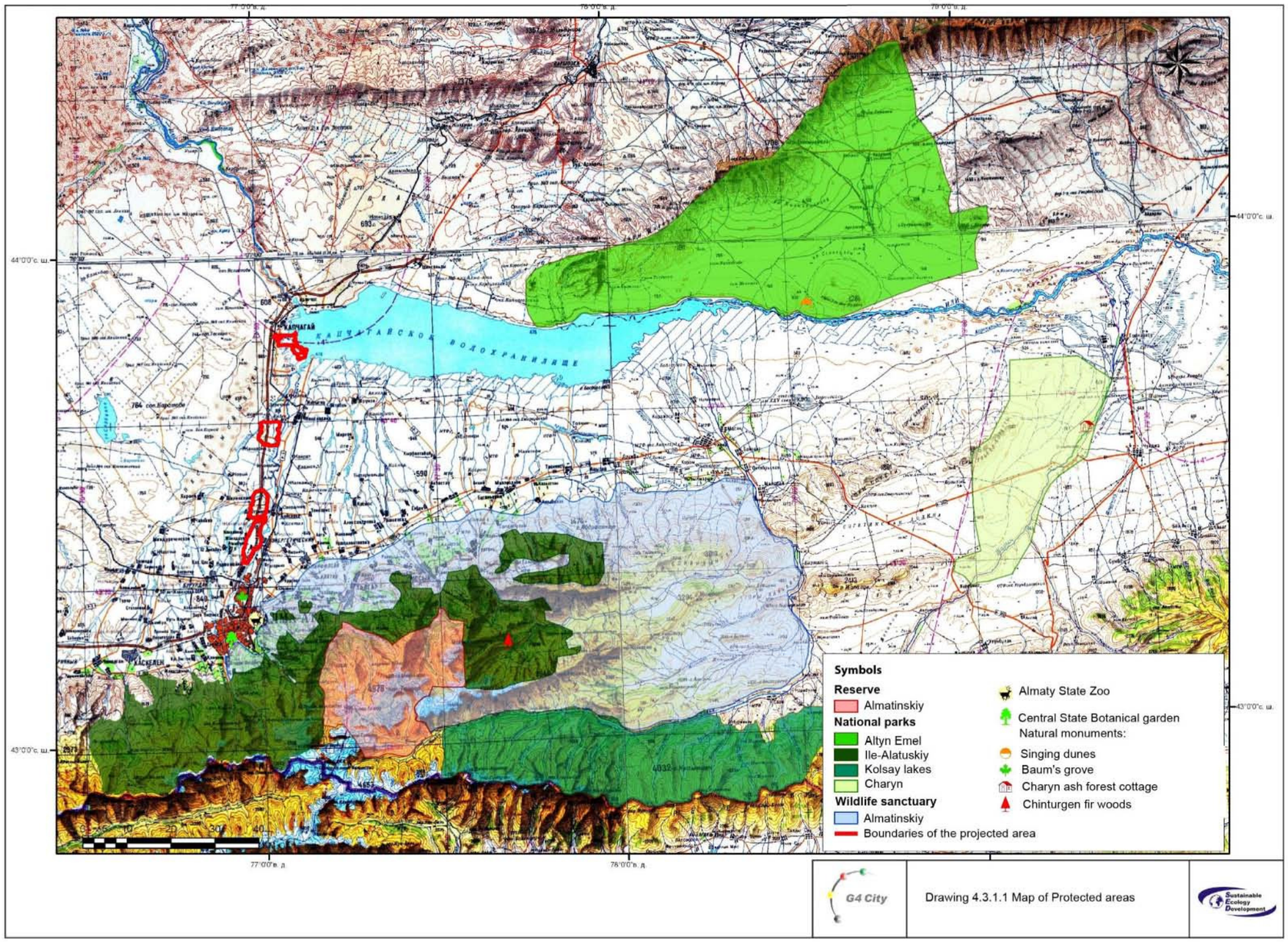
There are 21 locations in the national and local jurisdiction in the territory of the Almaty Province that are listed as protected areas of the Republic of Kazakhstan. Refer to Figure 4.3.1.1 below.

There are no reserves or national parks near the Project site. The nearest national monument is the Bauman Roscha (in Almaty, Turksib district), 9.8 km away. There are also no World Heritage, RAMSAR, Natura 2000, Alliance for Zero Extinction or other internationally designated sites within or close to the Project's area of influence.

Towards Almaty in the South, well away from the Project site, there are specially protected natural areas (SPNA) of national importance:

- Ili-Alatau State National Natural Park (SNNP)
- Almaty Main State Zoological Park

Figure 4.3.1.1 – Map of Protected Areas



6.2 Landscape features and land use

The boundaries of Gate City are marked by:

- The floodplain of the Esentai River to the North.
- The floodplain of the Esentai River and the villages of Koyankus and Zhanadauir to the West.
- The Pervomaisky rural district and settlement of Pervomaika to the South.
- The Almaty – Oskemen national highway and the floodplains of the Karasu-Turksib and Kishi Almaty Rivers to the East. The main channel of the Esentai River and the village of Pervomaika is situated East of the highway.

The land earmarked for the development comprises a shallow, inclined valley with a ridged, uneven relief that is broken up by smaller valleys. The maximum variation in altitude across the site does not exceed 20 metres.

The Almaty Main Ring Road (BAKAD) will bisect Gate City into Southern and Northern districts, as described in the Master Plan. The Almaty – Oskemen national highway opened in the early 1970s. The highway has four lanes, each 3.75 m wide with an asphalt surface. A central reservation ranging in width from 2-4 m separates the two carriageways. Highway maintenance over the years has primarily been limited to 'patching' repairs, with major surface repairs not having been undertaken for several years. Work is presently being conducted to upgrade the road to a 6-lane highway in the Almaty-Kapchagay area.

The settlement of Pervomaika is the centre of the Pervomaisky rural district and is located in the Southern catchment of the Esentai River. It had a population of 7,913 inhabitants as at January 1st, 2007 but has been expanding since then. The district is divided by the Esentai River valley and the Boroldaiskii tectonic fault zone is located in the area, to the South of Gate City's borders. There is also a utility network corridor, along which runs a 10 kV overhead power line, with underground irrigation ditches and water pipes.

The existing 'Koyankus' settlement is situated to the South-West of Gate City's territory and is also part of the Pervomaisky rural district. The settlement of Koyankus had a population of 1,531 inhabitants as at January 1st, 2009 but has also been expanding since then.

A number of dirt roads branch off from the Almaty – Oskemen national road, which run in a North-South direction. Another dirt road runs to a small reservoir located to the North-West of the proposed Gate City area. An underground pipeline of treated waste water from the Gallagher Kazakhstan tobacco factory is laid along the Eastern border of Gate City near the settlement of Intymak.

A number of high tension electricity lines cross the Southern area; these comprise 220 and 110 kV lines in the North-East to South-West direction and a 35 kV line West-East. The 220 and 110 kV electricity lines coincide with the path of the Boroldaiskii tectonic fault line.

There are several cemeteries in the immediate vicinity of the Gate City area. There is a 3.94 hectares cemetery in the existing Koyankus settlement. Two more cemeteries are located in the village of Intymak; one is Christian, the other is Muslim.

Until recently, most of the land had been used for irrigated and non irrigated arable farming or pasture for grazing but a significant proportion of the land has been taken out of cultivation since the Gate City development was proposed. There is an irrigation network of narrow channels that covered the area extending from the Northern border of Pervomaisky to the Almaty – Oskemen road to supply greenhouse-based agriculture. Part of the network has become waterlogged and overgrown with reeds, sedge and other aquatic plants.

Water is supplied from the small reservoir, which is situated to the North-West of Pervomaisky. There were two other reservoirs ("Western" and "Eastern"), which collected water in springtime for use in summer; however these are no longer used.

A local road (the Ili Route) passes along the Eastern side of the Gate City area and through the large villages of Pokrovka, Otegen Batir, Baiserke and Zhetigen. The width of the asphalt road varies between two to three carriageways in both directions; away from settlements, the road is lined on both sides by tree belts.

The TurkSib (Almaty – Lokot) railway line, which connects Almaty with the Eastern regions of Kazakhstan and Western Siberia, runs through the aforementioned settlements.

The town of Otegen Batir is the administrative centre of the Ili District and is situated North of the village of Pokrovka on the Western side of the local Almaty – Zhetigen road. In recent years, major industrial and logistics businesses have become established here; these include subsidiaries of "Philip Morris Products S A" and Gallagher Limited. Further clusters of logistics companies are being developed in the Northern part of the town and will eventually comprise 159 hectares.

A Combined Heat and Power Plant #3 (TEC-3) is also located in Otegen Batir and supplies electricity to the adjoining populated centres, including Almaty. The Almaty-Lokot railway line passes close to TEC-3, which has a railway sidings branch. The Combined Heat and Power Plant 3's landfill (ash deposition) occupies 122 hectares and is located North of the village of Otegen Batir in the floodplain of the Kishi Almaty River.

6.3 Atmospheric and physical conditions

Ambient air quality

The main sources of atmospheric emissions currently consist of local commercial and industrial establishments, power plants, coal-fired domestic heating and vehicular traffic.

Baseline measurements of ambient atmospheric conditions in the Gate City area were undertaken at a representative range of sampling points in December 2008. Selection and analysis of those samples were conducted in accordance with Regional Directive 52.04.186-89: "Guidance for the inspection of atmospheric pollution". Processing of air samples was performed in the accredited laboratories of the Research and Analytical Centre of Almaty (accreditation certificate No. KZ.7100000.06.09.00902 of the 1st August 2007).

The quantitative and qualitative characteristics of pollutants emitted into the atmosphere from industry in the Iliiski District are described in the EIA. The main pollutants are: suspended solids, carbonic oxide, sulphur dioxide, nitrogen oxides, hydrogen, and hydrocarbons.

Atmospheric pollution assessment based on surface concentrations

Atmospheric pollution assessment was performed through the mathematical modelling of surface concentrations and was based on an established model for estimating the dispersal of pollutants into the atmosphere: "Methods for calculating the concentration of atmospheric pollutants contained in industrial emissions", Regional Directive 211.2.01.01-97 (OND-86).

Estimations of atmospheric pollution were conducted using Era software, version 1.7, which was developed by the Logos Plus company, Novosibirsk, in accordance with the A.I. Voeykov Global Hydrometeorological Observatory No 1346/25, dated 3rd December 2007 and approved for use by the Ministry of Environmental Protection of the Russian Federation.

Emissions from pollution sources from existing businesses situated in the general region allocated for Gate City were taken into consideration in the estimation of background concentrations in accordance with RGF Kazidromet No 01-10/856, dated 30th April 2008.

Estimations of the dispersal of pollutants were made using emission sources from road transport. Simultaneous movement was included in the calculation based on the speeds of cars, goods vehicles and buses, taking into account the actual traffic intensity per hour. The calculations were conducted for the summer period, as this is the period with the worst dispersal conditions. Areas of the existing route in the region in which Gate City will be located were considered in the calculation.

Further, in accordance with the “Sanitary and epidemiological requirements for planning industrial developments” No 334, dated 8th July 2005, sanitary protection zones (buffer areas) were defined at the borders of residential or recreational zones by calculating the dispersal of atmospheric pollutants.

The results of calculations of the maximum surface concentrations in the residential zone close to the villages and percentage of deposition from the identified sources in shown in Table 3.2.3.3 below.

Table 3.2.3.3 - The list of sources that make the largest contribution to atmospheric pollution

Code	Name of Substance	Estimated maximum ground level concentrations (total and without background) share of MPC / mg/m3		The coordinates of the maximum surface concentration		Sources with greatest input to max concentration			Location of sources (production, plant, factory)
		In residential zone	At border of sanitary - protection zone	In residential zone	At border of sanitary - protection zone	N Source	% input		
				X/Y	X/Y		In residential zone	At border of sanitary - protection zone	
1	2	3	4	5	6	7	8	9	10
CURRENT SITUATION									
Pollutants :									
0184	Lead and its inorganic chemicals	0.00594/ 0.00001		20969/-8448		6001	100.0		Gate city
0301	Nitrogen dioxide	0.09497(0.06085)/ 0.00807(0.005171) input=64.1%		20969/-8448		6001	100.0		
0328	Soot	0.00006/ 0.00001		20969/-8448		6001	100.0		
0330	Sulphur dioxide	0.0076(0.0008)/ 0.0038(0.0004) input=10.5%		20969/-8448		6001	100.0		
0337	Carbon monoxide	0.04933(0.00933)/ 0.24663(0.046646) input=18.9%		20969/-8448		6001	100.0		
0703	3,4-benzopyrene	0.00009		20969/-8448		6001	100.0		
1325	Formaldehyde	0.00162/ 0.00006		20969/-8448		6001	100.0		
2704	Gasoline	0.00111/ 0.00554		20969/-8448		6001	100.0		
2754	Hydrocarbons C12-19	0.00111/ 0.00111		20969/-8448		6001	100.0		
Summation groups:									
27 0184 0330	Lead and its inorganic chemicals Sulphur dioxide	0.01354(0.00674) input.=49.8%		20969/-8448		6001	100.0		
31 0301 0330	Nitrogen dioxide Sulphur dioxide	0.10256(0.06164) input=60.1%		20969/-8448		6001	100.0		

According to the calculations, the maximum dispersal zone of pollution in the atmospheric boundary layer was defined based upon the totals of the nitrogen dioxide and sulphur dioxide groups, which resulted in a range of 50-70 metres. No residential areas fall into these pollution zones; Isoline surface concentration is less than 1 Maximum Admissible Concentration (MAC) for the remaining constituent areas under investigation.

Businesses located in villages along the Almaty-Oskemen road were not included within the scope of this research and no calculations of the dispersal of atmospheric pollutants were carried out. Each of those businesses are however subject to maximum permissible emissions limits, and it was concluded that the atmospheric boundary concentrations will remain within both the C33 and residential zones limits for all constituents and that the values of emissions from those businesses do not exceed the air quality criteria for populated areas.

6.4 Geomorphology

From a geomorphologic viewpoint, Gate City is situated within the boundaries of an erosion-accumulating (i.e. alluvial proluvial inclined) valley, which is separated into major outliers by several river valleys. The lowland area acts as a local water collection basin for shallow, temporary water accumulations from rainfall and snow melt, as well as for collected groundwater.

The surface of the outlying plain has an overall Northerly incline with a gradient of 0.005.

Absolute surface elevations in the Southern area vary from 662 m to 665 m ASL.

The cross section of the Kishi Almaty River shows a very distinct box-shaped valley, which is mostly asymmetrical. The slopes are steep (30-40^{o}), sheer in places (60-90^{o}), and covered in debris and eroded. These have a height of along the length of the area are 10-15 m with a maximum 20-25 m in places. The prevailing width of the valley is 500-600 m.

The Esentai River is also a box-shaped valley. The height of the banks (valley edge) is 20-30 m and is generally steep. The width of the valley is 300-500 m.

6.5 Surface water

Materials from the “Technical account of engineering surveys” forms part of the text in regard to surface waters (“Almaty satellite cities within a 297 km^2 zone along the Almaty-Kapchagay road in the Technical and Economic Assessment Stage, volume 3 Hydrology”). The baseline work was conducted by Karaganda GIIZ+K in the Kishi Almaty and Kaskelen rivers in October to November of 2007. Materials from the “Project Standards for maximum permissible harmful impacts (MPHI) in the Almatinka Minor River” document were also used in the analysis (Kaspiecology Environmental Service, Almaty 2007). Observation records from meteorological stations and hydro-posts, research reports, project critical analyses and literary sources were also used to a large extent. Specialists from SED conducted background research in November 2008 within the framework of this exercise, which included research into the river regions and sampling for chemical and bacteriological analysis.

The river territory is divided into three types based on the location of sources, nature of supply and water regime: i.e. mountainous, foothills and valleys. The chief rivers of the region described are the Kishi Almaty, Esentai, Besterek Karasu, Terenkara, Ashchibulak, Karasu-Turksib, Moika and Sultanka. The discharge from these rivers runs toward the Kapchagay water reservoir.

Hydrology of the Kishi Almaty River

Gate City will be situated in the interfluvial zone of the Kishi Almaty River and its tributary Terenkara. The principal Kishi Almaty river bed divides into three smaller rivers at a height of approximately 110 metres where it exits the mountains: Esentai to the left, Kishi Almaty in the

centre and Zharbulak (Kazachka) to the right. All three river channels are used as arteries for supply to agricultural irrigation systems.

The discharge from those channels is regulated by a series of dams and sluice gates situated along its branches. A silt dam constructed in 1934, which was re-built in 1964, is located at the fork of the Esentai and Kishi Almaty Rivers and diverts flows to control the maximum outflow from the course of the Kishi Almaty River into the Esentai River.

The EIA also describes the estimated transits for the Kishi Almaty River (within the borders of the territory that neighbours Gate City and Golden City), which were investigated in the period November-December 2007.

Shallow surface water

The Gate City area contains a channel from one of the branches of the small Esentai River, which flows along the Western border of the proposed development. Some small artificial reservoirs (accumulator reservoirs) have been created within the course of the channel to supply the irrigation network.

Another artificial reservoir is located to the West of Gate City. There are no other surface water features within Gate City's boundaries.

Ice conditions in rivers

Most surface waters freeze for extended periods during the winter months and ice formation usually occurs from November onwards, when the average maximum ice thickness in stretches of the Kishi Almaty River is 40-50 cm.

Thawing starts to occur between February and March when the rivers are affected by the formation of ice blocks and other obstructions. The average dates when the ice clears from the river are between the 10th to 15th March.

Surface water use

Water from the Kishi Almaty River is diverted for irrigation in the upper part of Almaty Province. A substantial portion is also diverted into the main irrigation ditch that connects the Kishi Almaty and Esentai Rivers at Abaya Boulevard, from where it irrigates the planted areas of the city centre. The flow of the Kishi Almaty River below Raimbeka Prospect is chiefly re-established by ground waters.

According to a report of the Committee for Water Resources of the Ministry of Agriculture of the Republic of Kazakhstan: "Diversion, the use of surface water", over 30.0 million m^3 of fresh water is collected annually. Of this, the state municipal facility Vodokanal Almaty consumes approximately 20.0 million m^3 of water per annum and only a negligible volume is used for productive purposes within the boundaries of Almaty. The remaining volume of water collected from the Kishi Almaty River is used for industrial purposes by RGC (KazPAS), brewery No 1 Zelenstroi, TFC Altin-Taraz, and other smaller companies.

According to official statistics, only three state municipal companies KazPAS, Altin-Taraz and Kok-Terek are currently permitted to discharge treated waste water into the Almatinka Minor River within the boundaries of Almaty.

Surface water quality

Water samples from 10 points were tested during background research; a total 15 samples were collected from rivers in the territory of the satellite cities and analysed against hydro-physical, hydro-chemical and bacteriological parameters.

Hydro-physical research into surface waters was performed with the aid of a Horiba U-22 instrument; the following parameters for water samples were defined at all collection points: temperature, salinity, turbidity, oxygen content, pH, potential reduction in oxidation. The results of the survey are included in the report.

Water samples selected from these points underwent chemical and bacteriological analysis. A litre of water from each testing point was sent to a nationally accredited laboratory to determine characteristics such as suspended solids, mineralisation, stability, chemical oxygen demand (COD), biological oxygen demand (BOD), synthetic surface active substances, general chemical composition, nitrites, nitrates, ammonium nitrogen, phosphorous, phosphates, heavy metals (iron, lead, mercury, manganese, selenium, chrome), total concentration of hydrocarbons, phenol and pesticides, etc. The chemical analysis applied the criteria included in Table 3.4.5.9 below.

Table 3.4.5.9 - Hygienic classification of small rivers by degree of contamination

Degree of contamination	**estimated figures**						**Index of contamin-ation**
	Organoleptic / sensory properties		**Toxic properties**	**Sanitary regime**		Bacteriological	
	Smell, taste (scores)	Maximum allowable concentration (exceedances)	**Max allowable toxic concentration (exceedances)**	Biological oxygen demand	**Dissolved oxygen, mg/dm^3**	The number of E-coli lactose in 1 dm^3	
Allowable	2	1	1	36	4	Less 1x10^4	0
Moderate	3	4	3	68	33	1x10^4-1x10^5	1
High	4	8	10	810	2	Over 10^5-1x10^6	2
Very high	≥4	≥ 8	100	≥810	1	Over 1x10^6	3

No pollutants exceeding the limit of permissible concentrations were detected in the Project area, while mineralisation ranged from 222-382 mg/dm^3.

The surface waters in the area (as at December 2008) had an acceptable level of pollution according to the standard bacteriological indicators (number of lactose-positive Bacillus coli) and no coliphages or pathogenic flora were detected. The surface waters also had a pollution index of zero so the level of pollution was therefore considered to be within 'acceptable' limits.

However, any use of surface waters with a high number of water features for potable purposes in connection with the presence of lactose-positive Bacillus coli (LPBC) would be unacceptable. At the majority of test sites for LPBC (River Terenkara test point No 7, Karasu Turksib test point No 12, Karasu in the North Western suburb of Pervomaika on the Esentai River test point No 15), the water was also considered to be unacceptable for bathing (bathing is not permitted with an LPBC >1000 units per dm^3). None of these potential sources are being used by the Project.

6.6 Geology

Geological structure

A report was compiled based on the results of the engineering and geological investigations of the G4 City sites (Master Plan, TEB). Quaternary deposits were taken from the geological formation based on the drilled wells and the engineering and geological surveys, on a 1:25,000 scale from the surface and to a depth of 30 m.

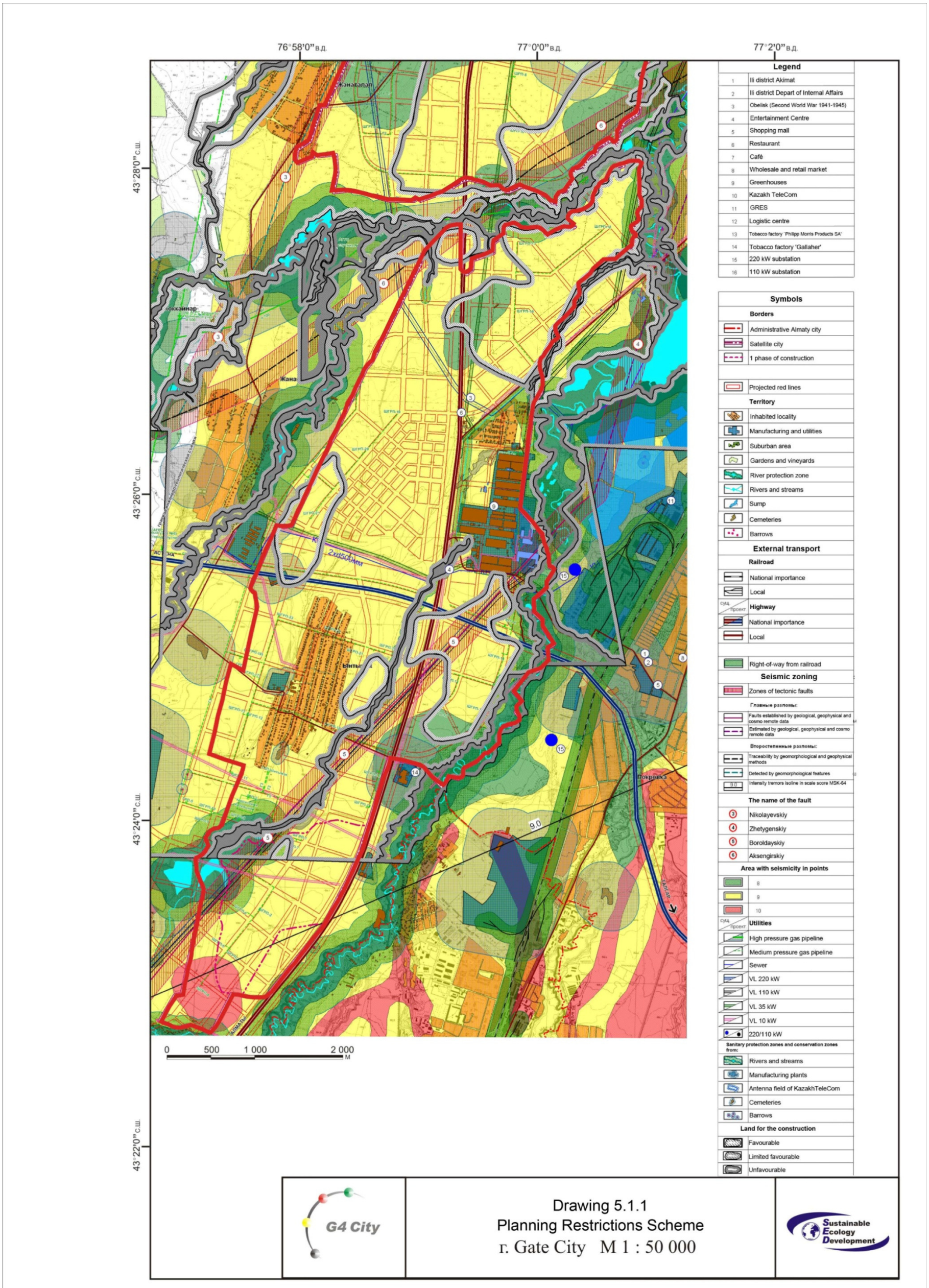
Tectonics and neotectonics

This section summarises the results of probability assessments of seismic risk in the proposed construction areas. An estimate of earthquake repetition periods of varying intensities was made for each area. The seismicity of the Gate City area as a whole is 9 Ball points and has been taken fully into account by Project designs and the Master Plan (i.e. location, maximum heights and resistance factors).

Seismic conditions are potentially significant for Gate City due to the effect of high seismic activity on the escarpment soils but this is taken into consideration during the structural design process. The escarpment soil is poor, in geotechnical performance terms, where it meets the banks of the Kishi Almaty, Esentai, Besterek-Karasu and Terenkara Rivers. Here it is structurally far less resistant to seismic activity. Therefore the zones adjoining these rivers are excluded from construction development. A high rate of lateral erosion also occurs in the floodplains of the Kishi Almaty, Esentai, Karasu Turksib and Terenkara Rivers.

The Project site avoids any high risk features such as escarpments, although a small fault line runs through the Project area. This does not pose a serious risk to the Project and building construction is permitted subject to compliance with height restrictions and other building regulations dealing with seismic risks (which have already been factored into the Master Plan and designs and have been validated by the authorities). Figure 5.1.1 below indicates the planning restrictions scheme for Gate City.

Figure 5.1.1 – Planning restrictions scheme, Gate City



Physical and mechanical soil properties

The soils in the Gate City area consist of light-brown to brown coloured carbonised loams with streaks of sand with an average granularity occurring to a depth of 10.8-23.4 m. According to laboratory test data, the loams are characterised by yield values of 24-28% with an average value of 26%, a rolling-out limit of 15-21% with an average value of 16%, and a plasticity index of 7-12% with an average value of 11%. The standard depth of seasonal ground frost penetration is 125 cm, with a maximum 150 cm where snow cover is removed from the surface.

Soil salinity and corrosiveness

Based on the total content of water-soluble salts, according to GOST 25100-95 All-Union State Standard, soils in the sampled areas are non-saline.

The corrosiveness of soils (Table No 4 of the Building and Construction Standards 2.03.11-85), is based on coming into contact with cement type W_4. The level of corrosiveness changes from weak in ordinary Portland cement to strong in sulphate-resistant cements. Where ground bearing reinforced concrete is concerned, the corrosiveness ranges from no corrosion to average corrosion.

The corrosiveness of soils (GOST 9.602-89 All-Union State Standard) is based on ground contact with structural steel and with lead and aluminium cable shells. The sampled areas range from average to high, so underground infrastructure needs to be suitably protected to meet the relevant design standards.

Engineering and geological conditions

The following contemporary, geodynamic processes are identified as the most important negative effects on construction conditions, building use and structures:

- Seismic area – 9 Ball points. In addition, seismicity may be affected by the high level of groundwater and the presence of layers of soils, with a consistency of 0.5 and higher (or a humidity level greater than 0.8). There is a small area with a seismicity of 10 to the South of Gate City.
- The upper most soil layers at (0.5 – 3.1 m).depth offer quite variable bearing capacity.
- A high level of groundwater, which may become elevated during the flood period and after any significant rainfall.
- The salinity of groundwater and a high level of corrosive activity from soils in relation to some metals.

Based on this combination of factors for Gate City, Category II (average) difficulty for engineering and geological conditions have been defined. In order to mitigate the effects of any unfavourable physical and geological processes, it is necessary to perform the following measures:

- Eliminate subsidence.
- Manage surface run-off, construct horizontal drainage.
- Anti-corrosion protection of buried metal structures and foundations.

Mineral deposits

There are no hard mineral deposits in the region of the Gate City development, which includes the Project site.

The sand and gravel mix to be extracted for construction purposes will come from Alekseyevskoye, to the North-East of Gate City. There are also deposits of brick earth to the South-West of Gate City.

6.7 Hydrogeology

The corrosiveness of underground fresh water on cable sheaths (according to GOST 9.015-74 All-Union State Standard) is considered to be 'average' for lead and for aluminium, and 'non-corrosive' in relation other common construction materials.

Groundwater originating from Pokrovskoye, Boroldaiskii and Zheltigenskii was tested. In order to measure groundwater levels, a number of small wells were drilled from which the upper, water-bearing level was measured. Based on the results of these measurements, in the Project area, the depth of groundwater was recorded as between 2-5 m or more below ground level.

Subterranean water resources

Groundwater in the region is characterised as a natural resource. Natural resources occur in an area located parallel to Trans-Ili Alatau at the periphery of the alluvial fan. Routine inspections are carried out by "Almaty Hydrogeology JSC".

A range of research and exploratory work was undertaken in the Almaty artesian basin with the aim of detecting potential sources of industrial, agricultural and potable water supplies, and any thermal or mineral waters. Sixteen potential groundwater sources were checked and underground water reserves (of categories A+B+C1+C2) were identified at Almatinsky, Boroldaiskii, Vostochno-Talgarskii, Gornii Gigant, Issikski, Issik-Turgenskii, Kaskelenskii, Nikolaevskii, Pokrovskii, Talagarskii, Uzin-Bulakskii, Chilikskii and Chulakskii.

The sources of groundwater closest to the Project area are: Nikolaevskii, which was explored for drinking and industrial purposes; Pokrovskoye, Alma-Atinskii and Talgarskii, which were explored for industrial, drinking and purposes; and Almatinskii for thermal mineral purposes (seven areas). The Alma-Atinskii and Talagarskii sources are not situated in the territory of the future towns; however, it should be noted that since these sources are the basis of water supply for Almaty, the Northern periphery of the drawdown cone of depression is gradually approaching Gate City's location.

A description of groundwater resources that may be used as a water supply to the both Gate and Golden Cities was still being developed at the time the EIA was concluded.

The Alma-Altinskii groundwater resource is situated in the foothills of the Trans-Ili Altau, within the alluvial fan of the rivers Aksa, Kargalinka and the Greater and Lesser Almatinka and adjoining foothills' valley.

Various 'points of origin' (sources) were explored for potential industrial and potable water supply to Almaty and for 'technical' water supply to businesses. In 1990 the groundwater resources were calculated to be 694.6 thousand m^3/day (A+B+C1), including at the alluvial fan: upper tier (technical purposes) – 125.2 (A); 17.3 (C1); middle tier (potable) – 21 (A), 43.2 (B), 172.8 (C1); lower tier (potable) – 21.6 (A). Resources in the foothills' valley are: upper tier (potable) – 76.9 (A), 4.3 (B); lower tier (potable) – 17.3 (A).

Groundwater is of both a hard and soft nature. Fresh water tested at the groundwater source has a mineralisation ranging from 0.5-0.6 g/l, as per the GOST "Drinking water" All-Union State Standard; however, some individual wells were found to contain an elevated level of pollutant components in the upper layer of soft water.

There is no standard monitoring network so no sampling of subterranean waters was undertaken in the Pliocene layer. A cluster of observation wells needs to be established to study the interaction between water-bearing resources and identify the cone of depression.

No sources of pollution were detected immediately in the sampled groundwater; however, within the region as a whole (both the foothills and valley zones), pollution in the upper water-bearing layer is characterised by magnesium and oil-based products in the areas close to existing industrial / municipal activities.

Existing water supply and disposal in the general area

1. Almaty is supplied with water from two types of source; the surface waters of the River Ulken Almaty (Greater Almatinka) and Kishi Almaty (Lesser Almatinka) Rivers and four water intakes for groundwater abstracted from the Almatinskii and Talgarskii aquifers, the valley of the Kishi Almaty and the Kaminski plateau. Groundwater is abstracted from over 300 wells at depths of 165 to 500 metres. The planned productivity of all water abstractions is 487.4 million m^3/year. In order to satisfy the Almaty's water requirements in 2020, a further cluster of wells will be to abstract water from Talgarskii's subterranean waters.

The Turksib area of Almaty obtains its water from wells at Ulken Almaty. Water from this source is generally used to meet industrial and domestic requirements; however, a small amount is used for other purposes.

2. The Pervomaiskii rural district obtains water from two sources: the Almatinskii well of the Ulken Almaty and the Boraldaiskii well of the Kaskelen. Water from these sources is only used to meet domestic needs. Inhabitants of the Pervomaiskii settlement also obtain water from subterranean waters via the Almatinskii well of the Ulken Almaty.

Wastewater disposal

The existing settlements around Gate City, Intymak, Koyankus, Zhanaduar, Zhanatalap and Arman Kokterek, use a mains drainage system or collect sewage in septic tanks.

Existing wastewater containers

In the general Gate City area, consolidated waste waters from Almaty Province are discharged after full biological treatment into Lake Sorbulak, which is located 60 km to the North-West of Gate City.

Waste waters from the Almaty Power Generation district are drawn into filtration beds at the state municipal facility at Kamkor, Almaty Kus, the Iliiskii state municipal facility "ViK" as well as the Almaty urban drainage systems.

Water supply and disposal in the Gate City area

There are two existing sources of water supply, surface water and subterranean waters, in the Gate City area. Surfaces waters along the Almaty-Kapchagay road adjacent to Gate City are chiefly used for industrial purposes, while subterranean waters are used to meet drinking and domestic needs. The reserves of fresh water total are estimated as 1,512,000 cubic metres per day.

It is noted that the majority of water mains, drainage systems and networks, as well as their equipment, in the wider area currently needs replacement, having passed their expected useful lifetimes.

A reduction in the water consumption in the area was noted between 1998 and 2004 following to the introduction of water meters into the residential sector and the introduction of closed circuits and water-saving technology, by industrial concerns; there was also a net reduction in the number of businesses. However, there has been growth in the supply and use of water since 2005 connected with an increasing residential construction, population growth and economic revival.

The growth in population is expected to continue and it is believed that current water source reserves are sufficient to meet increased water withdrawals from both surface and subterranean waters. The construction of a further cluster of wells for Talgarskii water withdrawal of subterranean waters is proposed before 2020.

Current groundwater quality

There are a number of sites within the general Gate City area that are potential sources of groundwater contamination. These are the existing settlements of Koyankus and Intymak, and the smaller town located to the North of the greenhouse facility. The source of the groundwater contamination at these sites is apparently from household sewage disposed to septic tanks. There is no routine monitoring of groundwater in these settlements.

A significant part of the Gate City area was formerly irrigated arable and bogharic (loamy) land or low quality pasture. No groundwater contamination is expected here, apart from in areas where fertilisers or pesticides may have been used in the past; however, this is not expected to be a significant concern.

6.8 Contaminated Land

The land at Gate City has strong and moderate pastoral soils. The EIA does not define any problems linked to soil degradation.

Field research was carried out between November and December 2008 to gain background knowledge before construction works for Gate City commence. The results showed there were some contaminated areas within the land earmarked for Gate City, but as far as can be determined there is no land contamination within the specific Project area.

6.9 Flora

General characteristics of vegetation cover

The Project area contains 300-340 species of seed plants as well as living shrubs, dwarf shrubs, semi-shrubs, herbaceous annual plants and perennial plants, ephemerals and ephemeroids, over 60% of which belong to the Compositae (Asteraceae) , goosefoot (Chenopodiaceae), legumes (Fabaceae), grasses (Poaceae), rosales (Rosaceae) families.

Serotinous and ruderal (weed) species of annual plants provide most of the vegetational cover in the Project area; this is the result of human impact, mainly from past agricultural activities.

The tree-shrub types of vegetation within the general area form a natural grouping, as do artificial planted areas, which can be found along roads and, in some parts, along irrigation channels / canals.

Rare, endemic and relict plant species listed in the Red Book of Kazakhstan

It is considered highly unlikely that any rare plant species are still present - or will occur in the future - due to the significant human impact in the Project area although the following may be encountered within Gate City's borders:

1. Sizolist poplar - Populus pruinosa Schrenk. Varieties of, distribution of and quantity of this have all greatly decreased. It may possibly grow in the floodplain of Kishi Almaty.

2. Albert tulip - Tulipa Albertii Regel. A rare and endemic species. Usually found in ephemeroid and sagebrush communities in sierozem soil.

3. Juno Alma-Ata - Juno almaatensis Pavl. A rare, narrow-endemic endangered species. It can be found in the river valleys of Esentai and Kishi Almaty.

Human impact on vegetation

Past agricultural activities have had the greatest impacts on vegetation, often manifested by the presence of irrigated and, to some extent, runoff from massifs. The ploughing of the area for cultivation of grain, feed, vegetables and vine-crops has resulted in the complete destruction of natural vegetation and the formation of agrophitocenoses. More than 75% of the area for the site of Gate City has been ploughed at various times, and the vegetation is therefore degraded. The Project site has a similarly degraded vegetative cover.

Ploughed fields are almost devoid of any vegetation when fallow, and display pockets of both water and wind erosion. Common weeds (bindweed, clover, thistle, wormwood broom corn, chicory, sow thistle, etc.) can be found among crops of cultivated plants and along the edges of fields. There are large areas of fallow land in the surveyed area. Some parts are in various stages of recovery, depending on the period since they were last ploughed.

Ecosystems have also been influenced by pastoral activities, including excessive cattle grazing throughout the year. The effects can be found along the rivers of Kishi Almaty, Esentai and Karasu-Turksib Rivers, as well as the sloping eroded plains, fallow lands and near the settlements and Intymak and Pervomaisky. Unmanaged use of grasslands and floodplain for grazing and haymaking has led to the replacement of soft stem grass swards with grassweed, herbal-grassweed and annual saltwort.

In conclusion, the vegetation is sandy grassland, subject to moderate areas of severe degradation.

6.10 Fauna

Over recent decades, urbanisation and agricultural activity have had an impact on the natural (primary) biogeocenosis and biological diversity of the region. As a result, the local fauna is dominated by species of mammals and birds that benefit from association with humans (known as ‘synanthropic’ species). A similar tendency towards a reduction in species composition and a decrease in native species has been observed in the ichthyofauna inhabiting the Small Almatinka and Big Almatinka Rivers, as well as in the ponds and lakes that sustain them.

There may be over thirty various species of wild animals (permanent or temporary) in the region of the project; most of these are insectivores and rodents. Research over many years into ornithofauna in the Gate City and wider area has revealed the presence of more than fifty species of birds. The area also hosts a small number of diverse indigenous amphibians. While reptiles are generally rare, two species of snake (water snake and common snake), the Pallas' coluber and the steppe runner can be found in this area. The region also hosts a diverse variety of arachnids and insects, found in the valleys of the rivers in the semi-desert areas, steppes and foothills.

The anthropogenic impacts are related to the construction of irrigation and other dams, the contamination of watersheds and the recreational impact on natural landscapes in the basin. The Ili River has also seen significant changes in its fish populations through the introduction of alien species. This has caused a reduction in habitats for native fish, which are now only preserved in small streams on foothills and in mountain areas.

Rare and endangered fauna in the region

The following species are listed in the Red Book of Kazakhstan:

Amphibians:

- Danatin toad - category 4 status (Unstudied species).

- Central Asian Frog - category 2 status. Now believed to be locally extinct or extremely rarely found in the rivers of Almatinka, Kaskelenka and Almaty.

Fish:

- Ili Marinka - Fishing of this species is prohibited due to its extremely low population. It has been assigned category 1 status (endemic or endangered species).
- Balkhash Perch - category 2 status. Numbers of this species have fallen significantly, and it has been included in the Red Book of the International Union for Conservation of Nature. There were many in the Kapchagay reservoir for the first few years after it was filled. There is now a small population remaining in the Small Almatinka area of the Ili Delta.

Insects:

- From the dragonfly family – South Asian Green Marsh Hawk (Orthetrum sabina), Black Selis (Selysiothemis nigra); Cordulegaster Insignis (Cordulegaster insignis Schneider), Blue Emperor (Anax imperator Pallas), Beautiful Demoiselle (Calopteryx virgo Linnaeus);
- From the Orthoptera family – Tree Mantis (Hierodula tenuidentata), Saga Pedo (Saga pedo Pallas);
- From the Diptera family – Asian Stefaniola (Stefaniola asiatica);
- From the beetle family – Calosema Beetle (Callisthenes semenovii Fabricius) and Spotted Ladybird (Stethorus punctillum Weise);
- From the Lepidoptera family – Feathered Homoptena (Cheimoptena pennigera).

Note that, of these Red List species, both amphibians and two insect species are IUCN 'Least Concern' and one fish species is 'data deficient'; none of the other species have yet been assessed by the IUCN.

Species of wildlife with commercial or economic value

- *Mammals.* Topai hare, fox and weasel fur are all hunted for recreational purposes in the territory.
- *Birds.* There are no industrially or economically significant species specific to the region.
- *Amphibians and reptiles.* Economically valuable species include the green toad, the Pallas' columber, the Orsini's viper and the copperhead snake.
- *Fish.* Hunted species in the territory include the common carp and the silver crucian carp.

Animals that may be harmful or dangerous to humans

Among the large number of invertebrates inhabiting the area studied, there are some that have a negative impact, as well others that are poisonous or parasitic to humans and domestic animals. For example, the region hosts the poisonous tarantula spider, whose bite is similar to that of a wasp sting, accompanied by a short-term swelling and oedema.

Insects that have or carry/transmit dangerous diseases include those that bite, such as mosquitoes, ceratopogonidae, gnats, sandflies and horseflies, which are known to be carriers of human diseases such as malaria, tularemia, leishmaniasis and other arboviruses. Certain insects and mites are intermediate hosts of helminths and other pathogens of diseases that can affect humans and farm animals. Disease carriers in the region include ectoparasites,

carriers and distributors of pestilence and, above all, fleas (Aphaniptera). Certain species of Ceratopogonidae, which develop in rodent burrows, can transfer the peptic ulcers pathogen.

6.11 Surrounding Land Use

There are no large-scale industrial developments planned within either the Project site or Gate City itself. Intymak currently has a number of small industrial facilities, such as a rubber glove factory, a construction plant and a highways maintenance enterprise. East of Intymak, there is a concrete factory in the Eastern portion of the land allocated for Gate City.

Around these companies there are also landfill sites for construction and household waste. There are also tree planted along the permanent roads and some anthropogenic aquatic landscape features on the territory of Gate City, in the form of two ponds in the Southern part of the Gate City area, which created for irrigating agricultural land. These ponds were formed by damming the courses of small streams that originate from springs. These ponds are no longer needed due to the cessation of agricultural activities in the Gate City area.

Emissions from the Otegen Batyr Combined Heat and Power Plant 3 may have had an impact on the area where Gate City is planned. Concentrations of smoke and aerosol in the form of smog (during the second half of the day) can occur across the entire surface of the slopes up to an absolute height of around 2000 metres. In the morning, the mountain breezes blow them into the valley.

We can therefore conclude that the territory designated for the planned city is a predominantly natural-anthropogenic landscape.

6.12 Radiation

According to the Russian Federation legislation, No 219-1 dated 23rd April 1998, on Radiation Safety, an examination of radiation conditions should be carried out when assessing the impact of proposed sites on the environment.

The first priority of radio-ecological research, in accordance with the provisions of Cabinet of Ministers of the Republic of Kazakhstan No 1103, dated 31st December 1992, and no 363, dated 30th March 1995, is to improve the radiation conditions in the Republic of Kazakhstan, by detecting any radioactive contamination from the past and taking control of any activities that may lead to radioactive contamination.

Radiation safety is provided in compliance with the existing Norms of Radiation Safety – SP 2.6.1.758-99 (SRS-99) [1], Sanitary Regulations on Handling Radioactive Waste (SPORO) [2] and other national and industrial normative regulations.

Radiation levels in the territory of Gate City

A radiological evaluation of the territory for the proposed construction of Gate City was conducted in accordance with the radiometric measurements taken as part of the background information by SED LLC in November 2008. Measurements of gamma background radiation were taken using a PSA 68-01 radiometer 0.1 metre above the ground. There were a total of 700 measurements taken in the area for study. The gap between profiles was 250 metres, and the distance between the sample points on the profile was 100 metres.

The exposure dose power (MED) in the surveyed area ranged between 5 and 17 mR/h (0.07-0.17 mSv/h), corresponding to the natural background level of radiation for the Almaty region and are therefore of no significant concern to the Project.

6.13 Socio-economic situation in the region in relation to Gate City

The village of Koyankus is part of the settlement of Pervomaisky in the Ili District. It has a population of 2,000 people and a territory of 784.0 hectares, 546 hectares of which are

agricultural land. It is located 8 km from the district centre and there are approximately 70 economic entities / enterprises there.

The Project will be located next to Pervomaisky, which has undergone extensive changes as a result of business activities.

Archaeology and cultural heritage

A survey of physical cultural heritage resources was undertaken under the auspices of the State Archaeological Survey. Although the whole general area has been extensively modified by human activities, a number of physical cultural heritage features were identified by the EIA within and around the wider Gate City's footprint.

These include: an early Iron Age burial mound: the vestiges of a 2nd/early 1st millennium BC settlement (buffer zone specified); and both Muslim and Orthodox cemeteries. However, there are no listed monuments or other archaeological or cultural heritage features on or near the Project site that will need to be moved or otherwise protected from possible damage.

6.14 Environmental constraints

Various types of territory are subject to special environmental conditions including protected areas, water-protection zones in rivers, lakes and reservoirs, first-group forests, various sites' sanitary protection zones, the sanitary protection zones for household drinking water intake, cultural facilities, and areas exceeding standards set for technogenic pollution on environmental quality.

The potential presence of water protection zones, industrial enterprise protection zones, cemeteries, power lines, sites, electro-magnetic radiation (from overhead power lines) and protection zones for cultural monuments was taken into account when making the architectural and planning decisions during the Master Plan and detailed designs:

- The Project area does not coincide with the protection zone of any facility or enterprise.
- There are ponds next to the North-Eastern side of the Project site. Water protection zones for the rivers and coastal belt are also located to the West, and South around the border close to the Project area.
- There is a tectonic fault on the surface of the North West area of Gate City but outside of the Project area; construction is prohibited within 100 metres of that fault.

Sanitary protection zones for sites of electromagnetic radiation facilities (in existence and proposed)

Gate City's land is intersected by numerous high-voltage power lines (220 kV and 110 kV going from North East to South-West, and 35 kV going from West to East) which are away from the Project area. The 220 kV and 110 kV power lines also run across the Boroldai tectonic fault. The long-term construction of new power lines will have the same capacity (but may be buried).

There are no sanitary or hygienic requirements for power transmission lines of 220 kV, 110 kV or less in the protection zone (although at the field levels for residential areas are normalised), and their operation is regulated according to safety regulations.

6.15 Seismic and geotechnical constraints

According to the micro zoning map, there are up to 9 Ball points within the territory of Gate City.

In terms of engineering and geological conditions, only areas well to the South of Gate City's border (and the Project area) border are considered as unfavourable for construction, as a result of the Boroldaiskii tectonic fault zone.

7 IDENTIFICATION, FORECASTING AND ANALYSIS OF IMPACTS

Impacts assessed in this section are primarily based on the Gate City EIA; where applicable, they have been associated with the Project.

7.1 Methodology

The most acceptable method for assessing environmental impacts is to apply three main criteria: the spatial and temporal extent of the impact and its magnitude (intensity). To determine the significance (integral value) of the proposed activities on a separate element of the environment an aggregate of the various environmental impact indicators received for this component is kept. The aggregated impact score is determined by multiplying or summing up the points of the indicators for the spatial extent, duration and intensity of the impact.

The EIA does not contain an overall summary of the Project impacts.

The following sections identify the potential impacts for both the construction and operational phases of the Project. Note that the 'operational' phase commences with occupation of the housing units and the term 'occupational' is used instead of operational.

7.2 Atmospheric emissions

7.2.1 Construction period

For the construction period, atmospheric emissions are likely to include:

- Emissions from fuel combustion in construction plant and equipment, including indirect emissions at power stations in relation to any procured electricity used during the works.
- Dust generation from site clearance and construction activities, including vehicle movement along site access roads and the local road network that could, without mitigation, potentially be a nuisance and/or pose health risks to nearby communities;
- Vehicle exhaust emissions in and around the Project area also have the potential to degrade air quality for site workers and local residents;
- Odours from decomposing organic and/or other construction waste materials on the Project area may also affect air quality.

7.2.2 Occupation period

The occupation of the proposed housing stock will entail the release of some pollutants into the atmosphere when impacts on air will come from both stationary (fugitive and non-fugitive) and mobile sources of emissions.

Quantitative data of the emissions collected from this assessment of the impact of the proposed facilities on the atmosphere are all approximate. The permissible emission levels of the designed facilities (i.e. for both the housing and the other infrastructures being provided by the authorities and/or utility service providers) will be set as the during on-going design processes.

Sources of air pollution in Gate City in general, and more specifically in the Project area, will include chimney boilers, pre-heaters and gas heating furnaces, exhaust pipes from the combined heat and power plant, back-up diesel generators, ventilation pipe production facilities, sanitary engineering department maintenance areas, respiratory petrol nozzles, refuelling vehicles' fuel tank pipes, cistern neck of tank trucks, flames for out-gassing

pipelines, vents for gas system utilities, wood waste silos, technological equipment, internal combustion engine exhaust pipes (fugitive sources).

The quantity and toxicity of emissions are determined according to:

- The enterprise danger factor (EDF).
- The mass and composition of EDF pollutants emitted from the city-wide utilities.
- The EDF for residential areas.

Implementation of the Project will also entail the emission of pollutants from mobile sources (vehicles and equipment) into the atmosphere.

Local legislation requires continuous monitoring of air pollution levels, both at the source of emissions and on the borders of the sanitary protection zone (SPZ) for the enterprises. (It is assumed that this monitoring will be undertaken by the relevant environmental authorities.)

The analysis of atmospheric pollution shows that within the Gate City area in which the Project is to be developed, the Integrated Air Pollution Index (API) is less than 5 and corresponds to a low level of air pollution.

7.3 Noise and vibration

7.3.1 For the construction period

Site clearance and construction activities using piling or other heavy equipment will cause an increase in ambient noise levels and potentially result in noise and vibration nuisance effects on nearby communities.

The assessment determined that the main factor for the negative physical effects of intermediate importance during the construction period was linked to noise arising from the operation of construction machinery, vehicles and equipment especially if located close to existing settlements.

7.3.2 For the occupation period

Noise pollution will be mainly caused by traffic on permanent roads to be built in the Project area. The main factor is the presence of the nearby motorway, which can generate noise that is higher than the permissible level (55 dBA).

7.4 Soils

7.4.1 For the construction period

Potential impacts during the construction phase include the following:

- Removed topsoil could be damaged if not stored (drainage) appropriately (e.g. compacted by vehicles and mobile construction machinery).
- Soil erosion could result from poor drainage and prolonged periods of exposure of soil surfaces (post-removal of natural stabilisers, e.g. vegetation) during construction works.
- Limited potential for disturbance of any pollutants such residual traces of fertilisers or plant treatment products applied to the land when it was still in agricultural production.

7.4.2 For the occupation period

Gate City's territory, on which the Project is to be developed, is characterised by the shallow level of the water table (less than 5 metres). Groundwater levels may rise when the land is

developed, leading to a deterioration of the bearing capacity of soils, and the foundations of buildings. One of the major anthropogenic impacts predicted for this area is the possible flooding of the city; However, no flooding from storm events, saturated water table or overflows from surface waters is considered likely once the planned drainage systems are in place.

7.5 Water resources

Gate City will be located in the area between the Kishi Almaty and Esentai rivers, which are characterised by a constant flow. Architectural and planning decisions for this project do not affect these waterways; however, certain streams and smaller surface water features may be affected to varying degrees.

7.5.1 For the construction period

Potential impacts during the construction phase include the following:

- Surface water quality could be affected by soil sediments if suitable construction phase drainage systems are not implemented;
- Vegetation clearance and construction of access roads and other infrastructure have the potential to cause flooding in high groundwater areas. Removal of vegetation may increase water flows with the Project area, resulting in increased soil erosion and topsoil stripping;
- Potential contamination of groundwater and surface water resulting from any spillage of contaminants such as sewage, chemicals or fuel.

7.5.2 For the occupation period

Factors that would have an impact on water resources include:

- Abstraction of both surface water and groundwater for the supply of industrial and drinking water,
- Conversion of land for urban use will affect the recharge of groundwater resources from rainfall / snowmelt (as the runoff waters will be diverted to drainage systems),
- Uncontrolled discharges of wastewater to surface and/or ground water resources.

7.6 Surface water

It is anticipated that overall impacts on surface waters will be very limited and of low severity. Architectural planning will not affect any sanitary protection zones of any of the nearby rivers and there is no untreated wastewater discharges into the river. The smaller surface water features will be incorporated into the proposed ‘green’ amenity areas.

7.7 Land

7.7.1 For the construction period

Potential impacts during the construction phase include the following:

- Ground contamination could result from any spills or leakages of chemicals or fuels.
- Soil erosion due to the removal of topsoil and vegetation.
- Possible disturbance of any prior residual contamination from abusive waste disposal or from agricultural fertilisers or plant control products applied to land.

7.7.2 For the occupation period

The main potential factors for chemical contamination of soil are the following:

- Contamination from domestic and industrial wastewater.
- Contamination from hydrocarbons.
- Contamination from waste products.

These may occur through a number of pathways including direct spills, leakages from pipes or storage vessels, from facilities include petrol filling stations, vehicle maintenance services, garages, parking facilities, fire departments, etc. These are being constructed or operated by the relevant authorities and/or utility service providers and not by the Project Developer. Nevertheless it is assumed that, with adequate design mitigation, these facilities' impact on soil conditions will be negligible.

7.8 Flora

7.8.1 For the construction period

The impacts on vegetation will be mainly mechanical with a negligible amount of chemical impact. Main impacts are its removal during clearance, potential smothering of nearby vegetation due to dust deposition in / around the Project site, and topsoil storage.

7.8.2 For the occupation period

In the operational phase there will be no natural vegetation within the Gate City area, which includes the Project area, since this will be entirely replaced by cultivated plants.

The chemical impact of the planned facilities on the vegetation may manifest itself directly, through atmospheric emissions of pollutants such as sulphur dioxide and nitrogen oxides.

Therefore it can be concluded that:

- The natural plant cover within the Gate City area, and specifically within the Project area, will be partially destroyed and replaced with cultivated plants.
- Within the Project area, improvements are planned to create a large number of landscaped areas including forested areas for public use, avenues and areas of forest and parkland which will be regularly maintained.
- In the occupation phase, there will be elevated traffic densities and the natural vegetation of the adjoining areas and the cultivated vegetation within the urban areas may be exposed to atmospheric chemical pollution.
- Provided that work is well organised and all environmental protection measures envisaged in the Project are carried out, the impact of the Project in the operational phase on new vegetation will be assigned a low to average ecological risk rating. Overall, the environment is suitable for human habitation and the natural and man-made bio-communities are changed but not suppressed.

7.9 Fauna

7.9.1 For the construction period

Within the Project area, the main impacts during the construction period consist of limited potential disturbance, displacement and/or loss of habitats and wildlife due to removal of vegetation and topsoil and construction activities.

7.9.2 For the occupation period

No description of impacts is provided within the EIA, but it is expected that there will be some re-colonisation by small mammals, birds and insects due to the creation of green zones/ parkland, gardens, tree planting and other amenities.

7.10 Wastes

The EIA states that waste implications of Gate City and the Project were to be examined at the next planning stage (i.e. when the design phase and construction plan are compiled). At the full development stage, various types of waste will be generated and its temporary storage, dumping or recycling will have a potential impact on the various components of the environment.

7.10.1 For the construction period

A range of construction wastes will be generated including surplus materials such as debris from site clearance; concrete; bricks; tiles and ceramics; wood; glass; plastics; and packaging materials. As no building demolition is required in the Project area, it is unlikely that any potentially contaminated demolition wastes will be generated.

Inappropriate storage or disposal of any of the range of anticipated waste materials could also result in pollution of air, contamination of soils and water, attract vermin and/or cause health issues. All wastes will need to be properly segregated, stored, handled and disposed of in accordance with local legislation.

7.10.2 For the occupation period

Based on data from similar approved projects, the following types of waste are likely to be generated within the general Gate City area and, in particular, within the Project area:

- Household wastes;
- Medical waste; and
- Building / grounds maintenance wastes including used fluorescent lights, scrap metals, waste oils / oily rags, used batteries / tyres, etc.

The levels of waste generated in the Gate City area, which can be extrapolated for the specific Project area, are estimated in the EIA report and appear reasonable.

Table 7.9.2.6 shows the anticipated waste levels of Gate City.

Table 7.9.2.6 - Anticipated Waste Levels for Gate City (at full development)

№	Designation of waste	Hazard level	Hazard category	Generated amount, tons/year		Properties	Storage conditions	Recommended disposal or recycling
				Ist phase	Completion			
1	Waste fluorescent lamps	Amber list AA100	1	3000 pcs	1000 pcs	Solid, incombustible. Toxic component - mercury.	Metal tank.	De-mercurisation facility
2	Waste batteries	Amber list AA170	2	160,95	377,33	Solid, non-soluble. Plastic pipes with joined electrolyte.	Special containers on allocated yard	Transfer to specialized company
3	Waste oil	Amber list AC030	3	229,43	537,45	Liquid. Inflammable. Toxic components - oil products.	Metal tanks for waste oil	Recycling generation or transfer to specialized companies
4	Waste oil filters	Amber list AE020	3	34,23	80,39	Solid inflammable, non-soluble in water. Toxic components - oil products.	Metal tanks	Transfer to specialized company
5	Oiled rags	Amber list AE020	3	35,97	84,27	Cotton fabric, infiltrated by fuel and lubricants.	Storage in special box and marked as "Rags"	Disposal to landfill
6	Oil contaminated soils	Amber list AE020	3	20,0	40,0	Solid, non-inflammable. Uncontrolled type of waste. Toxic components – oil products	Metal tank for oil contaminated soil	Transfer to specialized company
7	Waste vehicle tires	Green list GK020	4	818,94	1930,46	Solid. Inflammable. Toxic component - rubber.	Designated apron	Transfer to specialized company
8	Scrap metal	Green list GA090	4	50,0	100,0	Solid, non-soluble, non-inflammable. Ferriferous waste. Ferrous scrap	Designated Open yard	Transfer to specialized company for recycling
9	Construction waste	Green list GG170	4	5537,0	9154,0	Solid, non-inflammable, non-soluble in water.	Designated open yard	Transfer to specialized company companies for disposal on landfill
10	Solid domestic waste	Green list GO060	5	56574,88	111034,4	Solid, inflammable, non-soluble in water.	Metal tanks on the apron	Disposal via solid domestic waste landfill
Total				**63461,4**	**123338,3**			
Including		**Red list**		0	0			
		Amber list		480,58	1119,44			
		Green list		62980,82	122218,9			

7.11 Socio-economics

The criterion used for a social impact assessment is the extent to which social needs are met; for an economic impact assessment the criterion is the extent to which the results of the planned activities will impact on the economy of the region and the entire country.

It is understood that the land acquisition process has been completed successfully and that no resettlement or compensation issues are outstanding in regards to the Project site. The land had been left unoccupied and unworked until 2010 when the authorities commenced site preparation works; no occupation or activities requiring compensation are currently taking place. As the site has already been vacated, no further physical displacement will be required during the construction phase of the Project.

Also, although it is considered generally unlikely that there will be any significant 'economic displacement' as a result of the construction phase, there is some low potential for disruption to local businesses (e.g. through disruption of access or as a result of nuisance impacts such as dust deposition on adjoining properties). However, such instances can be adequately mitigated through the application of good industry practice and, in the event of any compensation claims from affected stakeholders these can be managed via the community grievance mechanism.)

7.11.1 For the construction period

Construction works will trigger positive impacts such as:

- Increased employment opportunities during the construction phase.
- Increased demand for local goods and services from construction workers and the establishment of a temporary workers' camp (still to be confirmed).

However, impacts could also be negative and relate to:

- Lack of community support within nearby existing settlements (e.g. if insufficient consultation or communication with them).
- Economic displacement related to the disruption to local businesses caused by construction associated nuisances such as local traffic congestion.

7.11.2 For the occupation period

The potential positive impacts on the economic and social spheres:

- Gradually meeting the various needs of various segments of the national and Almaty province population for improved living conditions and building homes for both middle classes and vulnerable segments of the population.
- Stimulating economic activity.
- Securing employment opportunities for the residents of the Gate City and the surrounding areas.
- Providing cultural and educational services.
- Developing professional education and science.
- Forming a healthy lifestyle and popularising physical education and sport.
- Developing preventive medicine and providing hospital beds.

- Developing road transport infrastructure.
- Making improvements to the ecological situation.

At the national level, there is evidence of three types of likely positive impact:

- Development of infrastructure and confidence levels for major investors which will meet international standards.
- Direct tax revenues from works connected with the operational infrastructure in Gate City.
- Reduction in local socio-economic problems and resultant reduction in the burden on the budget.

The potential negative socio-economic impact during the operational phases of the planned facilities includes:

- Creating new infrastructure leads to the destabilisation of nearby existing communities.
- The economic instability of the new communities will impair the social conditions of vulnerable segments of the population.

Summary of socio-economic impact assessment

Overall however, the construction and operational phases of Gate City will have a positive socio-economic impact on the region due to the generation of employment and training, the development of infrastructure and public utilities and a reduction in local socio-economic problems.

7.12 Community health and safety

7.12.1 For the construction period

The main risks for community health and safety during the construction period relate to the increase in spread of communicable diseases, following any influx of labour during construction and the establishment of temporary workers' accommodation on the Project site.

The possibility of elevated traffic levels in the area could also result in more frequent road accidents.

7.12.2 For the occupation period

Within the Project area there is a risk of various types of incidents and emergencies occurring, including:

Man-made incidents

- Fires and explosions at various facilities
- Oil spills

Natural disasters

- Earthquake
- Flooding, swamping and water-logging
- Dust storms and snowstorms

Epidemics caused by natural factors

Results of the emergency situation risk assessment for Gate City are presented in 'Matrix of predictable impact of incidents and emergencies' as shown in Table 8.2.1 below.

Table 8.2.1 - Matrix of potential effects of accidents and emergencies

Receptor / Action	Visual Impact	Local economy	Health, security, wellness	Access to resources	Impact
Human Factors					
Fires and explosions at work / home	6	6	8	2	Death and injury of people, psychological pressure, destruction, loss of property, air pollution, visual adverse effects, disruption to access routes
Traffic accidents with spills of petroleum products	1	1	1	-	Environmental pollution, restricting access, fire
Natural factors					
Earthquakes	6	8	9	8	Death and injury of people, psychological pressure, destruction of infrastructure, air pollution, adverse visual effects, disruption to access routes, changes to landscape, loss or suspension of services
Dust storms and snowstorms	2	2	4	1	Injuries to people, psychological stress, air pollution, disruption to access routes, delays / disruption to public services and trade
Flooding, swamping and water logging	6	9	8	6	Injuries to people, psychological stress, damage, visual adverse effects, disruption to access routes
Disease epidemics	2	2	2	-	Illness, psychological stress
Significance of impact		High		Medium		Low		Slight

7.13 Traffic

The main impacts on traffic during the construction phase include:

- Increased road traffic congestion and elevated risk of road accidents resulting from increased construction and worker vehicles moving to and from the Project area.
- Any temporary restrictions to access to local properties and amenities due to construction works.

During the occupation phase and in subsequent development of Gate City, local traffic levels will increase cumulatively; this is catered for by the road planning authorities.

7.14 Landscape and visual

Temporary visual disturbance will be caused by appearance of the construction site (poorly stored materials and waste; excessive clearance of vegetation) and littering.

Long term, permanent changes following completion of construction works are expected to be positive given urban design and extensive landscaping.

7.15 Labour and working conditions and Occupational health and safety

Potential impacts for both the construction and occupation phase of the Project include:

- Potential for discriminatory hiring of workers if no Human Resource Policy is in place;
- Low risk of exploitative employment of children and/or forced / trafficked labour if outsourcing of labour to non-compliant sub-contractors if no mitigation and monitoring is in place.
- Potential for workplace accidents associated with typical hazards on construction sites and building works;
- Injury or death of workers resulting from inappropriate transportation, handling, storage, use and disposal of hazardous materials.

7.16 Cultural heritage

There are no known monuments or other features within the proposed Project area.

Potential impacts on cultural heritage are considered minimal for the construction period, as there is only limited potential for damage or destruction of any chance finds of cultural heritage items during site clearance or construction works.

The table below provides a summary of the nature, duration and significance of potential environmental and socio-economic impacts during both the construction and occupation phases.

Table 1 – Summary of Nature, Duration and Significance of Impacts during Construction (C) and Occupation (O)

Issue	Impact	Location	Phase	Nature of Impact	Duration	Significance
Air Quality	Emissions from fuel consumption during construction	Project site	C	Adverse	Short – Medium Term	Low
Air Quality	Dust generation from construction activities	Project site	C	Adverse	Short – Medium Term	Negligible
Air Quality	Vehicle exhaust emissions	Project site	C	Adverse	Short – Medium Term	Low
Air Quality	Odours	Project site	C	Adverse	Short term	Low
Air Quality	Emissions due to fuel combustion / consumption during occupation (including traffic)	Project site and regional / local roads, plus remote power generation	O	Adverse	Medium – Long Term	Low - Medium
Noise and vibration	Nuisance impacts	Nearby settlements	C	Adverse	Short – Medium Term	Low
Noise	Raised ambient noise levels from background traffic noise etc	Project Housing	O	Adverse	Medium – Long Term	Low – Medium
Soils	Damage to removed topsoil	Project site	C	Adverse	Short term	Low
Soils	Erosion	Project site	C	Adverse	Short term	Low
Soils	Disturbance of existing soil pollutants	Project site	C	Adverse	Short term	Negligible
Soils	Impacts on water table	Project site	O	Adverse	Medium—Long term	Low
Surface Water	Change in surface water	Project site	C O	Adverse	Long term	Low

Issue	Impact	Location	Phase	Nature of Impact	Duration	Significance
	runoff & quality					
Groundwater	Change in groundwater quantity & quality	Project site	C O	Adverse	Long term	Low
Land	Potential contamination from leaks and spills	Project site	C O	Adverse	Short – Medium term	Low
Vegetation	Loss and/or disturbance of natural species	Project site and adjacent areas	CO	Adverse	Short – Medium term	Low
Fauna	Loss and/or disturbance of natural species	Project site and adjacent areas	CO	Adverse	Short – Medium term	Low
Landscape and visual	Visual disturbance	Project site and adjacent areas	CO	Adverse	Long term	Low
Wastes	Construction waste including hazardous and non-hazardous wastes	Project site	C	Adverse	Short – Medium term	Low
Wastes	Domestic, medical and commercial wastes	Project site	O	Adverse	Medium—Long term	Low
Socio-Economic	Increased employment opportunities with reputable businesses	Regional	C O	Positive	Medium—Long term	Significant
Socio-Economic	Lack of community support, nuisance complaints and disruption to business by increased traffic	Area around Project site	C	Adverse	Short – Medium term	Low
Socio-Economic	Increased demand for local goods and services	Area around Project site	C	Positive	Short – Medium term	Medium

Issue	Impact	Location	Phase	Nature of Impact	Duration	Significance
Socio-Economic	Provision of modern, good quality residential environment	Project Site	O	Positive	Medium—Long term	Significant
Socio-Economic	Destabilisation of existing communities and economic instability with particular regard to vulnerable elements of society	Area around Project site	O	Adverse	Short – Medium term	Low
Community Health and Safety (including Traffic)	Increased health risks to local communities through possible diseases and road traffic accidents	Area around Project site	C	Adverse	Short – Medium term	Low
Community Health and Safety	Consequences of man-made and natural emergencies (fire / explosion, spills, earthquake, flood, extreme weather events	Project Site	O	Adverse	Short – Medium term	Significant
Occupational Health and Safety	Accidents / injuries, exposure etc	Project Site	C O	Adverse	Short – Medium term	Significant in construction phase; low thereafter
Cultural heritage	Chance finds	Project Site	C	Neutral	Short term	Negligible

8 MEASURES TO MITIGATE, MINIMISE AND REMEDY IDENTIFIED IMPACTS

The proposed mitigation measures are set out in the following sections.

8.1 Air quality

8.1.1 For the construction period

In order to minimise nuisance and health risks related to dust emissions, The EIA recommends:

- Storage of materials onsite for reuse to reduce vehicle movements
- Storage areas to be a minimum 50 m from the Project site boundary, further from site offices / nearby settlements if feasible
- Appropriate site traffic speed limit to be set and enforced
- Site haul roads to be damped down as appropriate, e.g. in the dry season
- Cover loads of dust generating materials before leaving site
- Clean vehicle wheels before joining main public road
- Sweep/clean any accumulations of mud and/or debris from main public road
- Briefing of workforce on requirements
- Record all complaints (community, workforce, regulators)

Degradation of air quality can be reduced through:

- Maintenance of plant and vehicles in good working order
- Turning off engines when not in use
- Designation of approved transport routes
- Briefing of workforce on requirements

Finally, odour nuisances can be countered through:

- Drying topsoil, sand and organic matter on site prior to reuse/disposal
- Locating drying organic matter and topsoil away from sensitive receptors
- Washing waste collection vehicles and containers regularly
- Providing suitable waste storage containers / facilities and frequent waste collections

8.1.2 For the occupation period

The design includes measures to help reducing the impact of emissions on residential areas.

Implementation and monitoring of air shed status

In order to comply with statutory requirements on atmospheric protection, including compliance with statutory maximum emissions permitted during recycling of facilities by an enterprise, the overall Gate City design includes a system for routine monitoring sources of atmospheric pollution by the facility operator.

The monitoring system of atmospheric emissions must provide systematic data on emissions; baseline data; and an assessment of compliance with established emissions norms and on the analysis of the reasons for exceeding these norms.

Mandatory controls on substances will include major pollutants - nitrogen oxides, sulphur dioxide, carbon oxides, suspended particulates and specific substances characteristic of industrial emissions from the relevant settlement (in Gate City: total hydrocarbon and methane).

Regular inspections of equipment, in compliance with safety regulations and operating rules for all sites in the Project, will help minimise or eliminate entirely accidents.

Additional monitoring of the airshed is required and will comprise the following:

- Monitoring of atmospheric pollution emission sources to check compliance of emissions with permitting requirements.
- Assessment of atmospheric air quality status (monitoring of impact).

In order to assess atmospheric pollution levels in the G4 Cities an appropriate network of static observation posts will be created (to be agreed by the city's chief architect). The statutory laboratories will define these air sampling points.

GHG emissions and overall impacts on climate change are not covered by the EIA.

8.2 Noise and vibration

8.2.1 For the construction period

In order to minimise the impact of the construction period, schedules/plans for traffic and transportation on roads will be designed, eliminating night-time traffic and at weekends.

Designated construction sites must have perimeter fencing equipped with standard cladding and/or be equipped with standard perimeter walling (noise screens) while work is in progress, in order to reduce noise from construction activities and equipment.

In addition, the following measures are recommended:

- All vehicles and mechanical plant used for the works should be maintained regularly and be in good working order
- Machinery should be turned off when not in use
- Noisy operations (such as piling) should be located at a maximum distance from any sensitive receptors / nearby settlements
- Noisy operations should not be undertaken overnight, at weekends or on public holidays
- Materials should be delivered/removed during normal working hours
- All ancillary construction plant and equipment should be positioned so as to cause minimum noise disturbance
- Where works are carried out near residential areas, provide prior notice of noisy activities

- Acoustic enclosures and/or acoustic shielding should be considered if appropriate
- Control of traffic movement around the site
- Record and act on all complaints

8.2.2 For the operating period

Preventive measures, taking sanitation standards into account, are to be implemented to help further reduce noise levels by 30-70%.

The Project's design solutions mean that any buildings that are sensitive to noise (children's nurseries, and medical, health, educational and public institutions) are to be located away from main roads at a distance ≥ 60 meters, and are to be located inside multi-storey architectural complexes.

The Project is using advanced sound-absorbing surfacing materials for those buildings that are sensitive to noise (children's nurseries, health and educational institutions.

Plans to install belts of trees and bushes along roads and near houses will be an efficient protection against noise from transport.

If required, sound barriers could be placed along the "Almaty-Kapshagay" Road (they have been designed for the Almaty Main Ring Road), along with windbreaks to reduce noise pollution in accordance with established standards.

Taking into account the localised nature of the impact and the location of the proposed boiler station and of the combined heat and power plant in the communal areas outside the residential areas, their impact is estimated to be low.

Vibration protection screens may also be provided as an additional measure to reduce vibration from motorway traffic.

The total cumulative value, taking all influences into account, is rated as average.

8.3 Geological environment

8.3.1 For the construction period

Soil erosion and damage to topsoil can be prevented or minimised through:

- Minimising the removal of natural stabilisers such as grass, vegetation and mulch and, to the extent practicable, the amount of time that disturbed areas are left exposed.
- Minimising the number of vehicle access points to and from the site.
- Avoiding site disturbance during wet weather or when water table is high.
- Strip and stockpile topsoil at the start of excavation works. Stockpiles shall be constructed to be smooth and free-draining, to a maximum height of 3 metres, in a manner that minimises compaction by machinery.
- Implementation of suitable plans for site drainage works, including sediment traps, diversions, culverts and related structures as appropriate, to minimise sediment loads in run-off.
- Training of workers on operational requirements.

In order to reduce flood risk and increased levels of water flow on-site, mitigation measures should ensure the following:

- Establish risks and monitor potential conditions that might result in flooding of the construction site.
- Re-profiling of site topography and installation of planned site drainage scheme to reduce flood risk from high groundwater levels.
- Store plant/equipment and materials away from areas susceptible to flood damage.
- Creation of 'Green Zone' areas.
- No vegetation removal outside construction site boundary.
- Appropriate design and implementation of site drainage systems / structures.
- Protection of topsoil stockpiles from gullying / erosion.

8.3.2 For the occupation period

The only significant negative geological process is the possibility of flooding or water logging to individual sections of the Gate City, and potentially to the Project area. However, these problems can be successfully resolved with appropriate and timely implementation of underground water drainage.

The Environmental Impact Assessment offers preventive measures to protect the area from flooding and soil subsidence, as well as slope stabilisation techniques. These include: lowering of the water table, the regulation of surface runoff, drainage, waterproofing buildings and structures and localised levelling.

Untreated wastewater discharge should not be allowed on the land on which the Project is developed.

The main way to prevent wind erosion is the construction of protective layers on all affected surfaces (e.g. made of clay soil). It is important to recreate conditions to encourage the development of roadside vegetation. Properly implemented, roads can become a powerful barrier to erosion, and will contribute to the gradual formation of a vegetative cover and permanent soil on road verges.

During periods of snowmelt and heavy rain, valleys and depressions can be filled with water that passes down dry channels from roads. The Project must provide for a smooth passage for this water by installing culvert pipes.

Prefabricated concrete slabs or monolithic concrete can be used for strengthening bank slopes, depending on the design standards.

Another form of protection recommended against erosion would involve hydro seeding perennial grasses across the surface of the soil layer on the embankments at a thickness of 10-20 cm.

8.4 Water resources

8.4.1 For the construction period

In order to avoid deterioration of water resources quality and groundwater contamination during the construction period, the following is recommended:

- Workforce to be trained in pollution prevention and emergency spill response procedures
- Provision of spill kits
- Appropriate sanitary facilities installed for site workers and cleaned daily

- Fuel storage and filling areas with adequate primary and secondary containment of storage containers
- Measures to control any spillage/leakages outside of these areas
- Dewatering method to minimise water quality impacts
- Foul sewage from the workers camp to be managed by either connection to local mains, removal from site by road tanker or other suitable effluent treatment unit

8.4.2 For the occupation period

The physical infrastructure of any modern municipality requires significant amounts of fresh water for both drinking and industrial purposes. As a consequence, the disposal of large amounts of waste water into the environment is also required.

The Project should set out its water consumption and wastewater management plans for the protection and rational use of water resources, as well as to prevent the pollution of surface water and groundwater.

Systems for the supply of water, including the choice of water sources, the location of water intake structures, and determining the estimated cost of the water, are to be established in accordance with the requirements of the Construction Rules and Norms for the Republic of Kazakhstan SNiP RK 4.01.-02-2004 "Water Supply. External networks and facilities", and Construction Rules and Norms SNiP RK 3.01-01-2002* "Urban Planning: The planning and development of urban and rural settlements".

Similarly, sewerage systems, including the choice of sanitation circuits, the location of treatment facilities, the adoption of wastewater treatment schemes, the conditions and location of treated wastewater discharge, as well as calculating the costs drainage, are to be established in accordance with the requirements of Construction Rules and Norms SNiP RK 2.04.03-85 "Sewerage: External networks and facilities" and Construction Rules and Norms for the Republic of Kazakhstan SNiP RK 3.01-01-2002* "Urban Planning: The planning and development of urban and rural settlements".

Water consumption

Groundwater quality in all properties is regulated in accordance with the "Drinking Water" All-Union State Standard" (GOST).

Treatment for drinking water

Quality standards for drinking water in Kazakhstan are regulated by the following documents:

1. Sanitary-epidemiological rules and norms "Sanitary Requirements for the Protection of Surface Waters from Pollution", approved by Decree of the Acting Minister of Health, dated June 28th, 2004, No 506.
2. Sanitary regulation and standard (SanPiN) 3.01.067-97 Sanitary rules and norms. Drinking water. Hygiene requirements for the quality of centralised water supply systems. Quality control.
3. GOST 2874-82 All-Union State Standard. Drinking water.

The Pokrovskoye groundwater resource complies with the above-mentioned regulations in terms of chemical composition, on the basis of which it is planned to supply water to Gate City and the Project, as well as being the proposed location for a new groundwater intake.

Wastewater disposal

The sewerage system will receive, dispose of and treat industrial and domestic wastewater from the residential area. Treatment facilities will be located outside the urban area (to the North-West of Gate City).

The EIA recommends a vertical design for wastewater treatment plants, adopting an aerobic-gravitational method. This method will allow wastewater to be treated so that it meets the discharge requirements for fishery water bodies.

The EIA states that a industrial and domestic wastewater feasibility study will consider various alternative sites for allocation, including treatment plants in Almaty and a storage facility in Sorbulak, which will be located in West of the Kaskelen River.

Surface water conservation in the area

In accordance with “Technical instructions on planning water conservation areas and belts of surface facilities” approved by the Chairman of the Water Resources Committee of the Ministry of Agriculture of the Republic of Kazakhstan on 21st February 2006, a plan for water conservation areas and belts of surface facilities must be developed.

Design studies must pay particular attention to measures within the water conservation belt, including the following:

- Implement agro-technical measures to combat erosion of soil and subsoils and retain runoff of solid matter containing pollutants.
- Implement measures to prevent transfer of concentrated and dispersed pollutants into water bodies from the water catchment area.
- Planting perennial grasses in the water conservation belt.
- Implement soil conservancy measures by afforestation by planting various bush and tree species.
- Ensure there are no summer cattle grazing points, farms, manure disposal lagoons, unauthorised landfill sites for household and industrial waste and other facilities (garages, fuel and lubricant stores, workshops etc.) in the conservation belts

The design for the water conservation areas and belts must provide recommendations on recycling of land in the water conservation areas and belts based on the specific local conditions.

Protection of water resources from depletion and pollution

Protection of water resources can be achieved within this Project by undertaking the following measures:

- Setting up sanitary protection zones (SPZ) for sources of water supply.
- Enabling recycling of water supply.
- Providing means of collecting and purifying waste water.
- Purifying emissions of effluents (using highly effective purification equipment).
- Protecting aquifers from depletion and pollution.

Sanitary protection zones for planned water intakes and waterworks

SPZs are included in the design of all domestic drinking water supply systems to ensure public safety as required by Building Code and Regulations of the Republic of Kazakhstan (SNiP RK) 4.01-02-2001, Sanitary Regulations and Standards of the Republic of Kazakhstan (SanPiN RK) No.3.01.068.97.

Water supply zones comprise the water supply source area around the water withdrawal point (including water withdrawal equipment), the sanitary protection zone and belt (SPZ) of the water supply equipment (pumping stations, water treatment stations, storage) and the sanitary protection belt of water conduits.

Potential factors influencing water resources and incident situations are examined, and measures to mitigate negative impact are already integrated into design solutions.

Monitoring of water resources

Data on the existing system for monitoring surface and ground waters are provided.

Expansion of water resource monitoring points is also planned.

8.5 Soil

8.5.1 For the construction period

The Environmental Code of the Republic of Kazakhstan (Article 217) indicates that if during construction users of natural resources "remove, store and use the topsoil layer as part of their work, this constitutes land disturbance".

Rules regarding the removal of the fertile layer are established in accordance with Republic of Kazakhstan standard 17.0.0.05-2002 (Conservation of Nature. Open mining operation: Land: Rehabilitation of disturbed land).

During construction activities themselves, soil contamination or degradation can be avoided through:

- Training of workforce regarding pollution prevention emergency response / clean up measures.
- Designated chemical and fuel storage areas on hard standing with adequate primary and secondary containment (e.g. 110% of largest container).
- Restricted access through designation of approved personnel and fencing where appropriate.
- Mobile plant and equipment refuelling protocols.
- Provision of appropriate sanitary facilities for site workers and adequate housekeeping / hygiene.
- Emergency spill / cleanup procedures.
- Minimising multiple handling of soil.
- Designated routes for vehicles moving around the construction site / designated parking areas.
- Erection of a barrier around / provide cover over any stockpiled topsoil / sand.

8.5.2 For the occupation period

Recommendations for the monitoring of soils

Stationary monitoring sites should be installed in areas that experience the most intense traffic (around large interchanges) and near major industrial or municipal enterprises (boiler station, combined heat and power plant).

The EIA recommends that monitoring includes analysis of the overall chemical, physical, and chemical-physical properties of soils (e.g. humus content, bulk and mobile nitrogen, water extraction, mechanical composition, heavy metals (Pb, Cd, Cr, Cu, Zn, Ni, Mn) as well as any relevant health indices.

Findings

A lot of work will be undertaken in 'greening' the Project area, including the creation of parks and forest park zones on the perimeter, boulevards and forest belts along the motorways and internal routes, the planting of lawns and decorative flowerbeds in the city's streets and squares. All this will lead to the formation of a layer of cultivated, fertile soil. If properly managed, the newly created soil will be assigned as low to average in terms of the severity of environmental risk.

8.6 Vegetation and wildlife

8.6.1 For the construction period

The Project site is not located within any protected area. There are no World Heritage, RAMSAR, Natura 2000, Alliance for Zero Extinction or other internationally designated sites within or close to the Project's area of influence.

As the site had been allowed to become derelict and then has been subject to a range of preparatory works ahead of the housing construction, it is considered that there are no 'priority' provisioning, regulating, cultural or support ecosystem services that would be impacted and no specific mitigation measures are therefore proposed in this regard.

Besides, there is limited potential for any invasive alien species - flora, fauna, pests or pathogens - to become established within the Koyankus site. A basic precautionary approach could be required if considered necessary - e.g. check on plant species used in landscaping / Green Zones and a short survey prior to completion of works so that appropriate eradication measures can be implemented.

Although if ecological impacts on vegetation and wildlife in the Project area are thought to be limited, they can be avoided or mitigated through a series of protective and conservation measures, including:

- No hunting or killing/injuring wildlife on/near site.
- Control of vehicle speeds on site.
- Restrict vegetation clearance to the minimum required within the site boundary.
- Prevent accidental introduction of invasive species during landscaping – implement a short survey period prior to completion of works so that appropriate eradication measures can be implemented if required.
- Establish the designated Green Zone areas.
- Control any burning (e.g. vegetation or wastes) and if appropriate ensure adequate fire breaks.

- Monitor and report wildlife incidents as a result of construction activities.
- Avoid smothering habitats through dust deposition or topsoil storage within the site boundary.
- Provide fuel storage and refuelling areas with adequate primary and secondary containment.
- Implement measures to control any spillage/leakages (i.e. locate spill kits).
- Train workforce on ecological measures as appropriate.

8.6.2 For the occupation period

In the planning and implementation of the environmental protection measures the design envisages that the artificial forest plantations will be the most important factor in enabling conservation, attracting and restoration of the biological components of the environment within the Gate City and the Project area. The plans for the landscaping measures reflect the interaction between environmental components and chemical processes.

The landscaping of the area takes into account the needs of the fauna habitat and human activities, the preservation or provision of landscapes close to the natural biotopes to attract animals and above all birds. The most important condition for birdlife is the presence of a sufficient number of sites with trees and shrubs.

The construction and operational phases of the Project will not have a negative effect on vegetation, wildlife or the gene pool of the animals whose habitat is located within the area under consideration.

8.7 Waste

8.7.1 For the construction period

The application of waste minimisation techniques and good industry standards plus ensuring due compliance with regulatory requirements should provide suitable mitigation of waste-related impacts.

Kazakhstan has a good standard of waste management legislation that requires the identification, segregation and safe disposal of wastes in accordance with a defined classification system (which is broadly equivalent to that operated in the EU) and that is subject to supervision by the relevant authorities.

As construction activities will require land clearance (but no demolition), and will entail production of construction waste as well as sanitary waste (e.g. sewage), the following is recommended:

- Storage on site away from site boundary and covered to prevent windblown dusts.
- Suitable materials to be re-used for landscaping.
- Waste management plan to minimise waste generation to the extent possible and then to ensure correct identification / categorisation (into Green and Amber List code / hazardous classification, etc.), segregation, storage and disposal of all waste materials in accordance with Kazakhstan's regulations.
- Provide sufficient quantities of suitable waste storage containers / facilities.
- Ensure frequent waste collections.

- Wastes to be collected and disposed of appropriately by duly authorised contractor(s).
- Sewage generated on site to be stored in septic tanks and collected by authorised waste carrier.
- Foul sewage to be managed by either connection to local mains if available, otherwise removal from site by road tanker or other suitable effluent treatment unit.

8.7.2 For the occupation period

All enterprises and residents who will occupy the Project area will generate household and industrial waste, raising the issue of their collection, temporary storage, transportation, final disposal, recycling or dumping.

Project designs already include allowance for the correct management of waste materials during the operational phase when the housing units are occupied; both waste utilities and authorities will ensure correct storage, transport, processing / recycling/disposal, and recording of wastes in accordance with national regulations and standards. The D&B Contractor shall develop and implement a Waste Management Plan to ensure compliance with legal and Developer requirements

In addition, a new waste processing facility will be built during later stages of the G4 development. In order to resolve the problem of recycling, the designs include the implementation of regular scheduled cleansing with the removal of rubbish to a waste reprocessing plant located at a specially designated site on the North-Western side of Growing City. This waste plant will eventually serve all four satellite cities.

The owners of the waste reprocessing plant (individuals and corporate entities) will ensure that land plots are designated, project documentation and expert assessments compiled, capital investments in technology are made, waste composition and recycling are monitored, as stipulated by the Sanitary Regulation and Standard (SanPiN) 3.01.016.97 “Arrangement and maintenance of municipal solid waste landfills”.

The municipal waste management system will include:

- Calculation of the volume of wastes generated and adjustment of volumes through new waste recycling technologies and refinement of technical processes at the Gate City enterprises.
- Collection of waste in special containers or stores for temporary storage of waste.
- Removal of waste to dumping sites in accordance with compiled and approved schedules.
- Registration of documentation for removal of waste with indication of volumes of waste to be removed.
- Recording of information on removal of waste in logbooks and computer databases of the relevant enterprises and organisations for removal of waste from the different city areas, including the Project area.
- Compiling of Form 3 reports (toxic waste), submitting report data to the Area Environmental Protection Office (TUOOS) (once every six months).
- Signing a Contract on removal of waste from the premises of the relevant enterprises and households.
- Obtaining of waste disposal limits and Environmental Emissions Permits.

Toxic substances will be stored in containers with contents labelled in accordance with statutory requirements on storage and the recommendations of the contractor or manufacturer. The containers will be stored in specifically designated sites at a sufficient distance from any site at risk of fire or explosion in crowded areas (parks, squares, schools etc.).

8.8 Socio-economics

It is understood that the land acquisition process has been completed successfully and that no resettlement or compensation issues are outstanding in regards to the Project site. The land had been left unoccupied and unworked until 2010 when the authorities commenced site preparation works; no occupation or activities requiring compensation are currently taking place. As the site has already been vacated, no further physical displacement will be required during the construction phase of the Project.

Also, although it is considered generally unlikely that there will be any significant 'economic displacement' as a result of the construction phase, there is some low potential for disruption to local businesses (e.g. through disruption of access or as a result of nuisance impacts such as dust deposition on adjoining properties), which could be managed through a community grievance mechanism.

An important mechanism for reducing negative socio-economic impacts on affected communities is the process of consultation with the public which ensures access at all stages of the planned construction works and when the Project is operational by all interested parties to information on the Project. This allows constructive decisions to be taken operationally on any problems that might arise whilst the effects to be identified and rectified.

The key objectives of the consultations are:

- To provide the public affected by the project with regular information on the progress of the works and Project implementation.
- To provide information about vacancies to the population in the region.
- To ensure there are appropriate processes for taking gender and cultural issues into consideration when communicating and implementing the activity.
- To identify any potentially significant problems that might arise during building works and Project implementation.

To this end, the following is recommended for the Project:

- Develop a suitable Stakeholder Engagement Plan (SEP), including a register of Project stakeholders and an overview of potential stakeholder concerns, prior to commencement of works. The SEP should include the requirement for a grievance mechanism.
- To minimise any safety risks and avoid complaints about nuisances effects, advise affected communities, their representatives and/or the relevant authorities in advance of any material issues, activities and timings (e.g. noisy works, significant road movements, road diversions, etc.).
- Develop appropriate grievance mechanism for handling and resolving grievances received by local business owners or community members. Include mechanism for processing any compensation claims.

8.9 Community Health and Safety

All relevant housing / building and other infrastructure (i.e. roads, medical and emergency services provision, etc.) safety requirements (i.e. seismic resistance, fire prevention and

control, etc.) have been incorporated into the various designs and duly approved by the relevant authorities as meeting the various regulatory criteria.

8.9.1 For the construction period

There is only limited potential for adverse impacts to community health and safety from the Project construction works and related activities. Access restrictions and adequate security provisions (fencing around stores, anti-vandalism measures on fuel / gas / electrical installations, etc.) to deter unauthorised visitors and maintaining vigilance should be sufficient to prevent most types of incidents on site.

Most labour will be sourced locally from within the wider Almaty area and it is therefore considered unlikely that there will be any significant problems in this regard. The D&B Contractor should assess any implications on this topic that could be associated with its workforce and take any necessary steps to mitigate, ensuring that:

- Staff and subcontractors are provided with training on communicable diseases, with particular focus on STDs and HIV/AIDS.
- Any accommodation camp meets minimum standards of acceptability, food storage/preparation, sanitation (latrines, sewage disposal), etc.

The Project team are to develop suitable and sufficient emergency prevention measures and response procedures for the range of potential incidents to be encountered during the construction phase. In particular, natural or man-made incidents or emergencies can be avoided or minimised through emergency prevention measures such as fire alarms, evacuation routes / fire-fighting systems etc., and suitable contingency reaction plans to deal effectively with any emergency situations that occur post-construction phase.

8.9.2 For the occupation period

Sanitary protection zone (SPZ)

SPZs have been designed for enterprises providing public facilities, constructing housing and greenhouse facilities, across the city, in accordance with the "sanitary and epidemiological requirements for the design of industrial facilities" Sanitary regulation and standard (SanPiN) No 3792, approved by Decree of the Acting Minister of Health for the Republic of Kazakhstan, dated July 8th, 2005, No 334.

No SPZs have been established within the Project area.

Fire safety precautions

To ensure that fires in municipal facilities are tackled and also in order to undertake rescue and other emergency activities in the event of natural and man-made emergencies, the design includes deployment of two fire departments.

As required by statutory regulations, the identification of the sites for the fire departments is based on covering a representative range, providing the required number of vehicles and an optimal arrangement of fire hydrants within the municipal water supply grid required to extinguish fires and deal with emergencies.

Earthquake protection measures

For the purposes of protecting the public, land and business facilities, and to reduce the economic damage from potential earthquakes, the design includes:

- Implementation of seismic zoning and an assessment of seismic risk when the facilities are constructed.

- Construction of earthquake-proofed buildings and equipment, particularly in residential buildings and buildings intended for use as educational, pre-school, healthcare and public institutions.
- Construction of wide roads (in a rectangular grid) to ensure there are no obstacles to prevent or hinder the quick evacuation of the population to a safe area.
- Avoiding building in tectonic fault zones.
- Creating open spaces to accommodate tent cities in emergencies.

Ensuring protection from flooding, water-logging and swamping

For the purposes of protecting the public, land and business facilities and to reduce the economic damage from potential floods the design includes:

- Conducting surveys to investigate the optimal conveying capacity of rivers and river crossings and exogenic processes.
- Conducting an inventory of the technical status of reservoirs, dams and dikes.
- Constructing engineering defences, levées as part of long-term flood defence programmes.
- Setting up a drainage system to provide preventive defence against swamping of the area and water-logging of various facilities in the projected construction areas.
- Avoiding building in areas prone to surface flooding, flooding and water-logging.

Minimising the impact of dust storms, snow storms and large snowdrifts

For the purposes of minimising the impact of dust storms, snow storms and snowdrifts, the design includes planting defensive forest belts along the main motorway and along residential streets on the windward side.

Provision of medical care during man-made and natural emergencies

For the purposes of preventing and ensuring operational medical services, the Master Plan design includes provisions for a medical centre with 126 beds with an emergency and first aid centre within Gate City.

Based on the assessment it can be concluded that the negative impact of man-made and natural incidents and emergencies can be minimised or avoided as far as possible.

Ensuring overall safety and quality of life

A full range of public amenities and services will be provided by the authorities. These will include: a central business district, sports and leisure centre, commercial subcentres, residential, green and other public spaces. In addition to the main transport arteries, car parks, service stations and public utilities (such as the central heating system, telecommunications, public transport services, power supply and waste management facilities), current plans envisage a number of kindergartens / schools, healthcare centres, pharmacies, cinemas, laundries, dry-cleaners', post offices, police stations, libraries, restaurants and so on that will ensure a suitable quality of urban living for the eventual residents.

Some of these components will have to be phased in as the wider G4 project evolves, but it is considered that there is existing capacity in local schools, medical and emergency response services to cover needs during the early transitional phase.

All relevant housing / building and other infrastructure (i.e. roads, medical and emergency services provision, etc.) safety requirements (i.e. seismic resistance, fire prevention and control, etc.) have been incorporated into the various designs and duly approved by the relevant authorities as meeting the various regulatory criteria. Further verification checks will be undertaken throughout and upon completion of the works, both by the Project Developer's agent and/or the authorities as appropriate.

8.10 Traffic

As stated above, main impacts on traffic will occur during the construction phase.

In particular, construction activities can restrict access to local properties and amenities. To facilitate such access, it is recommended to:

- Maintain safe access to the construction site and any existing nearby properties.
- Designation of safe alternative routes where existing access is disrupted.
- Record all complaints.

Increased road traffic and related impacts in terms of congestion can be minimised through the following:

- Traffic management plan: Establish approved haul routes; install access warning signs on the main public roads around the site and lighting at road junction (i.e. if 24 hour access required / winter months); Control of movement of vehicles joining / leaving main public road; Minimise traffic movements during peak traffic periods; Liaise with the public emergency services to ensure they are informed as to potential risks; allow community notification and assistance measures.
- Transport workers by bus to and from site.
- Record all complaints/ traffic incidents.

Finally, the following measures will reduce risks of accidents related to increased traffic:

- Training of workforce (All drivers fully trained and qualified to operate and maintain the vehicles they drive and ensure safe driving practice; ban on alcohol/drug use; emergency procedures)
- Selection of suitable subcontractors / transport service providers.
- Maintenance of plant and vehicles in good working order, e.g. brakes, tyres and indicators.
- Traffic management plan - Warning of site access signs on the main road leading to site; Control movement of vehicles joining/leaving main road; appropriate site and local road speed limit set and enforced, etc.
- Local authorities / community informed about increased traffic and duration of works. Any local schools provided with information on road and site safety.

8.11 Landscape

In order to mitigate the temporary visual disturbance related to the appearance of the construction site, it is recommended to:

- Ensure good site management: keep a tidy site (e.g. sort materials and store appropriately).

- Ensure regular surface cleaning of main public road adjacent to site.
- Remove litter and waste accumulations adjacent to site, even if it is not works-related.
- Restrict clearing of vegetation to the minimum practical extent.
- Create designated 'Green Zone' and other open spaces.
- Record all complaints.

8.12 Labour and working conditions, including Occupational Health and Safety

In order to ensure fair and equal treatment of direct and indirect employees, the Project Developer will ensure that the D&B Contractor's working terms and conditions meet Kazakhstan's legal requirements and the Project Developer's policy obligations, including that:

- There will be no barrier to worker membership of bona fide trade unions;
- The parties will have equal opportunities and non-discrimination policies;
- If confirmed as needed, temporary accommodation will meet acceptable standards;
- A suitable Retrenchment Plan is developed to cover any foreseeable situations requiring temporary or permanent lay-offs of employees prior to the anticipated scheduled completion of work (i.e. respect statuary requirements on minimum notice, redundancy, travel costs, etc as appropriate); and
- A procedure will be developed to handle and resolve any worker's complaints.

Construction works pose a number of significant safety risks and hazards to the workforce including those associated with moving machinery, excavations / confined spaces, working at height, falling objects and over-exertion.

The Project Developer will review health and safety policy requirements and communicate any further requirements to the D&B Contractor. The D&B Contractor is to assess and mitigate risks in accordance with good international industry practices as appropriate and will comply with the requirements of applicable legislation, such as SNiP 3.06.04-91: Construction Safety and other relevant laws and rules, throughout the execution of the construction phase works.

In particular, in order to ensure the safety of direct and indirect employees who will take part in the construction activities of the Project, it is proposed to:

- Review health and safety requirements and communicate any further requirements to D&B Contractor.
- Comply with the requirements of SNiP 3.06.04-91: Construction Safety and related legislation throughout the execution of the construction phase works.
- Implement good international industry practices as appropriate.
- Provide Health and Safety training for all staff working on the construction site, including supply chain staff.
- Record all incidents
- Develop suitable emergency prevention measures and response procedures – specify need for timely notification of any potentially serious incidents to the Project Developer and/or the relevant authorities as appropriate.

- Eliminate use of any substances subject to international ban or phase-out e.g. ozone depleting substances, unbounded asbestos fibres, polychlorinated biphenyls, radioactive chemicals, etc.

- Develop a Waste Management Plan, including safe transportation, storage and handling of hazardous materials, and avoidance of spills, leaks or fires.

8.13 Cultural heritage

There are no listed monuments or other archaeological or cultural heritage features on or near the Koyankus site that will need to be moved or otherwise protected from possible damage. Nevertheless, although it is considered unlikely that anything of significance will be found on the Koyankus site (due to previous land use and more recent preparatory works), the precautionary principle should be applied and a 'chance find' procedure should be considered.

The implementation of a chance find procedure in line with international best practice that includes timely notification of any potentially significant discovery on the site to the relevant authority (e.g. Ministry of Culture), will prevent damage or destruction of cultural heritage in case of chance find during construction works.

8.14 Conclusions

All the potential impacts arising during the Project's construction and occupation phases can be successfully mitigated or controlled through the application of the proposed mitigation and good international industry practices.

9 PUBLIC INFORMATION DISCLOSURE PROCESS AND CONSULTATIONS

Coordination meetings were carried out with representatives of local authorities (deputies and others). In 2009 a formal Project meeting ('Maslikhat') was held to which deputies were invited as well as public representatives.

The Environmental Code states that socio-economic projects must be examined at public hearings, i.e. the local population must be invited to hearings where they can express their opinion and ask questions.

Although all the formal agreements were duly obtained, further stakeholder engagement with affected communities and other parties should be undertaken (e.g. organise meetings attended by the population, representatives of the environmental expert community and other interested parties).

Note that the Government's environmental expert's report may also require that such consultation is done (in accordance with the Environmental Code).

The evaluation of ownership of the land is not included in the Gate City EIA.

The Project is supported by the Government of the Republic of Kazakhstan. At present the owner of the land is CS Land LLP (a subsidiary company of the Sponsor Group). In March 2012, 15.2082 ha of land were transferred to the Government of Kazakhstan, at the market valuation price, in order to construct some of the primary and social infrastructure, serving the Project and Gate City.