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FEDERATION OF RUSSIA
PROPOSED HOUSING DEVELOPMENT AND REFORM PROJECT
USAID/WORLD BANK HOUSING PROGRAM

ENVIRONMENTAL ASSESSMENT REPORT

for Six Cities
~~(DRAFT)~~ Final

by

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EXECUTIVE SUMMARY

INTRODUCTION

This is a summary of the environmental assessment (EA) conducted on the proposed Housing Development and Reform Project for the Federation of Russia to be financed by the World Bank. The project consists of 18 development sites in 6 cities of the Russian Federation that include Nizhny Novgorod, Barnaul, Rostov, St. Petersburg, Novgorod and Tver. The proposed developments will consist of a mixture of high rise apartments, town houses and single family homes that will house a total population in excess of 130,000. The package proposed for financing by the World Bank is site preparation and on and off-site infrastructure for the 18 sites.

The assessment was conducted in the Russian Federation by a CDM directed team during the period of March 18 to April 9, 1994. The team was contracted and financed by the United States Agency for International Development (USAID) under a grant in support of the Housing Development and Reform Project. Concurrent to the EA, the team conducted an Infrastructural Review (IR). The IR report is seperate and contains more detailed engineering and cost information. The environmental and infrastructure issues are closely related and, therefore, are addressed together, herein.

The team coordinated its work with the World Bank's Moscow Project Review Office and Gosstroi, the Russian Federation's Ministry of Construction.

PROJECT CONCEPT

Affordable and suitable housing is a pressing need in most major cities of Russia. The project goals are to alleviate this need as well as establish a new pattern of environmentally-sound land development in Russia. Project concepts support replacing the historical State financing and construction of dwellings with the concept of land purchase and construction by individuals and enterprises. Funds for the project would be employed to finance site development, including infrastructure, and the cost of bringing off-site infrastructure services to the sites. Funding for the project would be provided by the World Bank as well as regional and city administrations. The project is targeted to benefit the middle income families.

PROJECT COMPONENTS

A total of 18 sites comprise the project and represent the final package of projects submitted by the six cities for consideration of World Bank financing. These are summarized in Table ES-1 below along with the anticipated number of direct beneficiaries to receive dwelling space. The dwelling units are the total of the single family, townhouse and apartment units. City populations are also noted to show the relative magnitude of the developments.

TABLE ES-1 PROJECT SUMMARY

CITY/ SITE	*AREA (hectares)*	*DWELLING UNITS*	*CITY SITE POPULATION*
Nizhny Novgorod			1,445,000
Bughri	55	1,215	3,767
Beshentsevo 1	74	3,479	10,785
Beshentsevo 2	20	272	843
Novo Prokovskaya	33	1,327	4,083
Delovaya	22	2,859	8,860
Barnaul			606,800
Salnechnaya Polyana	82	4,646	16,261
Rostov			1,027,600
Niva	60	1,252	3,631
Vertolutnoy	10	199	577
Bataisk	39	350	1,050
St. Petersburg			4,466,800
Yugo-Zapadny	103	14,332	48,780
Severnaya Dolina	34	2,190	6,000
Severo Primorskaya	23	2,174	6,000
Kolimnaki	20	1,636	4,500
Kamenka	14	1,209	3,100
Novgorod			233,800
Pskovskaya Ploschad	81	2,566	8,458
Tver			455,300
Youzhny	35	573	2,292
Cherkassy	21	457	2,072
Batino	54	2,526	6,500

ENVIRONMENTAL ASSESSMENT APPROACH

The purpose of this environmental assessment (EA) is to insure that the development options under consideration by the World Bank are environmentally sound, sustainable and are in compliance with applicable regulatory requirements. The EA conducted is consistent with World Bank Operational Directive 4.01. The proposed project was assigned to Category B by the World Bank prior to the EA work. Under Category B, environmental analysis is required but a full EA is not required. To meet these minimum requirements, this EA addresses the project package as a whole at preliminary design level. It is not intended to replace comprehensive environmental assessments that are required to be conducted on a site-by-site basis in accordance with the current Russian regulations.

The primary focus of the EA was the siting of the developments and their associated environmental impacts. A wide range of environmental issues were addressed to support a through evaluation. The Physical Environment component addressed local geology, topography, soils, climate, meteorology, air quality, hydrology, water quality and site history. The Biological Environment component evaluated existing flora, fauna, rare or endangered species, sensitive habitats, species of commercial importance and pest species and disease vectors. The Socio-Cultural Environment component identified land use, planned development activities and cultural properties. Additional areas of evaluation included local landfills and disposal areas, site soil/groundwater contamination, radiological standard exceedance areas, and nearby hazardous waste sites and industrial facilities.

Because of a severe scheduling constraint required to meet the timing of the World Bank's project assessment team visit to Russia, the Environmental Assessment was conducted on an accelerated basis. This expedited approach incorporated three work phases that were conducted sequentially; (1) project scoping, (2) site visits, and (3) evaluation and presentation of data.

Project Scoping. During the week of 21 March 1994 the project team convened in Moscow and finalized the project scope and approach with the World Bank Project Office. On Friday 25 March, 1994 a co-meeting was organized in the World Bank Offices with the participation of Gostroi and representatives of the six cities involved in the project. At this meeting, World Bank requirements for the projects were presented as well as the data requirements for the environmental assessment and infrastructure review components. Subcontracts were negotiated with six local design institutes to obtain assistance in the data collection. Scopes of work for the Institutes were prepared and issued in English and Russian.

Site Visits. During the week of 28 March 1994, two expatriate teams visited the six cities, conducted a visual inspection of 18 proposed development sites and discussed environmental and engineering issues with city officials and Design Institute staffs. The

teams traveled a combined total of over 12,000 km during this six day period. Close inspection of some sites was precluded because of snow cover. During this period, additional teams consisting of two or three local environmental engineers were concurrently dispatched to each city to assist the Design Institutes and expedite collection of the required data .

Evaluation and Presentation of Data. During the week of 3 April 1994, the data collected during the previous week, including on-site and off-site infrastructure data, and reports from the field engineering teams were compiled and evaluated. Moscow Project Office and USAID Officials were briefed and a draft executive summary was presented on 8 April 1994.

INFRASTRUCTURE REVIEW METHOD

The infrastructure review focused on water, sewerage, heat, gas, power, electricity, roads and solid waste services and associated on-site and off-site costs. The preliminary design documents were not available for 7 of the 18 sites when the review started on March 21, 1994. The EA/IR team's work paralleled the finalization of the infrastructure design documents being prepared by the various Design Institutes for submittal to the World Bank. Because of this, the team was confronted with changing site parameters and in some cases changing sites, as well as a paucity of data on the details of the infrastructure planning. Some site information was submitted to the World Bank by the Design Institutes only a few days before the team left for the US.

ENVIRONMENTAL ASSESSMENT FINDINGS

General

The major environmental findings and conclusions are:

The socio-economic impacts of the proposed projects should be highly positive. The need for additional housing in Russia is critical. Recent political changes have caused return of military personnel and also significant migration of ethnic Russians from former Soviet Republics to the Russian Federation. The proposed housing developments target middle income families and although may not benefit newcomers directly, they should relieve general over-crowding in housing. The successful completion of the project should also have far reaching positive impacts in the general housing market of the Country by launching the much needed housing reforms. It is against these overwhelming benefits that the proposed project should be evaluated.

Adverse environmental impacts associated with all sites are minimal and none are considered irreversible or permanent. The sites are considered suitable for development

within the constraints and recommendations presented in the main EA report. Based on these findings, there are no significant environmental issues that would preclude the World Bank from proceeding with this much needed housing development project. The feasibility of the sites are more a function of the availability of nearby municipal infrastructure services than existing environmental factors. The development schedule for some of the sites will be governed by the schedule for installation of nearby municipal services.

The sites are mostly extensions of the existing urban environment within the cities or its suburbs. The background conditions for most of these sites are representative of a stressed environment typical of any urban area. The projected populations in these developments represent a small portion or fraction of the current urban population. Continued improvements in environmental controls in these urban areas are needed regardless of the proposed developments.

During this assessment special attention was given to potential presence of contamination and hazardous media (soils, groundwater and air) within the proposed sites. Related but limited data were reviewed in order to make a determination. This evaluation did not identify the presence of hazardous soils or contaminated groundwater. It should, however, be recognized that the local practice for industries had been to dispose off their wastes by their own means without any outside controls. Therefore, potential undocumented contamination should not be ruled out. Data for each media should be obtained and sites characterized as part of required more comprehensive future studies.

The environmental policies and regulations in effect are characterized by centralized and rigid national norms. In general, there is a high degree of environmental sophistication but regulations are often not strictly enforced because they are not practical. One environmental management area that needs improvement is the public participation process. The channels of communication between local and central agencies are formal and open. However, a public participation process for the proposed developments has not been initiated.

Site Specific

A summary of environmental issues for each site is presented in Table ES-2.

INFRASTRUCTURE REVIEW FINDINGS

General

The findings of the infrastructure review are:

The design standards used by the Institutes were reviewed. The design and construction

in Russia are carried out according to the State standards administered by Gosstroi (Ministry of Construction). Most date from the USSR era and are called SNIPS (Stpoitelnye Normy I Pravila). These standards are issued for all possible construction activities. In general, the design and construction standards are quite rigid and inflexible but are quite comprehensive and based on many years of experience. Designers tend to follow these standards "to the letter" even if impractical or outdated as they are mandatory. Correct application of the standards should lead to good design. Our review indicated incorrect use of design criteria in some instances.

The basis of construction cost estimates were also reviewed. The unit costs used by the Design Institutes are based on standard and official unit costs of 1984 and are updated by applying cost indeces. The 1984 costs has an index value of 1. The 1991 indeces are in the order of 100. The January 1994 indeces are in the order of 1000 to 1500 depending on the construction item. The method of development of these indeces are not clear although there appears to be an attempt made to determine market price levels. There is hardly any cost data based on competitive bids in the construction market to support development of cost indeces. The Design Institutes have tried to obtain current prices from construction contractors in their cities but the available data is claimed to be minimal.

In our review of the cost estimates for on-site and off-site infrastructures, we found great divergence. The source of the problem does not appear to be the design standards or unit costs. The source of the problem appears to be the fact that some of the Design Institutes are at very preliminary stages of their design work and some infrastructure components are not even priced.

One area of concern related to cost estimates is the charges for on-going or planned municipal infrastructure construction. They appear to be direct charges for municipal capital investment and go beyond the normal practice of initial connection fees followed by user fees and tariffs to recover the major portion of capital investments and operational costs. The amount of charges do not appear to have a systematic basis.

Site Specific

A summary of availability of critical infrastructural services for each site is given in Table ES-3.

Most of the proposed sites will have adequate access to off-site municipal services immediately. The availability of services for some sites are dependent on the completion of central municipal plants and/or major network items.

Municipal water and particularly wastewater services present the most significant off-site problems in some cities. In Rostov, a moratorium on building development is imposed

TABLE ES-2 SUMMARY OF SITE ENVIRONMENTAL ISSUES

Mutigative

CITY/SITE	*ENVIRONMENTAL ISSUES*
BARNAUL	
Salnechnaya Polyana	No significant impacts are anticipated at this site. Although 82 ha of prime farm land would be lost to this project, there is substantial farm land to compensate for this loss. Minimal impacts are anticipated on overall regional agricultural production.
TVER	
Youzhny D	The Youzhny D site used to be plough-land, where many types of weeds and wild vegetation currently exists. The site is bordered by multiple-story houses, a hospital, a policlinic and a State fueling station. No fuel spills and related on-site migration (resulting in soils/groundwater contamination) were reported.
Batino	The Batino site is located in an area with the greatest anthropogenic influence, given the high level of industrialization in the local area. The site is characterized by unstable secondary vegetation (e.g., weeds) predominate.
Cherkassy	Of all the three sites, the Cherkassy site is located on prime development land, adjacent to the Volga River and a thickly forested area. No deforestation is anticipated in order to implement construction. One drawback associated with this site is the fact that an active airfield is located very close to the site, further generating high noise levels.
NOVGOROD	
Pskovskaya Ploschad	This site meets all of the site selection criteria components established by the City. The site is currently an open meadow, and was used as plough-land in the past. One drawback associated with this site involves a resettling issue, which would impact approximately 13 households whose property sits within the proposed site. — may remain
ST. PETERSBURG	
Yugo-Zapadny	Significant impacts are not anticipated as long as any or substantial hydrofilling is not conducted on-site. A number of canals exist on-site, supporting natural aquatic and terrestrial habitats within this urban area. City snow is currently disposed of on this site.
Kolomnaki	Significant impacts are not anticipated as long as the existing on-site pond is not filled.
Kamenka	No additional hydrofilling is anticipated on-site. Green areas will be preserved on-site, as presented in

	current design drawings. Existing "ogorods" (kitchen gardens) will be demolished in order to complete construction, however no one lives in these sheds.
Severo Primorskaya	Numerous stocks of timber, sand heaps, and a wood processing factory exist on-site. Prior to construction the site must be cleared from these existing features. An adjacent area south of the site used to be a dumpsite for television housing, metal debris and concrete blocks. Given the presence of this debris, future characterization of site soils and groundwater is warranted.
Severnaya Dolina	The small-scale excavation and selling of on-site top soils (comprised of peat) is a current on-going practice. No significant impacts are anticipated at the Severnaya Dolina site, except for those associated with future large-scale excavation of top soils required in order to develop the site.
ROSTOV	
Niva	Based on available review of existing environmental information, no significant impacts are anticipated. The artifacts and antiquities associated with ancient burialgrounds must be preserved during construction.
Vertolutnoy	Based on available review of existing environmental information, no significant impacts are anticipated. There is a historical claim by Cossacks for portion of the site.
Bataisk	Based on available review of existing environmental information, no significant impacts are anticipated. Due care must be exercised during construction to comply with World Bank guidelines on wetlands.
NIZHNY NOVGOROD	
Bughri	Based on available review of existing environmental information, no significant impacts are anticipated. Groundwater suitability and capacity should be varified for proposed water supply wells.
Beshentsevo 1	Based on available review of existing environmental information, no significant impacts are anticipated.
Beshentsevo 2	Based on available review of existing environmental information, no significant impacts are anticipated.
Novo Prokovskaya	Based on available review of existing environmental information, no significant impacts are anticipated.
Delovaya	Based on available review of existing environmental information, no significant impacts are anticipated.

TABLE ES-3 SITE INFRASTRUCTURE SUMMARY

CITY/SITES	City/Site Population	Site Readiness*	Water Supply: Nearby Network	Water Supply: Municipal Plant	Water Supply: On-Site Wells	Wastewater: Nearby Collector	Wastewater: Municipal T. Plant	Wastewater: On-Site Treatment	Gas & Heat: Nearby Network	Gas & Heat: Municipal Heat Plant	Gas & Heat: On-Site Heat
Nizhny Novgorod	**1,445,000**										
Bughri	3,367	3	No	No	Proposed	No	No	Proposed	Gas		Gas Units
Beshentsevo 1	10,785	1	Yes	Yes		Yes	Yes		Gas		Gas Units
Beshentsevo 2	843	1	Yes	Yes		Yes	Yes		Gas		Gas Units
Novo Prokovskaya	4,083	1	Yes	Yes		Yes	Yes		Gas		Gas Units
Delovaya	8,860	1	Yes	Yes		Yes	Yes		Gas/Heat	Yes	Gas Units
Barnaul	**606,800**										
Salnechnaya Polyana	16,261	1	Yes	Yes		Yes	Yes		Heat	Yes	
Rostov	**1,027,600**										
Niva	3,631	3	No	Yes		No	Overloaded		No		Gas Units
Vertolutnoy	577	2	Yes	Yes		Yes	Overloaded		Gas		Gas Units
Bataisk	1,050	2	Yes	Yes		Yes	Overloaded		Gas		Gas Units
St. Petersburg	**4,466,800**										
Yugo-Zapadny	48,780	3	No	Deficient		No	Deficient		No	Deficient	
Severnaya Dolina	6,000	3	No	Deficient		No	Deficient		No	Deficient	
Severo Primorskaya	6,000	2	Yes	Deficient		Yes	Deficient		Yes	Deficient	
Kolimnaki	4,500	2	Yes	Deficient		Yes	Deficient		Yes	Deficient	
Kamenka	3,100	2	Yes	Deficient		Yes	Deficient		Yes	Deficient	
Novgorod	**233,800**										
Pskovskaya Ploschad	8,458	2	Yes	Yes		Yes	Deficient		Yes		
Tver	**455,300**										
Youzhny	2,292	1	Yes	Yes		Yes	Yes		Gas/Heat	Yes	
Cherkassy	2,072	2	No	Yes		No	Yes		No		Boiler/Gas Units
Batino	6,500	1	Yes	Yes		Yes	Yes				
Total Population of Sites	137,159										

Notes:

1. * A score of 1 to 3 is given to grade the relative readiness of the sites in terms of infrastructural services. One (1) represents the best score. The score is based primarily on the time frame that would be required to bring the services to the site. The Rostov sites of Vertolutnoy and Bataisk would have a score of one (1) without the current moratorium. The scoring of the St Petersburg sites are affected by the overall infrastructural deficiencies in the City. The three St Petersburg sites with scores of 2 have nearby municipal networks. The Novgorod site would have a score of one (1) if the 1995 or 1996 completion of the municipal wastewater treatment plant is a realistic schedule. The Cherkassy site in Tver does not have any nearby services. All scores are subjective.
2. The other infrastructural components such as roads, power and communications are not critical.
3. The impact of water, wastewater and heat related demand by all the sites on the municipal systems are generally low and can be offset by reducing existing sectorwide excessive water and energy consumption.

I. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Design and construction activities in Russia are carried out according to the state standards administered by Gosstroi (Ministry of Construction). Most standards date from the USSR era and these are referred to as SNIPS (Stpoitelnye Normy I Pravila). These standards are issued for all types of construction activities. In addition, extensive environmental regulations are issued on a National level and monitored and enforced on a regional basis. For example, the Meteorology Center is responsible for air quality monitoring and assessment. The State Epidemiological and Sanitary Inspection Committee is responsible for monitoring infectious and communicable diseases, while the Water Resources Board is responsible for overall water quality. Local environmental committees also must comment on proposed projects such as the one being considered by the World Bank.

In general, the design and construction standards are quite rigid and inflexible but comprehensive in nature and based on many years of experience. Designers tend to follow these standards "to the letter" even if impractical or outdated.

Housing construction activities proposed under this program would be conducted under the direct jurisdiction of City Administrations. Designs of the projects would be carried out by local design institutes using the aforementioned standards.

Local environmental committees are responsible for assuring compliance with national regulations during both design and construction phases. As with all major construction projects, Gosstroi will conduct a more comprehensive environmental assessment (EA) consistent with national regulations, prior to project startup.

PROJECT DESCRIPTIONS

A. BARNAUL

Salnechnaya Polyana

Barnaul has proposed only one site which is located on the west side of town adjacent to the main highway to the airport. The site is divided in two parcels of 40 and 42 hectares (ha) each. These two parcels are part of a larger 350 ha development consisting of a mixture of high-rise apartments and single family homes, currently under construction. The site, until recently, was used for agriculture crop research, and is crossed by a series of tree wind breaks which will be preserved.

The site is relatively flat and undeveloped meadow land. Most of the off-site infrastructure is already in place, including water and sewer mains, gas service and telecommunications. District heating will be supplied from an existing nearby facility. Some improved street access will also be required. A new power substation must be constructed to meet the demands of the fully developed site. Construction of the station has not yet been started however is scheduled to be completed by the end of 1995. This could be delayed if a dispute between the municipality and the power company over outstanding bills is not resolved. The site has been well chosen and is well suited for the construction of the 125 single family, 621 town houses and 3,900 apartments being proposed. Several general use buildings are also proposed and include schools, a clinic, shops and service buildings.

B. TVER

Youzhny D

The Youzhny site consists of 35 hectares and is approximately 8 km from the city center, near well-developed areas. Given its relatively flat topography it is suitable for development. On-site services will be connected to adjacent municipal networks which have sufficient capacity to support the proposed development.

The development is comprised of 573 single family units plus commercial and social facilities. The projected residential population is 2,292. Currently, the site is bordered by a school, a kindergarden, a high-rise housing complex area, and a State-run fueling station.

Cherkassy

The Cherkassy site consists of 21 hectares and is located approximately 2 km from the city center in a rural area overlooking the Volga River. The site consists of a flat meadow suitable for development.

The proposed development will consist of 457 single family dwellings which will fit the rural character of the site. The projected residential population is 2,072. The primary disadvantage associated with this site is that municipal services need to be extended. Water will be supplied from new wells.

Batino

The Batino site consists of 54 hectares. It is approximately 4 km from the city center and also near well-developed areas. No additional levelling is required or anticipated given its flat topography. On-site services will be connected to adjacent municipal networks which have sufficient capacity to support this development.

The proposed development will consist of a total of 2,526 dwelling units with 373 single family homes and 2,153 apartment units. Some social and commercial facilities are also planned. The site is currently bordered by a private housing area to the south.

C. NOVGOROD

Pskovskaya Ploschad

The proposed site consists of 81 hectares. The site is an extension of the present city at only 1 km from the center. The site's topography is flat and appears highly suitable for future development. There are no industrial facilities within the vicinity of the site. Given a number of single story residences are located within the project site boundary, approximately 13 households will need to be relocated.

The proposed development will consist of a total of 2,566 dwelling units with 243 single family units, 1,176 town-houses, and 1,147 apartment units including social and commercial facilities. All on-site services will be connected to existing off-site municipal networks currently with no capacity problems.

D. ST PETERSBURG

Yugo-Zapadny

The Yugo-Zapadny (southwest) site consists of 103 acres. As the name implies, it is located in the southwest side of the City. The site is about 12 km from the city center and only about 1 km inland from the Bay of Finland. The Dubbergovsky Canal runs through part of the site and leads to the Bay. The Matissov Canal runs through the site and connects to the Dubbergovsky Canal. To the southeast of the site lies the Juzhno-Primorski (south seaside) Park. The southern and eastern portions of the site are highly developed and consist of large blocks of about 50 hectares. Site access will be provided via extension of existing adjacent roads.

The site has been filled with harbor dredge in the past and is currently level. Backfilling of the Matissov Canal and part of the Dubbergovsky Canal is planned in order to prepare the site. Uncontrolled disposal of municipal waste is believed to have occurred in the past. Currently city snow is disposed off on-site. Site soils should be evaluated for potential contamination with heavy metals and other potentially toxic substances. Off-site services are regarded to be relatively favorable on this side of the city. However, it will be necessary to install 12-km long main water and sewer lines, as well as a hot water line of 4 km and a gas line of 18 km to extend the services to the site.

Overall, the site appears suitable for development with proper investigations and design. The proposed development consists of 28 single family residences, 1,030 town-houses and 13,274 apartments and, include social and commercial facilities. With a projected residential site population of about 49,000, this site is the largest of all sites in the six cities evaluated in this Environmental Assessment.

Kolomnaki

The Kolomnaki site consists of approximately 20 ha. It is one of the four sites situated on the northern part of the city, about 10 km from the city center. The site is located within a highly developed portion of the city. A small pond is located on the site and in the vicinity there is a chapel, a church and some new single family residences. Numerous high-rises are currently under construction to the north of the site. Adjacent to the site is a closed municipal landfill that is capped with clay and is reported to have undergone proper closure procedures.

The proposed development will consists of 1,636 apartment units plus minor social and commercial facilities. The projected residential site population is 4,500.

Kamenka

The Kamenka site consists of approximately 14.3 ha and is about 1.5 km from the Kolomnaki site. It is adjacent to numerous high-rise developments, many of them currently undergoing construction. Site elevations vary mainly because of old fill areas, thus the site would need to be graded. The site is bordered to the east by *ogorods* (kitchen gardens) where local people maintain small garden patches. Small wooden tool sheds within this *ogorod* area will need to be removed but no relocation of people is involved.

The proposed development will consist of a total of 1,209 dwelling units including 129 town-houses and 1,080 apartment units plus minor social and commercial facilities. The projected residential site population is 3,100.

Severo Primorskaya

This site consists of 22.7 hectares, and is located on the northern side of the city, overlooking

the estuary of the Srednaya Nevka River and the Finnish Bay. The site was filled in 1962 with bottom dredge from the Finnish Bay thus its topography is generally flat. The site is adjacent to five existing high-rise blocks (approximately 10-story high). Lumber is treated and sold in an on-site wood processing plant. A tract of the land between the south portion of the site and the Bay has been used for illegal disposal of old televisions, metal debris and concrete blocks. Future off-site land development plans include the construction and operation of a yatch club on this tract of land adjacent to the Bay.

The proposed development will consist of a total of 2,174 dwelling units including 94 town houses and 2,080 apartment units, plus minor social and commercial facilities. The projected residential site population is 6,000.

Severnaya Dolina

Severnaya Dolina (northern valley) consists of 34 ha and is generally level despite the on-going peat extraction operation at the site. The site is about 16 km from the city center and is the least developed in terms of off-site services.

The development will consist of a total of 2,190 dwelling units including 450 town houses and 1,740 apartment units plus a business park and social facilities. Provision of off-site services to this site will require construction of main lines over long distances and extension to most of the municipal central plants.

E. ROSTOV

Niva

Niva is a 59.7 ha site located on the northwest side of town. The site has been used for agriculture (hay) by a local collective farm under lease from the city. It has a very gentle slope but lacks a current access other than by farm roads. The road is located on the eastern border of the site as well as a high tension power line (110 kv) and a local service line (220 kv). Nearest facilities include a large power generating station and facilities of the collective farm. In order to make the site usable, major off-site works will be required including roads, sewer and water mains as well as appropriate pump stations and reservoirs, gas and electrical substations and distribution lines. As the site is somewhat remote, public transportation services will also have to be extended. Heating will be provided via individual gas units and central heating connections are not a concern. The site has been well chosen, as limited land for development exists much closer to the city. Lands adjacent to this site are also planned for future housing needs. The off-site infrastructure requirements to connect with the city utilities are generally normal for a site of this magnitude.

A problem exists, however, in proceeding with this housing development project because of the lack of adequate wastewater treatment facilities in Rostov. Because of this situation, a moratorium has been placed on all housing construction in Rostov. The city has submitted a

parallel request to the World Bank for loan to proceed with the expansion of the central treatment facility to meet existing treatment needs including the three proposed housing projects being considered by the Bank. The estimated cost of this remedial work exceeded $45 million in January 1994.

Units planned for this site include 473 single family homes, 672 townhouses and 107 apartment units. This site is well chosen and suitable for the planned residential development, once adequate sewage treatment facilities are provided.

Vertolutnoy

This 9.6 ha site is part of a 120 ha former small craft and helicopter airport facility. The site is being converted to residential development, however a few helicopters still actively use the site. The proposed housing site is on the northeast corner of the field opposite of the area still being used by aircraft. Most of the field was an open meadow with no paved runways. The proposed 9.6 ha area is a flat grassed meadow. An adjacent area of the airfield already has several single family residents under construction. These are being built by private individuals and are extravagant by local standards. Construction is proceeding in spite of a general moratorium on housing development because of inadequate wastewater treatment capacity in the city. The site is in a single family residential neighborhood where all utility services readily available. Some upgrading of the local streets and utilities will, at most, be necessary for this Vertolunoy site. Heating will be provided via individual gas units.

The moratorium on construction associated with the lack of the adequate wastewater treatment facilities (see Niva) is an issue that must be resolved before this site can be developed. The site is ideal for residential housing development as off-site costs are low, it is well situated in the city and is located in a residential neighborhood. Units planned include 75 single family houses and 124 townhouses.

Bataisk

Bataisk is located across the Don River from Rostov and on the Don River floodplain. The 38.5 ha site is a reclaimed wetland and is adjacent to the international highway leading to the Caucasus. The site was created from dredged material hydraulically deposited to about a 4-meter depth. This is estimated to be at a level subject to about a 1 percent flood recurrence interval or a once in a 100-year flood. The hydraulic fill consists of almost pure sand and provides an excellent construction base for the proposed housing project. Topsoil, however will have to be imported for landscaping purposes. Major utilities exist in the area as development has proceeded on similar adjacent fill areas.

The Bataisk site is subject to the same lack of sewage treatment capacity discussed above, as the central plant would serve all three sites. Construction cannot, therefore, proceed on this site until the sewage problem is resolved.

The site is somewhat unusual as it is proposed on fill land bordering a major highway. The hydraulic filling was in progress during the team site visit and the fill was noted to be very clean sand with an occasional snail and clam shell. The source of the dredged material was from a nearby lake, most likely created by the construction of the adjacent transnational highway. A review of the cost estimates for this project show that costs of the hydraulic fill are intended to be recovered in the loan costs, even though work is essentially complete which negated the site from environmental examination in its original wetland condition.

The adjacent highway provides a convenient access to downtown Rostov and other regional destinations, yet the site is somewhat remote by local standards. Physically, the site is very well suited to the planned construction of 267 single family and 83 apartment units.

F. NIZHNY-NOVGOROD

Bughri

Bughri is Nizhny Novogorod's most remote site, located about 20 km south of the city and about 30 km from the city center. A small pensioners village is nearby and currently only accessible by heavy equipment during the winter. One plan for this proposed site, consisting of 55 ha, is to develop it for retired Military Officer housing.

This gently sloping site has been used for general agriculture and bordered by a forest on the north and two major high tension power line on the south (550 kv and 110 kv). No on-site infrastructure currently exists. Adequate power and gas are available near the site, however no water or wastewater facilities exist. The nearby village is served by a local well. The proposed plan provides for the drilling of four or more wells for water supply and the construction of a "package wastewater treatment plant". The need for multiple wells is based on the production of the one local existing well and must yet be field tested to assure that adequate water is available. Heating will be supplied by individual gas units. Limited public transportation is available to the adjacent village which is reported to have increased in population as the region expands. The existing access to the site will require upgrading as it is barely passable in the winter. A new 2-km road is also planned to connect the site directly with the main highway to the west. This road would parallel the high tension power line right-a-way. The plan provides for 330 single family units, 516 townhouses, 369 apartments and associated support facilities. In general the site is adequate for the construction of the residential units, but because of its remoteness it must depend on stand alone utility services for water, sewerage and possibly snow removal, as well as solid waste disposal and local transportation services.

Beshentsevo 1

Beshentsevo 1, consisting of 73.8 ha, is located near the southern edge of the City of Nizhny Novogorod on farm land. It is adjacent to the main highway leading south on the eastern side of the Oka River. The site is on gently sloping land which drops off to the Oka river in the

distance. Thus most residents would have very good views of the local country side. Adequate water, sewage and gas mains are near the site as are power lines. The development will use individual gas heating units rather than district heating.

Access is simple as the site borders the main highway. The site appears well suited for the development of the 695 townhouses and 2784 apartment units being proposed.

Beshentsevo 2

Beshentsevo 2 consisting of 19.8 ha is located near Beshentsevo 1, but about one km off the main highway. Although on rolling farm land, this site lacks the views available on Beshentsevo 1. Conditions are similar on the two sites, except that the connections to the off-site utilities and roadway access are of greater distances for Beshentsevo 2. Heating, as in Beshentsevo 1, will be with individual gas units. Planned units for this site are for 272 single family residences only. The two sites together offer a good mix of single family, townhouse and apartment living, that in the near future will be without close neighbors other than a few scattered farm houses.

Novo Prokovskaya

Novo Prokovskaya, consisting of 32.5 ha, is similar to the Beshentavo sites, flanking the city on the east. These three sites are the vanguard of the cities outward development and even though appearing somewhat remote probably represent about the best opportunities for large residential development units at this time. Again the site is on rolling farm land with its nearest neighbors being light industry. City utilities are in the vicinity, adequate to support the project. Again, individual gas heating units will be used on this site. In general, the site is well suited for the planned residential construction of 41 single family homes, 566 townhouses and 720 apartment units.

Delovaya

Delovaya flanks the city on the northeast and consists of 22 ha. This site is at the junction of two major highways and borders a hospital heating plant on one other side. A major district heating plant is also nearby as is other industrial development.

The site, an open and undeveloped area, has most recently been used to grow corn. The site is gently sloping and adequate for the 63 townhouses and 2,796 apartment units planned for construction. All necessary utilities are in the vicinity and individual gas heating is planned for all units.

Delovaya, of all the Nizhny Novogorod sites, is the closest to the city center and as such will be easiest to adapt to public transportation systems.

III. DESCRIPTION OF THE ENVIRONMENT

A. BARNAUL

One housing development site consisting of two adjacent plots of 40 and 42 ha have been proposed for the City of Barnaul. The site is on the western portion of the city, adjacent to the main highway to the airport and an area of mixed residential housing currently under construction.

Physical Environment

a. Geology. The stratigraphy of the site is characterized by 3-6 m of sandy-loamy soil underlain by dense clay. Groundwater is encountered at a depth of 10 m. These substantial deposits of soils subject to subsidence may complicate construction on-site unless preventive measures are taken. The estimated load bearing capacity for these types of soils is in the range of 1.5-2.0 kg/sq.cm This area is not in an active seismic zone. Local design standards call for structures that can withstand 6.0 on a 12 point scale for seismic activity.

b. Topography. The site is relatively flat with a 1-2% slope to the southeast. The elevation varies from 230-235 m on the north boundary of the site to 200-180 m on the southeast boundary. Surface water runoff is to the south towards Pavlovsky Street. At the present time the site is free from buildings and appurtenances. In the recent past, the site was used for farming. Mature tree-line fencing, which will be incorporated into the site landscaping design, is in place for snow protection and as a noise barrier from adjacent roads.

c. Soils. The entire site has a surface cover of 3-6 m of fertile top soil. As an operating farm, the top soil was protected from wind and surface water erosion. There is no evidence of residual agricultural chemicals or other adverse impacts from previous agricultural activities, based on available information. During the winter the average depth of frost in the region is 2.0-2.2 m, with a maximum depth of 2.5 m.

d. Climate, Meteorology and Air Quality. The climate of this region is continental dry with long cold winters and warm summers. The average ambient temperature is 11°C with absolute maximum and minimum of 38°C (July) and -52°C (January) respectively. The annual average relative humidity for the region is 72%. Average annual rainfall for the region is 495 mm. Southwesterly winds dominate during the year. The average wind speed is 3-6 m/s. Days with high winds (> 15 m/s) occur about 45 days per year. Snow storms occur with a frequency of about 35 days per year, usually accompanied by southwesterly winds. About 62 foggy days are recorded each year. Ambient air quality data from Barnaul's air quality monitoring laboratory. (N68 dated April 4,1994) as presented in Attachment A indicates that air quality in the vicinity of the site meets National annual air quality standards for criteria pollutants.

However, short-term excursions of elevated concentrations of criteria pollutants may occur under conditions of atmospheric inversion.

e. Hydrology. Groundwater at the site is at a depth of approximately 10 m. Surface pooling of water after heavy rains is only temporary due to good natural site drainage. Site plans call for connection to the municipal water supply with no dependence on site groundwater. Based on information from the Barnaul Station of Sanitary-Epidemiological Inspection, the municipal water supply meets all the requirements of the State Standards for water supplies.

f. Site History. Until the recent past, the proposed site was used for agricultural purposes. The site was owned and operated by an agricultural scientific research institute to develop highly productive and drought resistant food grains. Crop rotation, soil protection and other agricultural experiments were also carried out on the site. Currently an "up-scale" private housing development is being built on the property adjacent to the proposed site.

Biological Environment

a. Flora, Fauna or Rare Habitats. There are no known rare, exotic or endangered species of flora or fauna in the vicinity of Barnaul. Inhabitants of the suburban forests and fields include common hares and elk and on rare occasions fox. Bird species common in the urban environment (sparrows, pigeons, etc.) abound. Local migrating birds include rooks,starlings, magpies and larks. More exotic species of migrating birds are rarely found within the city limits.

b. Sensitive Habitats. There are no areas of sensitive habitats on or in the vicinity of the proposed site.

c. Species of Commercial Importance. There are no species of commercial importance in the vicinity of the proposed site.

d. Pest Species and Disease Vectors. Significant numbers of pests and disease vectors have not been associated with the proposed site. Mosquitos, flies and rodents although encountered during certain times of the year are not considered as disease carriers by the Health Service. One species of tick of the genus "Dermozentor" has been confirmed by the Health Service.

Socio-Cultural Environment

a. Land Use. Attachment A includes a landuse map which presents the significant land uses and features in the vicinity of the site. Of most significance is a power station and an industrial zone to the southwest of the site, the airport to the west of the site, and a domestic landfill to the northwest.

b. Planned Development Activities. There are many other housing developments planned in the vicinity of the proposed site. This area is considered prime residential development land since it has maintained its rural attributes while having direct access to the infrastructure network of the City of Barnaul.

c. Cultural Properties. There are no significant cultural properties on or in the vicinity of the proposed site.

Environmental Issues of Regional Concern

a. Surface and Groundwater Contamination. None reported.

b. Exceedance of Ambient Air or Radiological Standards. None reported.

c. Known Hazardous Waste, Mine Tailings, or Radiological Sites. According to the records of the Ecological and Resources Committee of Barnaul there are no known hazardous waste or radiological disposal sites in the area.

d. Nuclear, Coal, Oil, or Gas Power Generating Stations. There are no nuclear power stations in the Altai region. There is a gas-fired electric/heating station within 1 km of the site to the southwest.

e. Petrochemical, Petroleum or Other Industries with Potential for Significant Fugitive Emissions. Barnaul is a major industrial center with multiple emission sources. Ambient air quality meets all national standards. There is an ambient air quality monitoring station within 1 km of the site to the west. The latest annual report is presented in Attachment A. This report presents annual average concentrations for various criteria pollutants as a function of wind speed and direction.

f. Other Areas or Issues of Environmental Concern. Although noise levels on and in the vicinity of the site currently are below national standards, future expansion of the airport may require noise control measures to maintain compliance. Currently there are 30 to 40 flights per day out of the Barnaul Airport. Of these only 10 are large commercial aircraft.

B. TVER

Three housing construction sites have been proposed for the City of Tver, including: (1) Youzhny D, (2) Cherkassy, and (3) Batino. The Youzhny D site is a 35-ha site located south of the city. The site is adjacent to a school, a kindergarten, a high-rise housing complex area, and a State-run fueling station. Cherkassy is a 21-ha site located in the southwestern portion of the city and adjacent to the southern bridge crossing the Volga River. The Batino site consists of a 54 -ha tract of land located in the northern edge of the city. This site is bordered by a school, a high-rise housing complex area, and single family homes.

Physical Environment

a. Geology. Recent geological information (dated 1986 to 1993) were obtained for all three proposed construction sites, as provided by the Tver Design Institute. However, because these data do not fully characterize site geological conditions, a more comprehensive assessment may be warranted prior to development of these construction sites.

Youzhny D's stratigraphy is characterized as follows: at 0.2 m, organic soil layer; from 1.8 to 4.6 m, loam with gravel; from 2.0 to 4.8 m, semi-hard loam, followed by a combination of gravel stone, and sand at a depth > 4.8 m. The depth of the soil frost has been recorded at 1.4 m. Unconfined groundwater was encountered between 0.4 and 1.0 m below surface, based on available data (see Attachment B).

Soil samples were collected near the Cherkassy site in 1986. The soil strata was described as follows: from 0.2 to 2.6 m, organic soil layer; from 0.7 to 2.2 m, fine sand with organic matter; and from 0.7 to 3.5 m, sand. The depth of the soil frost has been recorded at 1.68 m.

Soil samples were collected near the Batino site in 1986. Soils were characterized as follows: from 0.2 to 0.4 m, organic layer; from 0.2 to 0.5 m, loamy sand with gravel; from 0.3 to 3.0 m, loam with gravel; and from 4.3 to 4.7 m, clay with seams of sand. Unconfined groundwater was encountered from 4.3 to 4.7 m, whereas the depth of the soil frost has been recorded at 1.68 m.

b. Topography. As presented in Attachment B, all three sites are located in generally flat terrain. Although all sites were snow-covered during the team site reconnaissance, the need for site levelling is not believed to be warranted, particularly at the Cherkassy and Batino sites. None of the three sites are subject to flooding. Attachment B includes a figure presenting the 100-year flood line (or 1% flood probability). The maximum elevation subject to flooding within the city limits is approximately 132.35 m.

At the Youzhny D site, absolute height of the surface ranges from 136.4 to 139.1 m. This particular site is relatively flat, with no obvious slopes or terrain gradations. Absolute height at the Cherkassy site ranges from 137.0 to 139.5 m. The terrain gently slopes from north to south, towards the Volga River. At the Batino site, the absolute height of the surface ranges from 134.0 to 138.8 m, with a slight slope from west to east. This information is graphically presented in Attachment B.

c. Soils. Soil characterization for all three sites is presented in detail in Attachment B. As presented in the available soils information, none of the sites are located within or near areas identified as having a "high level of soil pollution".

In general, all sites soils are considered as arable and fertile agricultural soils. The Youzhny D and Batino sites are primarily considered to be "plough-land", while Cherkassy is an open meadow.

d. Climate, Meteorology and Air Quality. Tver is situated in the middle climatic zone, thus it is subject to middle continental climate. Total annual precipitation is approximately 593 mm. Winter conditions usually begin in mid-November and last until mid-March. Frosts up to -25°C are registered annually, but temperatures may be as low as -40 to -50°C. Steady snow fall starts in December with snow melt usually occurring by early April.

July is the warmest month in Tver and the average temperature is approximately 17.2°C, while a maximum temperature of 37°C has been recorded. On average, warm weather is experienced for approximately 219 days out of the year. Winds are generally from the southwest and west. The highest wind speeds are registered during fall and winter.

Air quality conditions are described in data provided in Attachment B. Ambient air quality at the Youzhny D, Cherkassy and Batino sites is considered to be good, bearing a classification of "clean". These areas are outside the zone of pollution generated by approximately 115 industrial complexes, automobile exhaust, and other contributing sources. As presented in Attachment B, the air quality classification scheme ranges from clean (< 2.5 pollution index) to extremely polluted (> 52.5 pollution index). No information regarding the basis of this scheme was provided in any of the provided documents (see Attachment B). However, the following substances have been identified as the primary air pollution contributors in Tver: carbon disulfide, hydrogen sulfide, nitric oxide, sulphur dioxide, and other suspended substances.

e. Hydrology. Limited hydrological data is available for all three sites. Groundwater levels vary between sites, for example, at the Youzhny D site, groundwater was encountered between 0.4 and 1.0 m, whereas the groundwater level is deeper at the Batino site (from 4.3 to 4.7 m).

The Volga River, the Tvertsa River, and the Tmaka River cut across the City of Tver (see Attachment B). Although flow data could not be obtained for these water bodies, a water quality figure presented in Attachment B, summarizes water quality conditions. The Tvertsa River and a portion of the Volga River bear a "high level of pollution classification". A high level of pollution classification is associated with a factor of over 30 MAC (maximum allowed concentration by indication of harm). The portion of the Volga River which runs west of the center of the city is classified as bearing an average level of pollution (up to 30 MAC). Main sources of surface water pollution within the city limits are attributed to local wastewater treatment plant discharges and stormwater runoff.

f. Site History. All three development sites are currently owned by the *sovkhoz* (collective farm). According to the approved General Master Plan for the City of Tver, the City administration was responsible for the preliminary negotiations associated with the purchase of these lands.

Potential site contamination as a result of past land uses is not believed to exist or be of significant concern. For many years the sites have been used for agricultural purposes. Chemical soil samples collected by ASRIMG (All-Russian Scientific Research Institute of Meliorated Grounds) in the summer of 1992 to characterize soil conditions in the entire City of Tver. Attachment B includes soil quality information for all three sites. Based on this information, it is believed that all three sites are outside the node of contamination.

Biological Environment

a. Flora, Fauna or Rare Habitats. A detailed description of existing flora, fauna, and rare habitats is presented for each site. However, information for existing fauna at all three sites is provided herein. The following vertebrate species are predominant throughout the City of Tver: *Corvidae* family (including jays, crows, and magpies) , *Corvus monedula* (raven or crow), *C. cornix* (crow) , *Pica pica* (black-billed magpie), *C. frugilegus* (crow), *Sturnus vulgaris* (european sterling), Laridae family (skuas, jaegers, gulls, terns), *Passer domesticus* (house sparrow), and *P. montanus* (magpie).

A large number of invertebrate species (e.g., insects and worms) have also been identified in the City of Tver, including: *Carabidae sp., Elateridae sp., Staphilidae sp.*, and *Coccinellidae sp.* Commonly found butterfly species include: *Piridae sp., Aglais urticae,* and *Nymphalis io*, among many others. All these species are rather common and quite numerous.

Youzhny D is an open area covered with many types of weeds, including the following species: *Dactylis glomerata, Phleum pratense, Poa pratense, Poa annua*, and others. Other weed species (forbs) are present, including *Thlaspi arvense, Capsella bursa-pastoris, Erysimum cheiranthoides, Bunias orientalis*, and *Barbarea vulgaris*. Plants considered to be rare, including *Epipactis hellebarine, Dactylorhiza macnlata, Ophioglossum vulgatum,* and *Iris pseudacorus*, may exist in areas adjacent to site. Therefore, a site reconnaissance may be warranted during the summer months to assess the existing flora. Near this site, particularly in low land areas, a rare species of butterflies has been identified, *Chrysophanus dispar rutilus*. A species which may also need protection is the *Bufo viridis* (toad), identified near the Youzhny D site.

Rare habitats of fauna or flora have not been identified at the Cherkassy site according to the archives of the Tver Ecology Department and the cadastre of nature-protected territories and objects. In an area near the Cherkassy site, a rare fauna species, *Papilio machaon*, (butterfly) was reported in the Russian Red Book.

The Batino site is located in an area with the greatest anthropogenic influence given the high level of industrialization adjacent to this site. The site is characterized by unstable secondary vegetation where weeds and wild plants predominate. Based on archived data, rare or endangered fauna and/or flora species do not exist within or adjacent to the site.

b. Sensitive Habitats. Sensitive habitats such as wetlands, sanctuaries, protected territories, do not exist on or adjacent to any of the three construction sites. A forested area is located north of the Cherkassy site, however deforesting is not anticipated as a result of future construction.

c. Species of Commercial Importance. No noticeable populations of plants or animals which may be employed for medical purposes or considered to be of commercial value have been identified at any of the sites. There are no species which are of hunting or commercial importance in the City of Tver.

d. Pest Species and Disease Vectors. According to personal communication with members of the Tver Design Institute, information relative to existing pest species and disease vectors is not available. However, due to the fact that appropriate natural drainage exists at all sites, standing water is not usually present. This condition limits the potential for increased mosquito populations during peak rainfall season, further limiting infectious diseases caused by these vectors.

Socio-Cultural Environment

a. Land Use. The Youzhny D site is considered to be *sovkhoz* "plough-land" which is bordered by multiple-story houses and a town hospital to the north, a polyclinic to the west, and a State-run fueling station to the east. Also to the north, is a recently-built school for approximately 960 students on the territory of the proposed "microdistrict". Urban transport is provided by an existing road east of the site, a bus line to the north and a trolley bus to the northwest.

At the Cherkassy, the territory of the proposed "microdistrict" is a part of a big residential district of farmstead type. Some building activities have already occurred south of this site, along the Volga River. Currently, this site is considered a *sovkhoz* meadow. A thickly forested area borders the site to the north and the main road and a gas filling station is located to the east.

The Batino site is situated in the northern portion of the city, bordering a private housing complex to the south. The "sanitary protection zone" lies between the site and the "combined-feeding" plant and the stock of fertilizers located to the northwest and west of the site. The territory of the proposed "microdistrict" is also considered "plough-land" and partial meadow.

b. Planned Development Activities. Additional future land development or construction activities near the site are not anticipated. However, this does not include construction activities associated with the infrastructure portion of the project.

c. Cultural Properties. No archeological or historical sites were identified within the on-site areas or areas adjacent to the site. Given the absence of these structures of cultural importance within the project sites, the proposed construction activities are not expected to pose significant impact with regards to this EA component.

Environmental Issues of Regional Concern

a. Surface and Groundwater Contamination. As previously discussed, a portion of the Volga River and the Tvertsa River are classified as surface waters with a "high level of pollution". Water quality is primarily impacted by local wastewater treatment plant discharges and stormwater runoff. Groundwater quality has not been fully characterized in terms of potential chemical or biological contamination.

b. Exceedance of Ambient Air or Radiological Standards. As previously discussed, ambient air quality within the entire City of Tver ranges from clean (specifically at all project sites) to very high levels of pollution at small concentric areas in the center of the city. With regards to radiation, background radiological standards are not currently exceeded in the City of Tver.

c. Known Hazardous Waste, Mine Tailings, or Radiological Disposal Areas. Hazardous waste areas, radiological disposal areas or mine tailings are not currently present at or within the project sites.

d. Nuclear, Coal, Oil, or Gas Power Generating Stations. No nuclear power stations, were identified in the City of Tver or adjacent regions. However, a gas-fired heating plant is located to the northeast of the Batino site.

As presented in Attachment B, a node of "acute ecological concern" with regards to effects associated with existing power generating stations was identified in the City of Tver. This node, located in the center of the city falls within Category I. A Category I node is defined as an area which is located in the zone of influence of the P.A. "Khimvolokno" heat power station and the "Iskozh" plant.

e. Petrochemical, Petroleum or Other Industries with Potential for Significant Fugitive Emissions. Specific information regarding this issue was not available for further evaluation.

f. Other Areas or Issues of Environmental Concern. A military airdrome is considered to negatively influence Tver's background noise levels. The airdrome's runway cuts through the middle of the City from west to east. As many as 70 to 80 take-offs and

landings occur on a daily basis, increasing the background noise level up to 80 dB. Some noise mitigative alternatives have been identified by the City of Tver. These alternatives include: (1) closing down the airdrome, (2) down-sizing the airdrome, and (3) relocating the airdrome to an area outside the city. A decision is yet to be made by the City's Administrations.

Approximately 10 construction debris landfills exist in the City of Tver (see Attachment B). Most of these landfills are located from east to west near the Volga River. One 2-ha residential and industrial waste landfill is located 13 km north of the city. Because this landfill has exceeded its capacity, City officials are currently in the process of evaluating waste disposal alternatives. The following options are currently being evaluated: (1) expansion and reconstruction of the existing landfill, (2) construction of a new landfill facility, and (3) construction and operation of an incinerator/recycling facility (with a capacity of 220,000 tons/year). Environmental impacts posed by these existing landfills have not been evaluated to date.

Some negative but reversible impacts may result from the construction of a new speed railway, from Moscow to St. Petersburg, slated to pass through the City of Tver. Likewise, negative but temporary and reversible impacts may also result from the construction of a new railway station in the City of Tver.

C. NOVGOROD

Physical Environment

The proposed construction site consists of an area of approximately 81 ha in the southern part of the Pskovski residential area and within the total development (consisting of approximately 283 hectares). Pskovski is a suburb of Novgorod located to the southwest of the city.

The site is a generally flat open meadow with an absolute height ranging from 22 to 24 m. Nearby features include the Novgorod-Shimsk Highway to the north, an operating airfield to the south, and a closed landfill to the east. These and other additional structural features are presented in Attachment C.

a. Geology. Detailed geological and lithological information is presented in a cross-sectional map prepared by the Institute Novgorodgrazhdanproyect (Novgorod Design Institute (see Attachment C). The geological structure of the territory, within the depth interval of 0 to 26 m, is comprised of lake-glacial and glacial formations. These formations rest on a layer of carbonate clay originating from the ancient Baltic Lake. The glacial deposits are represented by loam soils of semi-hard consistency mixed with gravel, pebbles, boulders, and lenses of silty loam and sand (Attachment C).

b. Topography. The site is generally flat with a natural slope towards a brook which flows to the Veryazha River. The difference in elevation does not exceed 1.0 m. The

northern portion of the site goes through the 8th of March street which provides access to private homes currently located in a portion of the proposed site. East of the site is a road which leads to the an operating airfield and the settlement of Yurievo which is located by the airfield. The Pskovskoye Highway is located to the west, while a former landfill and the Veryazha River is located to the south.

c. Soils. As presented in Attachment C, site soils have been classified as turfy podzols and marshy podzols. Site soils have been reported to be over-moistened due a high groundwater level. The on-site humus content varies from 2 to 5 %. A vegetative organic layer is regionally encountered at depths ranging between 0.25 to 0.3 m. The radioactive background level attributable to cesium concentration in Novgorod soils is approximately 0.2 curie/m^2, as described in greater detail in the radiological disposal area section.

d. Climate, Meteorology and Air Quality. Novgorod's climate is characterized as temperate continental. Climatic conditions are generally determined by the proximity to the vast aquatic basins of the Finnish Gulf, the Ladozhskoye Lake and the Ilmen Lake. The average annual temperature is + 4°C while temperatures have been recorded as low as -27°C. Dominant wind currents (50% of the time) are from the southwest. The average wind speed is approximately 4.3 m/sec. Annual precipitation for this region has been recorded as 608 mm, usually occurring between April and October.

The center of the city's air basin is considered to be polluted as a result of emissions generated by approximately 60 local industries. The largest air pollution contributors are believed to be JSC "Akron" and the Heating Power Station - 200, located to the north of the site. The air is principally contaminated with fugitive dust and this parameter exceeds its respective dust standard (see Attachment C). The average annual dust concentration is equal to 2 PDK (maximum possible concentration levels), while maximum concentrations have been reported up to 6.8 PDK (especially during the spring and summer months).

An assessment of Novgorod's air quality demonstrates that the dust, ammonia, and formaldehyde concentrations are often exceeded in ambient air. However, permissible concentration limits for nitrogen oxides, carbon dioxide, soluble sulfates, and sulfur dioxides are not exceeded. Detailed 1992 Novgorod air quality data for nine specific parameters is presented in Attachment C of this EA report.

e. Hydrology. The study area is located to the left bank of the Veryazha River, 1 km to the east. The district's hydrologic system is formed by shallow cuts in hollows and trenches of the old drainage system which flows into the Veryazha River. The Veryazha River is approximately 51 km in length and runs from the Vyazhitskoye Lake into Lake Ilmen.

The river valley flows opposite the housing development area and has a width from 100 to 150 m, and up to 200 to 300 m with a depth of 4 to 5 m. Groundwater is either not currently used or minimally used in Novgorod. As presented in Attachment C, local surface waters are considered to be polluted as a result of industrial waste discharges into these receiving waters. The water inlet area is approximately 369 km^2 off the site.

f. Site History. As presented in the Pskovski historical plan for the XVI century, existing project site soils were subject to ploughing by an adjacent monastery. Land development along the nearby Pskovskaya street dates back to the 1940's. The majority of the residential and commercial areas adjacent to the site were developed in the 1950's. The site, however, has remained as an open field for numerous years, and no records of site uses, other than for ploughing purposes, exist.

Biological Environment

a. Flora, Fauna or Rare Habitats. Within the vicinity of the site, there is a park and a pine grove located within the region of the village of Ilmen. The Dubray oak plantations comprise a total area of 105 ha and are located near the Savina-Mshaga villages. These are considered as local botanical monuments. Forest areas within the City of Novgorod are considered to be Group 1 forests, and constitute the "green zones" of the city. Group 1 forests consists of pines, birch, alder, aspen, and fir trees.

No rare or endangered fauna or flora species have been identified within the proposed construction site or adjacent areas.

b. Sensitive Habitats. Some ecologically-sensitive natural fauna habitats have been identified in nearby areas of Novgorod. These sensitive areas are as follow: fishery ponds and the Myachino Lake in the village of Yurievo, floodlands of the Msta River, and fishery ponds in the village of Volotono.

c. Species of Commercial Importance. All types of hunting are prohibited within a 10-km radius off the city. For reason, the identification of terrestrial species of commercial importance is not appropriate. However, the Ilmen Lake and Volkhov River are inhabited by fish of commercial importance, such as: braem, pike-perch, perch, pike, sparkling, and sinets.

c. Pest Species and Disease Vectors. The presence of rodents has been reported in the city, including grey and black mice and rats. In outdoor environments, pest species such as field and forests mice exist. Mosquitos in moist forest areas are believed to be responsible for spring and summer outbreaks of encephalitis in the City of Novgorod.

Socio-Cultural Environment

a. Land Use. The southeast portion of the site is a meadow, while some one-story houses exist along Pskovskaya street. Some 13 households would be affected since resettlement is an issue of concern which needs resolution prior to proceeding with site development. Given residences currently exist on-site, the City would need to purchase these and assist the affected population with associated resettlement issues.

b. Planned Development Activities. The Pskovski housing project envisions the future development of cottages, town-houses, and 4 to 5-story apartment houses, within the 81-ha project site. In addition, structures for commercial use and socio-cultural purposes are also planned. The construction of a school for approximately 1,266 students is also envisioned.

c. Cultural Properties. Close to the housing development territory, approximately 600 m from the site, is the old Petrovskoye cemetery. From the Pskovskaya street direction there is a view of the Yuriev Monastery, the Museum of Wooden Architecture, and the Church of Peter and Paul on the Silnishche. This church dates back to the XII century. None of these cultural features are located on the site or in the immediate vicinity of the site.

Environmental Issues of Regional Concern

a. Surface and Groundwater Contamination. As previously discussed, surface waters within the City of Novgorod are considered to be polluted. At the Volkhov River's head (near the settlement of Yurievo), the permissible concentration limits for oil-based compounds, iron, copper, and manganese exceed their respective water quality standards. All other water quality parameters are not exceeded on an annual basis. The Veryazha River, which flows along the city has detectable concentrations of organic matter, iron, manganese, zinc and copper which also exceed the permissible fishery norms. Given the presence of these compounds at detectable concentrations, use of this river is not recommended for recreational purposes or other uses involving direct contact.

b. Exceedance of Ambient Air or Radiological Standards. As previously presented in Section 3.4.1.4, various parameters are exceeded in the city's ambient air. These parameters include: dust, ammonia, and formaldehyde concentrations. However, permissible concentration limits for nitrogen oxides, carbon dioxide, soluble sulfates, and sulfur dioxides are not exceeded.

Background radiological standards are not exceed in the City of Novgorod .

c. Known Hazardous Waste, Mine Tailings, or Radiological Disposal Areas. Hazardous waste or mine tailings do not exist on-site or within the vicinity of the site. The on-

site radiological concentration is not believed to exceed the global background radiation standards for soils and plants. The soil and plant contamination with cesium following the Chernobyl catastrophe was reported to be 0.2 curie/m^2, which is representative of background conditions. This research was conducted by the St. Petersburg geodesic expedition of 1990-91, who also determined that the "Radioactivity Spot" with radionuclide concentrations up to 1.6 to 1.7 curie/m^2 is located within a marshy area of the Rogavka settlement district, approximately 35 kilometers from the project site.

d. Nuclear, Coal, Oil, or Gas Power Generating Stations. In Novgorod, there is one Heating Power Station (HPS-200) with mixed fuel (gas and coal). This HPS is located approximately 14 km to the north of the site. No nuclear power plants have been identified within the vicinity of the city.

e. Petrochemical, Petroleum or Other Industries with Potential for Significant Fugitive Emissions. At a distance of 13 km to north of the site, is the Joint-Stock Company "Akron" chemical plant. A number of industries, including: a capacitor plant, JC "Start", JC Elkon, and others, are located adjacent to the Veryazha River. These are considered to be prime contributors to environmental contamination. (See Attachment C).

f. Other Areas of Environmental Potential Environmental Concern. A number of closed solid waste landfills are located in the vicinity of the site. All these landfills have been closed within the past 20 years or so. One landfill is currently being operated, and is located north of the city. A detailed assessment of potential environmental impacts posed by these landfills unto the environment has not been conducted to date.

D. ST PETERSBURG

Five housing development sites have been identified by the City of St. Petersburg. These sites are: Yugo-Zapadny (southwest) (103 ha), Severnaya Dolina (north valley) (34 ha), Severo Primorskaya (23 ha), Kolomnaki, (20 ha), and Kamenka (14 ha). Baseline information on the existing environment is presented in condensed format in Table 3-1. This information has been compiled from data provided by the lead design institute, city officials, the on-site engineering team, and published literature, including the 1993 Ecological Atlas for the City of St. Petersburg (EASP). The following is presented in Table 3-1:

Physical Environment	geology, topography, soils, climate, meteorology, air quality, hydrology, and soils.
Biological Environment	flora, fauna, and rare or endangered species, sensitive habitats, species of commercial importance, and pest species and disease vectors.

Socio-Cultural Environment	land use, planned development activities, and cultural properties.
Issues of Concern	surface and groundwater contamination,exceedance of ambient air or radiological standards, known hazardous waste areas, mine tailings, and radiological disposal areas, nuclear, coal, oil or gas power generating stations, petrochemical, petroleum, or other industries with potential for significant fugitive emissions, and other areas or issues of environmental concern.

All raw data and deliverables used to develop Table 3-1 are presented in Attachment D.

ROSTOV

Three housing development project sites have been identified by the City of Rostov-on-Don. These sites are: Niva (59.7 ha), Bataisk (38.5 ha) and Vertolutnoy (9.6 ha). This information has been compiled from data provided by the lead design institute, city officials, the on-site engineering team, and published literature. The following is presented in Table 3-2:

Physical Environment	geology, topography, soils, climate, meteorology, air quality, hydrology, and soils.
Biological Environment	flora, fauna, and rare or endangered species, sensitive habitats, species of commercial importance, and pest species and disease vectors.
Socio-Cultural Environment	land use, planned development activities, and cultural properties.
Issues of Concern	surface and groundwater contamination exceedance of ambient air or radiological standards, known hazardous waste areas, mine tailings, and radiological disposal areas, nuclear, coal, oil or gas power generating stations, petrochemical, petroleum, or other industries with potential for significant fugitive emissions, and other areas or issues of environmental concern.

TABLE 3-1. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF ST. PETERSBURG, RUSSIA

	PROPOSED CONSTRUCTION SITES				
	Yugo-Zapadny (South West)	**Severnaya Dolina (North Valley)**	**Severo Primorskaya**	**Kolomnaki**	**Kamenka**
PHYSICAL ENVIRONMENT Geology	Surficial dredge comprised of boulders and sandy loams. From surface to - 4 m: sand, dredge, peat. Low seismic risk area.	From +20 to +10 m : fine sand, sandy loam, peat; from +10 to.0: luga moraine soil. 0 to -20 m: clay. Low seismic risk area.	from +5 to 0: peat; 0 to -5: loam; -5 to -12: sand, sandy loam; and -15 to -35: glays, loam, and kotlin clays. Low seismic risk area.	+15 to 0:natural soil, sand; 0 to -10: glay, loam, cobble with stones; -15 to -25: sandy loam, clay. Low seismic risk area.	+10 to 0:glay, fine sands, sandy loam; 0 to -12:sandy loam, glay, cobbles;-12 to -20, glays.Low seismic risk area.
Topography	Generally flat site, filled with dredged materials from nearby harbor.	Height ranges from +28 to +33 m. Jukki hills adjacent to site. flat relief on-site.	Flat-relief on-site. Gentle slope to the south of the site.	Height up to +20 m off-site. 3.6 to 4.7 m on-site.	Natural landmarks from + 2.6 to +4.2 m.
Soils	Alluvial territory outside node of contamination (EASP).	Alluvial territory. Peat found from 2.5 to 5.0 m.	Alluvial territory outside node of contamination (EASP).	Arable soils.	Forest soils. Outside the node of contamination (EASP).
Climate and Meteorology	Average temperatures for the City of St. Petersburg are as follows: low: -11.3, high: 22.1 degrees Celsius. Number of warm days: 156 (average) Winds: wind patterns characterized by currents primarily from the south (18%), southwest (15%) and west (17%).				
Air Quality	Northern portion of site is 70.1 of yearly MAC; Southern portion is 70.25 of yearly MAC (EASP).	Summarized gas concentration is 0.1 to 0.25 MAC.	0.25 of MAC (EASP).	0.25 of MAC (EASP).	0.1 to 0.25 of MAC (EASP).
Hydrology	North of the site is the Finish Bay. The site is bordered to the north and east by the Duderhoff Canal. West of the site is the Matyssov Canal. Groundwater is found at +2 m.	No nearby surface water bodies. Groundwater depth at +20 to +25 m.	South of the site is the convergence point where the Srednyaya Nevka River discharges into the Finnish Bay . Groundwater depth at 0 to +5m.	Pond located on-site. groundwater depth from 0 to +10 m.	No nearby surface water bodies. Groundwater depth from +4 to +8 m.
Site History	Past hydrotechnical construction on-site, willow tree area on bank of Dubbergovsky canal.	Peat extraction and, agriculture	Open territory filled in 1962. fishing.	Old residential area. North of site soils are natural, to the south the site is filled.	Forest, bogg area. Some hunting occurs.

TABLE 3-1. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF ST. PETERSBURG, RUSSIA

	PROPOSED CONSTRUCTION SITES				
	Yugo-Zapadny (South West)	**Severnaya Dolina (North Valley)**	**Severo Primorskaya**	**Kolomnaki**	**Kamenka**
BIOLOGICAL ENVIRONMENT Flora, Fauna, and Rare or Endangered Species	11 to 20 nesting species identified for the north portion of the site; 21 to 35 to the south. One rare bird species identified (EASP).	Birch and aspen trees 12 m high and 0.14 m diameter.	6 to 10 nesting species identified for the area in general.	6 to 10 nesting species identified for the area in general.	11 to 20 nesting species identified for the area in general.
Sensitive Habitats	Migratory route for birds. So. Primorsky Park is south of the site. Thick willow vegetation at the northeast corner of site.	Belomor-Baltic migratory route for birds.	Migratory route for birds.	Decorative shrubs, oaks, maple, birch, linden	Birch, asps will remain in the center of the site.
Species of Commercial Importance	None reported.	None reported.	None reported.	None reported.	None reported.
Pest Species and Disease Vectors	None reported.	None reported.	None reported.	None reported.	None reported.
SOCIO-CULTURAL ENVIRONMENT Land Use	Municipal open land. Leasing of motor vessels and parking.	Peat extraction operation, agricultural use.	Municipal leased land, On-site: lumber selling facility	Open land. A bottle recycling facility exists south of the site. Residential area exists east of site.	Municipal land. East of the site is bordered by ogorods. On-going contruction of car garages to the south.
Planned Development Activities	Housing	O-site: housing. Construction of the Srednyviborg highway is anticipated (3 km away)	Housing. Construction of a yatch club south of the site is planned.	Housing	Housing
Cultural Properties	Off-site: Matissov canal is under protection, Znamenka estate protected zone of Peterhoff highway.	Off-site: Shuvalovo Park, 1776	Off-site: historical waterway, parks of the Kirov Islands	Off-site: churches and chapels in Kolomnaki	Historical route along border of the site.

TABLE 3-1. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF ST. PETERSBURG, RUSSIA

	ENVIRONMENTAL INFORMATION FOR PROPOSED CONSTRUCTION SITES				
	Yugo-Zapadny (South West)	**Severnaya Dolina (North Valley)**	**Severo Primorskaya**	**Kolomnaki**	**Kamenka**
ENVIRONMENTAL ISSUES OF REGIONAL CONCERN Surface and Groundwater Contamination	Surface Water: Finnish Bay is a Class IV (contaminated), stream east of site is a Class V (dirty) (EASP). No groundwater data reported.	Surface Water: Starozhilovky River (13 m3/s) is considered to be cotaminated. No groundwater data reported.	Surface Water: Finnish Bay is a Class IV (contaminated) (located south of the site). Bolishava Nevka River: (contaminated). No groundwater data reported.	Lake Dolgoe is contaminated. No groundwater quality data reported.	Information for specific surface water bodies or site/local groundwater not reported.
Exceedance of Ambient Air of Radiological Standards	Ambient air: see discussion above. power of gamma radiation for general site vicinity: 6 to 10 and 10 to 12 mR/hr (from a scale of 6 to 25) (EASP). no-site specific information.	Ambient air: see discussion above. 12 to 16 mR/hr (off-site).	Ambient air: see discussion above. power of gamma radiation for general site vicinity: 10 to 12 (mR/hr). (from a scale of 6 to 25). (EASP) no-site specific information.	Ambient air: see discussion above. power of gamma radiation for general site vicinity: 12 to 16 (from a scale of 6 to 25). (EASP) no-site specific information.	Ambient air: see discussion above. power of gamma radiation for general site vicinity: 16 to 20 mR/hr (scale of 6 to 25). (EASP) no-site specific information.
Known Hazardous Waste, Mine Tailings and Radiological Disposal Areas	Two plots of radioactive contamination detected in nearby park & deactivated	The site is to be contaminated but has been deactivated since.	None reported.	None reported.	None reported.
Nuclear, Coal, Oil, or Gas Power Generating Stations	Kolomjazhskaya Atomic Power Station (60 km off-site).	Parnas Boiler-House runs on liquid fuel, gas (off-site).	Atomic power station (64 km off-site), co-generation plant (2 km off-site)	Atomic power station. (66 km off-site), co-generation plant (2 km off-site).	Atomic power station (66 km off-site), gas co-generation plant (of-fsite)
Petrochemical, Petroleum, or Other Industries with Potential for Significant Fugitive Emissions	None reported	None reported	Medium pressure natural gas pipeline along north border	None reported	None reported
Other Areas of Environmental Potential Concern	electric power lines.	electric power lines (110 and 330 kv). The site used to be contaminated but was deactivated.	South of the site, a vast dumping area exists (including t.v. set parts, metal debris, and reinforced concrete blocks).	Electric power lines (110 kv). Heavy metal contamination is not confirmed .	Electric power lines (110 kv).

TABLE 3-2. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF ROSTOV-ON-DON, RUSSIA

	PROPOSED HOUSING DEVELOPMENT SITES		
	Niva	**Bataisk**	**Vertolutnoy**
HYSICAL ENVIRONMENT			
eology	Interdispersed strata of silt and loess (30 m) underlain by dense clay of undeterminate depth. This area is not considered an active seismic zone.	Based on adjacent dredging activities, site is believed to be sand deposits to -20 m. These deposits will be overlain by 4.5 m of sandy hydraulic fill (at completion). Area not considered an active seismic zone.	11 m of loess overlain by sand and silt river deposits. This area is not considered an active seismic zone.
opography	Gentle rolling farmland.	Flat raised fill area bounded by drains and wetland currently under development. Groundwater at surface prior to filling activity.	Flat meadow bordered by an eastern berm on two sites.
oils	Loam top soil to 1 m.	Sandy hydraulic fill from adjacent lake bed.	Loam top soils to 1 m.
limate and Meteorology and Air uality	Rostov-on-Don lies in the steepe climate zone with continental climate. The average temperature in January is -5.7 degree C and in July is 23 degree C. Temperature extremes varies from -33 to +40 degree C. Average annual population is 539 mm. Dominating wind directions are east (32 - 40 %) and west (11 to 19 %). Ambient air quality in the Rostov area meets National norms for all criteria pollutants.		
ydrology	Groundwater not encountered up to depth of 30 m. No streams or water bodies in close proximity to site. Potable water for proposed construction site will be provided from Municipal supply from the Don River.	Groundwater will be at 4.5 m at base of hydraulic fill. The site is located in the wetlands adjacent to the Don River. Potable water will be provided by facilities of the City of Rostov.	Groundwater not encountered up to a depth of 18 m. No streams or water bodies on or in close proximity to site. Potable water for proposed construction site will be provided from the municipal supply from the Don River.
ite History	In the recent past, the site was used for agricultural crop production at the local collective farm.	The site is currently being reclaimed by hydrofilling from the floodplain of the Don River.	Prior to its most recent use, as a recreational airdrome, the site was a light aircraft field with a grass runway. The site is currently used by the local community for animal grazing.

TABLE 3-2. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES
CITY OF ROSTOV-ON-DON, RUSSIA

	PROPOSED HOUSING DEVELOPMENT SITES		
	Niva	**Bataisk**	**Vertolutnoy**
IOLOGICAL ENVIRONMENT ora, Fauna, and Rare or adangered Species	There are no rare or endangered species of flora or fauna on any of the proposed construction sites, as listed in the Russian "Red Book".		
ensitive Habitats	No records are available of sensitive habitats.	The filled wetland was a natural habitat for various local waterfowl and marshland flora. Aquatic mammals have long since been extinct in this area.	No record of sensitive habitats.
pecies of Commercial nportance	None reported.	None reported.	None reported.
est Species and Disease ectors	Common field mice are present on the site.	In addition to common field rodents, mosquito infestation associated with wetlands is anticipated. Mitigating measures (spraying, etc.) may be required.	Common field mice are present on the site.
OCIO-CULTURAL NVIRONMENT and Use	The site is with 1.5 km of a major power plant fueled by gas and Mazut (contingency). Mazut is stored on-site and received by tank car. Two high tension lines (550 and 110 kv) border the site. A major oil pipe line is within 0.5 km west of the site.	A major trans-national highway borders the site on the west. A small housing development (50 units) boarders the site on the site. There is a small village located within 1.5 km of the site to the northwest.	The site is bordered by residential housing on all sides. A small contingent of militaty personnel are currently located on the southwest corner of the open area. This operation will be closed in the near future when the military housing project is completed.
lanned Development Activities	Contingent upon resolution of the wastewater treatment under capacity, all of the sites represent the first phase of larger planned residential development.		
ultural Properties	Two known burial mounds are present within the proposed construction site boundary. Caution will be required during construction to preserve any remains or antiquities.	A large active cemetary subject to seasonal flooding is located across the trans-national highway adjacent to the site. Activity at the site is not anticipated to impact the cemetary.	There is a historical rights claim by the Cossacks for al l parts of the former airport property. Under Russian Law, this claim has no validity.

TABLE 3-2. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF ROSTOV-ON-DON, RUSSIA

	PROPOSED HOUSING DEVELOPMENT SITES		
	Bataisk	**Vertolutnoy**	**Kamenka**
'NVIRONMENTAL ISSUES F REGIONAL CONCERN			
.rface and Groundwater ontamination	No record for the Rostov-on-Don area.		
xceedance of Ambient Air of .adiological Standards	All areas of Rostov-on-Don are reported to comply with National annual standards for criteria pollutants.		
:nown Hazardous Waste, Mine 'ailings and Radiological Areas	None reported in the Rostov-on-Don region.		
Juclear, Coal, Oil, or Gas Power ienerating Stations	Major power/heating station powered by gas augmented by Mazut is located within 1.5 km of the site. No other facilities in proximity to site.	No facilities in close proximity to the site.	No facilities in close proximity to site.
'etrochemical, Petroleum, or Other .ndustries with Potential for Significant 'ugitive Emissions	Rostov-on-Don has a number of major industrial facilities of which none are located within close proximity to the proposed sites. All national standards for ambient air quality are met in the city.		
)ther Areas of Environmental 'otential Concern	The design capacity for the Rostov-on-Donn wastewater treatment plant is 440,000 m3/day. This serves a population of 1.3 to 1.6 million. The current average demand for treatment is 670,000 m3/day with a projected demand in 2010 of 900,000 m3/day. This severe under capacity must be alleviated to curtail health problems in the population and deteriation of water quality in the Don River Basin.		

All raw data and deliverables used to develop Table 3-2 are presented in Attachment E.

F. NIZHNY NOVGOROD

Five housing development project sites have been identified by the City of Nizhny Novgorod. These sites are: Beshentsevo 1 (73.8 ha), Beshentsevo 2(19.8 ha), Novo Prokovskaya (32.5 ha), Delovaya (22 ha), and Bughri (55 ha). This information has been compiled from data provided by the lead design institute, city officials, the on-site engineering team, and published literature. The following is presented in Table 3-3:

Physical Environment	geology, topography, soils, climate, meteorology, air quality, hydrology, and soils.
Biological Environment	flora, fauna, and rare or endangered species, sensitive habitats, species of commercial importance, and pest species and disease vectors.
Socio-Cultural Environment	land use, planned development activities, and cultural properties.
Issues of Concern	surface and groundwater contamination, exceedance of ambient air or radiological standards, known hazardous waste areas, mine tailings, and radiological disposal areas, nuclear, coal, oil or gas power generating stations, petrochemical, petroleum, or other industries with potential for significant fugitive emissions, and other areas or issues of environmental concern.

All raw data and deliverables used to develop Table 3-3 are presented in Attachment F.

TABLE 3-3. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES
CITY OF NIZHNY NOVGOROD, RUSSIA

	PROPOSED HOUSING DEVELOPMENT SITES				
	Beshentsevo 1	**Beshentsevo 2**	**Novo Prokovskaya**	**Delovaya**	**Bugri**
PHYSICAL ENVIRONMENT Geology	The surface strata consists of loess interdispersed with sandy loams to a depth of 6.5 to 8.0 m. This region is an area of low seismic activity.	The surface strata consists of loess interdispersed with sandy loams to an undetermined depth. This region is an area of low seismic activity.	The surface strata consists of loess and alluvial deposits to a depth of about 10 m. This region is an area of low seismic activitiy.	The surface strata consists of loess interdispersed with sandy loam to a depth of about 8 m. The region is in an area of low seismic activity.	The surface strata consists of loess interdispersed with clays to an indeterminate depth. This region is in an area of low seismic activity.
Topography	Proposed site on rolling land with slopes not exceeding 10% as reported by local officials.	Site on gentle rolling land with slopes generally not exceeding 5%.	Gently rolling with slope generally not exceeding 5%.	Site rises to the north with a slope of generally less t han 5%.	Gently sloping site with a high point on the north.
Soils	Surface soils consist of loess loams and sandy loams as reported by local officials.	Surface soils consist of loess loams as reported by local officials.	Surface soils consist of loess loams as reported by local officials.	Surface soils consists of loess loams and sandy loams as reported by local officials.	Surface rock consists of loess loams and clay as reported by local officials.
Climate, Meteorology and Air Quality	Predominant wind is southwesterly. Average snowfall accumulation during the winter varies from 1 to 2 m.				
Hydrology	Groundwater was not encountered at a depth of 10 m. The site is not subject to flooding.	Groundwater was not encountered at a depth of 10m. The site is not subject to flooding.	The depth of groundwater is indeterminate. Water is reported to pond in low areas.	Depth of groundwater at the site is indeterminate. The site is not subject to flooding.	Water level comes to within 0.5 m of the surface at lower groundwater elevations.
Site History	The site is currently used for agricultural production. Parts of the site are occupied by buildings of the Village of Lack.	The site has only been used for agricultural production.	The site used in the past only for agricultural use. A 200 mm high pressure gas line must be relocated prior to development of the site.	The site is currently fallow. In the past, the site was used for agricultural purposes.	In the recent past, this site has been used for agricultural production purposes.

TABLE 3-3. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF NIZHNY NOVGOROD, RUSSIA

	PROPOSED HOUSING DEVELOPMENT SITES				
	Beshentsevo 1	**Beshentsevo 2**	**Novo Prokovskaya Primorskaya**	**Delovaya**	**Bugri**
BIOLOGICAL ENVIRONMENT Flora, Fauna, and Rare or Endangered Species	As reported by local authorities, there are no "Red Book" rare or endangered faunal or flora in the Niznhy Novgorod region.				
Sensitive Habitats	No information available.	No information available.	No information available.	No information available.	As reported by local officials, the there are no sensitive habitats on this site.
Species of Commercial Importance	No information available.	No information available.	No information available.	No information available.	No information available.
Pest Species and Disease Vectors	The presence of common field rodents is anticipated on and in the vicinity of the proposed construction site.				
SOCIO-CULTURAL ENVIRONMENT Land Use	Bordered by a small gypsy village and agruicultural land. A 70% complete (construction terminated) nuclear power plant of Chernobyl design is located 5 km of the site.	Surrounded by agricultural lands. A 70% complete (construction terminated) nuclear power plant design is located within 5 km of the site.	A forest reserve is located directly to the north. This development is located in an area of generally light industrial activity.	Located at the junction of two main roads. On the west is an operating hospital. Within 0.5 km, a large gas-fired district heating plant. The site is surrounded by light industry.	Adjacent to a small pensioner's village, the site is bordered by a 550 kva power line. A forest reserve is located immediately on the north.
Planned Development Activities	No information available.	No information available.	No information available.	No information available.	No information available.
Cultural Properties	No information available.	No information available.	No information available	No information available	No information available

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TABLE 3-3. SUMMARY OF BASELINE ENVIRONMENTAL DATA FOR THE PROPOSED HOUSING DEVELOPMENT SITES CITY OF NIZHNY NOVGOROD, RUSSIA

	PROPOSED HOUSING DEVELOPMENT SITES				
ENVIRONMENTAL ISSUES OF REGIONAL CONCERN	**Beshentsevo 1**	**Beshentsevo 2**	**Novo Prokovskaya**	**Delovaya**	**Bugri**
Surface and Groundwater Contamination	No information available.	No information available.	No information available.	No information available.	No information available.
Exceedance of Ambient Air of Radiological Standards	NO2 concentrations in this area are higher than other areas of the city but below National Standards.	Below National Standards for criteria pollutants.	Below National Standards for criteria pollutants.	Below National Standards for criteria pollutants.	Below National Standards for criteria pollutants.
Known Hazardous Waste, Mine Tailings and Radiological Areas	A small area directly to the west of the site is reported to have surface soils contaminated with heavy metals.	None reported.	None reported.	None reported.	None reported.
Nuclear, Coal, Oil, or Gas Power Generating Stations	None reported.	None reported.	None reported.	None reported.	None reported.
Petrochemical, Petroleum, or Other Industries with Potential for Significant Fugitive Emissions	None reported.	None reported.	None reported.	None reported.	None reported.
Other Areas of Environmental Potential Concern	None reported.	None reported.	None reported.	None reported.	None reported.

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IV. SIGNIFICANT ENVIRONMENTAL IMPACTS

A. BARNAUL

Based on a review of available environmental information and construction details for the proposed housing development project, no significant or irreversible and negative environmental impacts are anticipated. In fact, the net environmental impact of this project is expected to be quite positive. The quality housing to be provided for the local population will relieve over- crowding and unsanitary living conditions, particularly in the center of the city. These positive impacts will more than compensate for the loss of 82 ha of prime farm land. There is more than adequate farm land in the Barnaul area, and this conversion will have a minimal impact on overall agricultural production.

B. TVER

Based on a close evaluation of all baseline environmental data presented in Section III, no significant or irreversible and negative environmental impacts are anticipated as a result of implementing the proposed housing development project. The disruption of site soils will not result in the depletion of rare or endangered vegetation or impact existing terrestrial animal habitats since no nesting or burrowing areas were identified at any of the three sites. Deforestation is not an issue, even at the Cherkassy site, which is bordered to the north by a thick forested area.

Some increased fugitive dust levels and sediment runoff to nearby surface water bodies and low lands may occur, but these are temporary and reversible in nature. Engineering controls may be warranted as part of a mitigative plan.

Out of all the sites, the Cherkassy site is considered to be the most favorable site given its location; away from the zone of pollution influence and natural scenic beauty. This site is located between a forested area and the Volga River and characterized as a "low level of contamination" area. One negative factor associated with the Cherkassy site is the adjacent military airfield, and the level of noise it generates.

In turn, the most prepared site for construction in Tver is the Youzhny D site. The city infrastructure, which includes engineering, social, and cultural structures are located at the border of the site. Water supply and sewage collection and treatment facilities, power station, medium pressure natural gas lines, boilers and telephone stations are all within close vicinity of this site. This is not the same for the Cherkassy site, which at this point in time requires the most effort in terms of establishing the necessary infrastructure works.

In summary, the proposed construction project will not result in the displacement or resettlement of human populations. In turn, it will provide citizens with much needed additional housing.

C. NOVGOROD

The proposed construction activities are believed not to cause significant or irreversible and negative impacts to the existing environment. The site provided for housing construction will not have any adverse effects on local farming, since site soils are not suitable and have never been used for this purpose. No historical or archeological monuments exist on or in the immediate vicinity of the site. Given the site is flat in nature, additional levelling and preparation is not believed to be required. However, because the site sits on a high groundwater level, there may be a need to provide for drainage. Since the site adjoins an existing housing area, connections to sewer water and heating facilities are feasible. Transportation services between the city and the site are also established.

The major impact involves population resettlement. An existing housing area is located on a small portion of the site, which may require for the City to purchase these homes and relocate approximately 13 households. This may pose potential long-term but reversible impacts onto the affected population.

In summary, the proposed Pskovski housing construction site was selected by the City of Novgorod because it meets all of the established selection criteria. In general, the evaluation criteria focuses on environmental quality, site accessibility, and engineering feasibility. Thus, the Pskovski site was favorably selected instead of other sites for further evaluation and consideration.

Based on the available environmental and infrastructure information, the Pskovski site development is viewed as a favorable project which would provided much needed housing for the City of Novgorod.

D. ST PETERSBURG

4.0 Significant Environmental Impacts

4.1 St. Petersburg

At the Yugo Zapadny site, soils are considered to be outside the node of contamination. However, since city snow is disposed of at this site, it may be necessary to evaluate potential soil and groundwater contamination in greater detail. The potential for air pollution is low at this site given its proximity to the Finnish Bay. Significant environmental impacts are not anticipated at the Yugo Zapadny site, as long as substantial hydraulic filling is not conducted on-site, as a means for site surface levelling. Backfilling of the nearby canals, including the Dubbergovsky and the Matissov Canals is proposed. Some impacts onto aquatic biota inhabiting the adjacent canals may result during construction unless overland runoff of soils is controlled.

It is not anticipated that on-site trees (i.e., birch and willows) would be cleared as a result of future construction. Otherwise, this action may result in deforestation impacts, including the resettlement of terrestrial animals.

Environmental conditions near the Severnaya Dolina site may warrant future characterization to determine if these pose impacts onto the site. Near the site is an industrial area and the Parnasa boiler station which may contribute to the emission of ambient air pollutants. In the vicinity of the site is the Strozhilovka River, which is considered to be contaminated with wastewater discharges originating from the nearby wastewater treatment plant. On-site high power lines may generate unfavorable electromagnetic emissions. At the Severnaya Dolina site, there may also be a resettlement issue, since some wooden houses will need to be demolished and accommodations provided, in order to implement the proposed project. Some major work is to be conducted regarding the engineering preparation of the site. This primarily involves the excavation and removal of a thick layer of peat which comprises the top surface of the site.

The off-site area facing the Finnish Bay and located south of the Severo-Primorskaya site, used to be a dumpsite for television housings, metal debris, and concrete blocks. During the site reconnaissance, the team noticed the presence of numerous scavengers picking through the rubbish (primarily looking for useable t.v. parts). Given the presence of this debris, future characterization of site soils and groundwater may be warranted to determine if this dumpsite may affect on-site environmental conditions. Numerous stocks of timber, a wood processing factory (WPF-5), and large sand heaps currently exist at the Severo Primorskaya site. Prior to construction at this site, the stock of timber and sand heaps must be removed and hauled off-site, while the wood processing plant would need to be relocated.

Adverse impacts are believed to be minimal at the Kolomnaki site. The nearby Lake Dolgoe is considered to be a contaminated surface water body, however it is not believed to pose adverse impacts onto the site given its distant location from the site. At the Kolomnaki site, significant environmental impacts may result if the existing on-site pond is filled. This filling may result in potential flooding and disturbance of on-site terrestrial and aquatic habitats. The disadvantage associated with construction at this site is the need for additional infrastructure support.

One of the reported problems at the Kamenka site is the lack of a natural and appropriate drainage. It has been reported that groundwater levels rise during spring flood due to the low elevation of the area. These are attributed to the existing hydraulically-filled areas. No additional filling is anticipated. East of the site, a number of *ogorods* (kitchen gardens) exist. It is believed that these will be demolished as a result of the housing development. Currently, no one lives in these wooden sheds since they are only used to store tools. Deforestation is not an issue since open green areas (including a park in the center of the development) would exist, as presented in current design drawings.

Although some site-specific issues have been identified for all these sites, these are considered to be minor and are not believed to form a basis for not implementing the proposed housing development projects.

E. ROSTOV-ON-DON

Based on a review of available environmental information and construction details for the proposed development activities for these sites, no significant environmental impacts are anticipated for this project. In fact, the net environmental impact of these projects is expected to be quite positive. The quality housing to be provided for the local population will relieve over-crowding and unsanitary living conditions. These positive impacts will more than compensate for the loss of 60 ha of prime farm land in Niva, 10 ha of open area in Vertotutnoy and 38.5 ha of marsh land along the Don. There is more than adequate farm land in the Rostov-on-Don area, and this conversion will have a minimal impact on overall agricultural production. Although the reclamation of wetlands should always be undertaken with due environmental consideration and consistent with World bank Guidelines (OPN 11.02), in the case of this proposed development the net impact on the extensive Don river marshlands will be minimal and off-set by the improvements in the lake being created. This reclamation project represents only a fraction of a percent of the total Don River marshlands in the vicinity of Rostov.

The overriding environmental issue associated with these projects is the required improvements to the city's wastewater treatment facilities.There is currently a severe treatment under-capacity causing deterioration in receiving water quality at the present time. If this situation continues it may have an adverse impact on human health and overall sanitary conditions for the population.Other improvements to the city's infrastructure to include sewerage improvements in the north of city and construction of much needed housing developments to alleviate overcrowding will also have to be curtailed

F. NIZHNY-NOVGOROD

Based on a review of available environmental information and construction details for the proposed construction activities for the proposed Nizhny Novgorod housing development sites, no significant environmental impacts are anticipated for these projects. In fact, the net environmental impact of these projects is expected to be quite positive. The quality housing to be provided for the local population will relieve over crowding and unsanitary living conditions. These positive impacts will more than compensate for the loss of approximately 230 ha of prime farm land contained within the five proposed sites. Some 70 ha of this total is outside of the city limits on the Bughri site. There is more than adequate farmland in the Nizhny Novgorod area, and this conversion will have a minimal impact on overall agricultural production. Almost 25% of the total 100,000 ha area of the city of Nizhny-Novgorod is now dedicated to agricultural purposes. Of the five proposed sites, Delovaya is the most urban. Its lack of rural attributes is more than off set by its easy access to the urban infrastructure network.

V. ANALYSIS OF ALTERNATIVES

The Housing Development and Reform Project aims at alleviating a serious housing need in Russia, as well as establishing a new pattern of land development which is based on the concept of land purchase and construction by individuals and enterprises. In order to successfully reach these goals, a phased-approach, involving the selection of environmentally-sound sites and adequate infrastructure implementation is warranted.

Initially multiple sites in each city were under consideration for housing developments. After a review of these sites with respect to World Bank environmental, design and infra-structure criteria only those sites meeting these criteria were presented by the cities for final consideration. The positive environmental attributes of the proposed sites were a major consideration in the final selection process. The other sites were ultimately rejected for a combination of economic, environmental and engineering considerations.

Under the "no action" alternative, project goals would not be met. The current housing situation characterized by over-crowding and sometimes unsanitary conditions, would remain. In addition, the historical state financing and construction of dwellings would not be modified to allow for the concept of private land purchase.

While the proposed project "go ahead" alternative may pose some environmental impacts, these are not significant and are temporary in nature. The advantages obtained from the implementation of the proposed site developments off-sets negative but temporary impacts such as those anticipated with construction (including increased noise and fugitive dust levels). The displacement of existing land uses is not of concern given all the sites are already prepared. No future destruction of environmentally critical areas is anticipated nor will the future on-site population's health or public welfare be compromised.

Overloading of existing infrastructure services is an issue which needs resolution prior to project start-up and is further discussed in the companion Infrastructure Assessment and Engineering Review report.

VI. MITIGATION PLAN

No significant long-term environmental impacts are anticipated or associated with this project. Short-term impacts associated with construction activities can be mitigated by implementation of engineering controls during this phase of the project. These controls should include dust suppression, noise mitigation, traffic control measures for construction equipment and workers, implementation of an erosion plan and containment of surface runoff and dewatering fluids, if required.

Any loss or degradation of vegetation from unnecessary removal or mechanical damage is not anticipated. However, should this occur, sufficient vegetation to compensate this loss would be incorporated into the design layout of the site.

VII. ENVIRONMENTAL MANAGEMENT AND TRAINING

The existing Russian infrastructure has a high degree of environmental sophistication. Very stringent environmental review of construction projects is the norm. Environmental standards are routinely incorporated into design plans as evidenced by sanitary (buffer) zones around farm lands and infrastructure such as power lines that may have an adverse environmental impact. However, the general public has minimal input at best into the decision making process. Training sessions for community leaders and the existing environmental committees to promote and encourage more public participation and a more open decision making process may be warranted.

VII. MONITORING PLAN

As no long-term environmental impacts are anticipated or associated with this project, environmental monitoring for this program should be limited to oversight of the engineering control measures presented in Section VI. Once construction is completed, local environmental agencies, such as Meteorological Centers, State Epidemic and Sanitary Inspection Boards, and Water Resources Boards, should include the project area and population in their ongoing environmental surveillance programs.

IX. INTERAGENCY COORDINATION AND LOCAL INVOLVEMENT

The channels of communication between local and central agencies are formal and open. As noted in section I many agencies are involved in review and approval of construction projects. This organizational structure promotes continual review and assures compliance with construction and environmental standards.

There is little or no public participation in development decisions for projects as being proposed by the World Bank. However, there seems to be a genuine awareness and concern in the population at large regarding environmental issues. At the present time the peoples' interests are represented by local committees composed of individuals trained in the appropriate technical disciplines and engaged on a full time basis by City.

The fiscal relationship between the local and national government agencies continue to be rigidly centralized. For these proposed World Bank housing development projects, the role of the central government in approval and most importantly in funding of major infrastructure construction and improvements to accommodate the added demand of these development projects is critical. Local funding of these major infrastructure improvement projects is not the normal practice.