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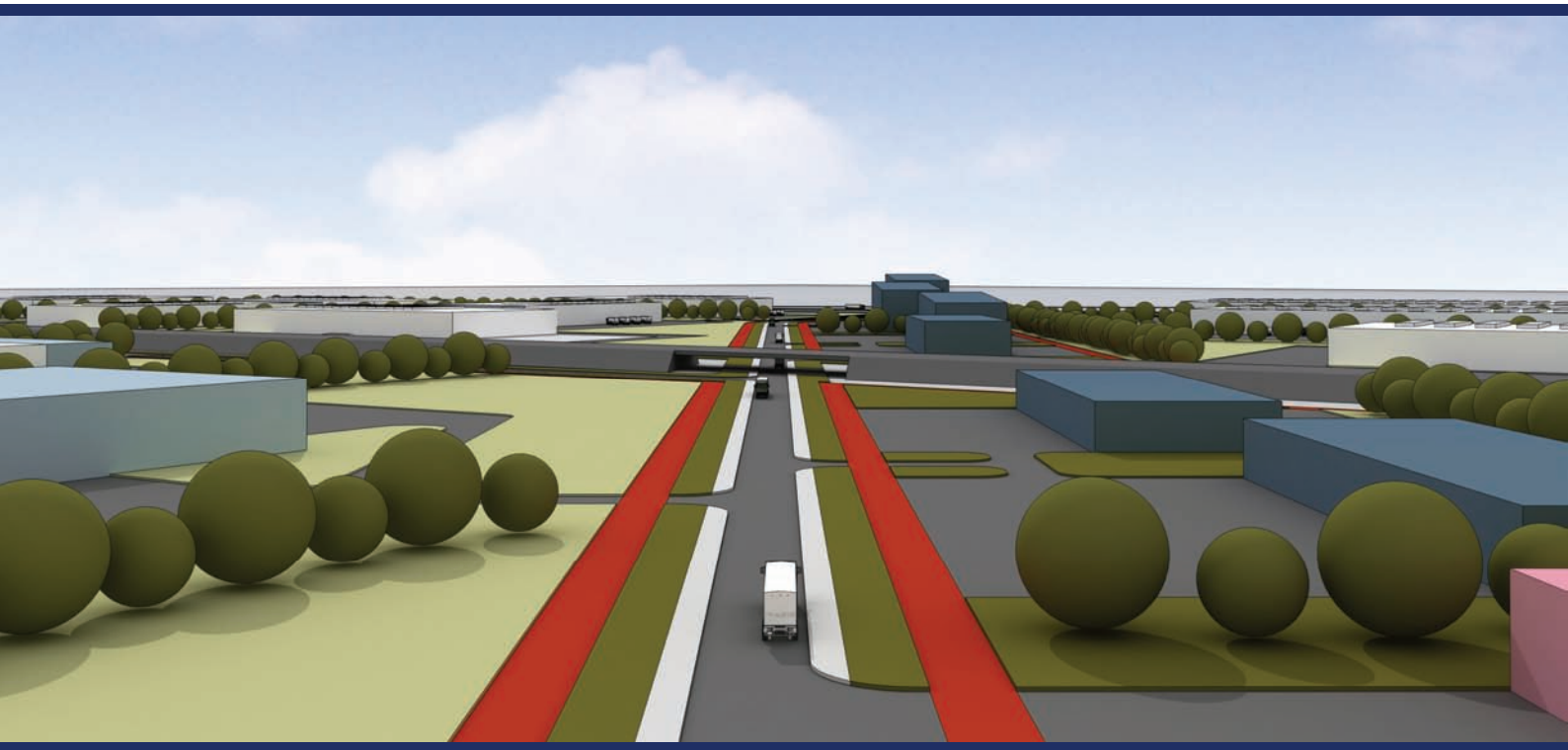

INDUSTRIAL PARK RUBIZHNE: DUE-DILIGENCE & CONCEPTUAL DESIGN REPORTS

June 2011

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CONTENTS

DUE-DILIGENCE REPORT 6
1. Introduction 6
2. Location of the city from national and regional perspective 6
3. Location of the site from municipal perspective 7
4. Size and visual characteristics of the site 8
5. Transport infrastructure 10
5.1. Roads 10
5.2. Railways 10
6. Technical infrastructure 10
6.1. Gas – capacity and network 10
6.2. Electric energy – capacity and network 10
6.3. Water – capacity and network 11
6.4. Sewage network and WWTP 11
7. Other significant findings on site 11
CONCEPTUAL DESIGN REPORT 12
8. Development motto and vision 12
8.1. Global trends and assumptions 12
8.2. Local development specifics and pre-conditions 12
8.3. Development vision 14
9. Development phases 16
10. Spatial development framework 17
11. Infrastructure development needs, requirements and assumptions 18
11.1. Gas 19
11.2. Electric energy 19
11.3. Water 20
11.4. Sewage water 20
11.5. Surface water 21
11.6. Standard cross-section 21
12. Bill of development quantities 22
13. Development costs 23
14. Feasibility report, risk analysis and follow up actions identification 24

LIST OF ATTACHMENTS:

1. Spatial analysis of Czech cities and industrial sites

LIST OF DRAWINGS:

1. Wider relations 1:5 00 000
2. Site analysis 1:5000
3. Site plan 1:5000
4. Perspective view (camera 01)
5. Perspective view (camera 02)

DUE-DILIGENCE REPORT

1. INTRODUCTION

This due-diligence report has been made in the framework of USAID LINC Project, Ukraine as an input for conceptual design of the potential development of the industrial site in Rubizhne. As a source of information has been used:

- Discussion of the overall framework of the city economic development with the deputy mayor Mr. Ihor Bondarenko
- Site visit, March, 30th, 2011 (+11°C, clear) guided by Mr. Netreba Oleksandr Vasylyovych
- Discussion with Mr. Rohalyov Oleksandr Oleksandrovych - Deputy Mayor on Economics, Mr. Netreba Oleksandr Vasylyovych - Head of the Department on Economic Development and Regulatory Policies of the Economy Office of the Rubizhne City Council and Mr. Cherevko Oleksandr Mykolayovych - Head of the Department of Land Relations and Land Planning of the Land Planning, Architecture and Urban Development of the Rubizhne City Council
- Interview with the city specialist for electric energy and water supply and sewage water discharge and treatment
- Various maps and text sources describing the city (city master-plan, strategic plan, others….)
- Visit of the potential reserve sites
- Maps with indicative drawings of the infrastructure on site

The group of experts of the LINC project Ukraine has executed the site visit. The participants present during the interview and the site visit:

- Karel Barinka – architect
- Tetyana Pasichnyk – investment promotion specialist
- Roman Proskurenko – translator and interpreter
- Radim Gill – project manager

2. LOCATION OF THE CITY FROM NATIONAL AND REGIONAL PERSPECTIVE

The city of Rubizhne belongs to Luhansk region. The city is located in the center of the Northern – Western sub-region of Luhansk oblast (Rubizhne, Severodonetsk, Lysychansk and Kremina district) that is (according to the city representatives) an optimal factor to implement the inter-municipal project on creation of an industrial zone in the city of Rubizhne.

Taking into account the circle with radius of 30km with the center in Rubizhne, all above mentioned cities belong to the catchement area identified in such a way. It is expected that all the communities of sub-region – many of them are participants of the LINC project-will benefit from that kind of development due to immediate proximity and good interregional accessibility.

From national point of view Rubizhne is quite far to the East of the country. Thus regular air transport between the regional airports (Donetsk, Luhansk) and central national airport in Kiev/or airports in EU is important assumption of successful FDI industrial park development not only in Rubizhne but in all Luhansk regions. Approx. road distances[1] are listed bellow:

- to Kiev: 750 km (main international airport in the country, EU and overseas flights)
- to Luhansk: 135 km (the nearest regional international airport)
- to Ukrainian-Russian border: 150-200 km (according to crossing point selected)
- to Donetsk: 172 km (the nearest regional international airport with flights to EU)

In the following analysis the main reasons to select the site in Rubizhne are identified:

Strong points:

- flat, sandy-easily removable terrain

[1] Source: Freytag and Berndt, 1:1 000 000, Ukraine-Moldova

- most probably no underground water (due to altitudes above road, above rails)
- size adequate for local-regional IP taking into account position of the city
- adjacent to existing Zarja plant territory and Zarja railway siding
- easily accessible from the existing regional road network
- within 30 km catchement area from the cities of Lysychansk, Severodonetsk and Kreminna
- future industrial or logistic park in Rubizhne can serve all northern parts of Luhansk region

Weak points:

- in proximity of small agriculture area (small wooden houses area – could be sensitive)
- need to relocate some infrastructure (water pipe-unofficial, water pipe Dn 300 mm, gas pipe Dn 200 mm (approx 600 m)
- shape of the site (after verification of northern border can be extended)

Conclusions:

Location, accessibility, flexibility and adequate site matter. Site was finally recommended for next processing of conceptual design.

Rubizhne is middle sized city with long industrial tradition located in north-west part of Luhansk region. On the north-west of the city large forest area is located offering to the city good recreational background. According to the indications of the representatives of the city approx. 80,000 inhabitants are living in the city and immediate surroundings today.

The nearest international airport with regular direct flights from/to the countries of EU or Europe and to various international destinations (Moscow, Vienna, Prague, Warsaw, St. Petersburg, Athens, Istanbul, Abu-Dhabi, Tel Aviv and many others….) is Donetsk from which also flights to Kiev are run on daily basis. Due to unfavorable road conditions it takes approx. 4-5 hours by car to safely reach the airport in Donetsk from Rubizhne. Donetsk airport is under intensive construction just now to be ready for the purpose of air-transport within the European football Championship in 2012.

3. LOCATION OF THE SITE FROM MUNICIPAL PERSPECTIVE

The site is located adjacently to the road of district importance No: T-13-02 with the carrying capacity of 140 trucks/day. The site lies in approx. 1 km distance from the city center and it has (following the decision of city council in Rubizhne) rather rectangular shape. While the southern border of the site is clear and visible (the area of Zarja facilities), the northern border is difficult to identify. The reason is the existence of various small private wooden houses with private gardens on the north of the site (gardeners' partnership "Komunalnyk"). On the other hand, according to city officials, these houses are built without official permissions. Anyway, the location and status of the "private" houses must be taken into account when making conceptual design.

Now there is no new Master Plan approved in the city due to the lack of funds. The Master Plan concept was approved in 2003 but it does not take into account the identified land plots. No matter that, according to official decision of the city council the land of the selected site can be developed for industrial purpose, moreover and in fact, this plot of land is part of the industrial zone of the city of Rubizhne.

Top ten biggest employers of City of Rubizhne is shown in following table:

Name	*Branch (type of production)*	*Number of employees*
RUBIZHNE STATE CHEMICAL PLANT "ZORYA"	Explosives production	321
OPEN JOINT STOCK COMPANY, RUBIZHNE BOARD AND TARE COMBINED ENTERPRISE	Corrugated board, paper and board tare production	1,471
LIMITED LIABILITY COMPANY, "PROMINVEST PLASTIC" FIRM	Plastic plates, sheets, tubes and shapes production	378
LIMITED LIABILITY COMPANY, "RUBIZHNE KRASITEL"	Other basic organic chemistry products manufacturing	618
COMMUNAL SPECIALIZED HEAT SUPPLYING ENTERPRISE "RUBIZHNETEPLOKOMUNENERGO" OF THE RUBIZHNE CITY COUNCIL	Vapor and hot water production	408
LIMITED LIABILITY COMPANY, "TREST RUBIZHANSKKHIMBUD"	Buildings construction	399
LIMITED LIABILITY COMPANY, "RUBIZHNE PIPE PLANT"	Plastic plates, sheets, tubes and shapes production	361
LIMITED LIABILITY COMPANY, "BFK"	Plastic plates, sheets, tubes and shapes production	189
100% FOREIGN INVESTMENT ENTERPRISE "INTERGASSYNTHESIS"	Varnishes and dyes production	129
TOV NVP "ZORYA"	Production activities	1,900

4. SIZE AND VISUAL CHARACTERISTICS OF THE SITE

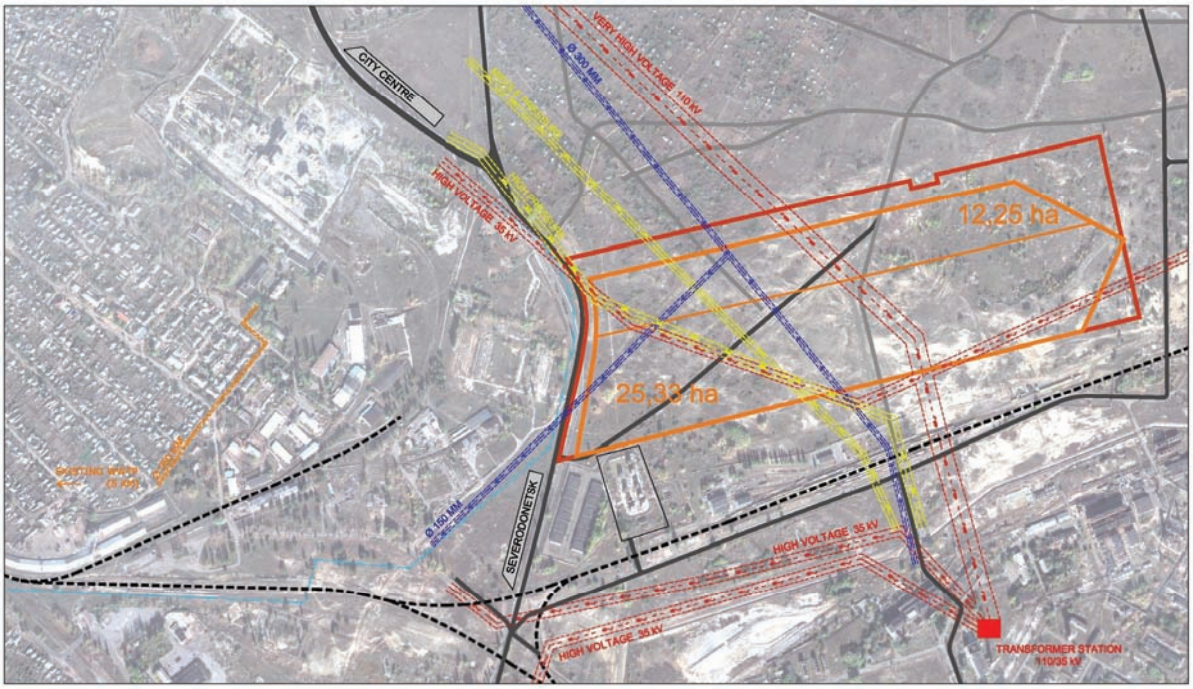
The site which was investigated during the due-diligence phase has overall size of 37,58 ha (it consists of two parts according to decision of city council: 12,25 ha on the north and 25,33 on the south.

It should be noted that some discrepancy between the size indicated by city (30 + 10 ha) and measurement done using CAD tools (12,25 + 25,33 ha) has been found by LINC experts. Due to requests of conceptual design measured size was taken as a basic platform.

The site is sloped from North to South. While southern parts are more les flat, northern part is rather sloped. An altitude difference in North-South direction was estimated by experts approx. 10-15m.

Dry-sandy surface of the site at the end of March 2011. Occasional appearance of trees and dry grass. No agriculture production on site. No constructions on site

The terrain is dry and sandy. There are no big trees and no visible large old construction on the site. On the other hand site analysis discloses that the site is limited by existing infrastructure which divides the overall part into 3 logical sub-sites. That means that phasing (30 + 10 ha) proposed in official decision of city council is not possible any more. Details can be found at following scheme of site analysis:



Results of site analysis, Rubizhne, 12,25 + 25,33 ha

5. TRANSPORT INFRASTRUCTURE

5.1. ROADS

The site is well served by road network. The regional road P 66 (in approx. distance of 1 km from the plot), the road of local-district importance (T-13-02) is leading adjacently to the site and carrying capacity of 140 trucks/day. The road of international importance connecting connection Rostov in Russia and Kharkiv is in 70 km distance from the site. The cities of Kreminna, Severodonetsk and Lysychansk are accessible by car within 30-45 min. Anyway majority of regional road network is in very poor shape and requires immediate maintenance.

5.2. RAILWAYS

The nearest railway station is located just in the city. Rubizhne is connected with Charkiv and Donetsk agglomeration by rail which allows serving both passengers and cargo. In immediate proximity of the southern boundary of the site a railway siding of chemical plant Zarja is leading.

Rails of Zarja plant in distance of approx. 100 m from the southern border of the site

6. TECHNICAL INFRASTRUCTURE

6.1. GAS – CAPACITY AND NETWORK

There are two gas pipes leading through the site. However both of them are declared as high pressured, they are not operated at high pressure values. The first one has pressure P ≤ 1.2 MPa and protection area 10 m on both sides of the pipeline (of Ø 500 mm). The second one has pressure P ≤ 0.6 Mpa and protection area 7 m on both sides of the pipeline (of Ø 250 mm). Gas reduction station as a potential connection point of gas is located out of the site boundaries at the northern territory of chemical plant Zarja (approx. distance 200 m from the site border).

According to city representatives the available volume of gas to be delivered for the purposes of industrial park development is given in following table:

Dn of the gas pipes	*mm*	*Ø 500*	*Ø 250*
Pressure in each pipe	MPa	1.2 actually < 0.3	0.6 actually 0.3
Volume of gas available for the development of industrial zone	m^3/year	160 mln. m^3/year	88 mln. m^3/year

6.2. ELECTRIC ENERGY – CAPACITY AND NETWORK

There were two high voltage air cables (110 KV and 35 KV) identified on site or close to the site. Both of them are leading to the transformer station TS 110/35 KV which located approx. 200 m from the southern border of the site (at the territory of chemical plant Zarja). TS has been assigned by city specialists as a connection point of electric energy for the development of the industrial park.

The protection area of 110 KV line is 20 m on both sides of the cable, while for 35 KV it is 15m on both sides.

According to city representatives the available volume of electric energy which can delivered for the purposes of industrial park development is 25 MW (while the overall designed capacity of TS is 50 MW – not fully loaded currently)

6.3. WATER – CAPACITY AND NETWORK

There are two water-mains leading through the site (DN 300 and 150 mm). Protection area of both them is 5 m on both sides of the pipe axis. According to city representatives the available volume of potable water which can delivered for the purposes of industrial park development is 328 m^3/hour. The connection point is the pipe of Dn300 mm (interposing of the T shape pipe, measurement equipment and other necessary facilities)

6.4. SEWAGE NETWORK AND WWTP

Sewage network is also in immediate proximity of the site, anyway its usage for next industrial park development is to certain extent unclear. There were two sewage mains identified. The first is in distance approx. 800 m from the western border of the site (Dn 250 mm-ceramic pipe) but according to expert estimation it is located higher then altitude of the site. To reach it pumped sewage is necessary. There is also sewage-main leading from cartoon plant to municipal WWTP which is adjacent to western border of the site and the street No: T-13-02 (Dn 150 mm-steel pipe). This line can be accessible for gravitation sewage discharge, anyway, its current status, exact position and quality is not known properly.

Both sewage-mains are leading to municipal WWTP which is located approx. 2 km from the site. WWTP is of biological type consisting of set of pounds with micro-biological way of waste water treatment. Its designed capacity is 40.000 m^3/day while its current loading is 6.000 m^3/day, so the reserve is 34.000 m^3/day.

7. OTHER SIGNIFICANT FINDINGS ON SITE

About 100 m from the plot border near the road it is laid a temporary water pipe for irrigation the gardeners' partnership "Komunalnyk". The indicated object was not available at the time of approval of the land plot. The pipe is laid without the permission of the local authorities. The relocation of that pipe should be solved by city officials properly and according to the plans made for next development of the site. Moreover, no other private activities on site already identified are not allowed.olved in working order.

The site is very limited by various protection areas of technical infrastructure (electric air vires, underground gas-pipes and sewage lines. Based on experts estimation protection areas have been taken into account and kept in conceptual design. Anyway more detailed measurement is strongly recommended. Moreover following additional studies have to be executed to make the investors entry on site as smooth as possible:

a) detailed cadastral and topography mapping with the measurement of altitudes and facilities on site
b) detailed investigation/mapping and passportization of the old facilities hidden underground
c) technical study to verify the capacities and connection points of the all kind of required technical infrastructure
d) outputs of all studies (graphical parts) **must be** in digital .dwg or .dgn format which are internationally recognized

It can be expected that this process will take 10-12 months but for successful future development of the industrial park it is essential.

CONCEPTUAL DESIGN REPORT

8. DEVELOPMENT MOTTO AND VISION

8.1. GLOBAL TRENDS AND ASSUMPTIONS

From a long-term perspective, the expected continuing growth of the Ukrainian national economy will generate a higher demand for more advanced business locations. It will also lead to the development of a more sophisticated production infrastructure that will benefit both domestic Ukrainian producers and international investors (FDI). It is estimated that this domestic demand for advanced business accommodation will be larger in industrialized agglomerations and important transport nodes, where both indigenous and international businesses are already established. This could be the case for Rubizhne, given its location in the heavy industrialized Donbas agglomeration and given its good accessibility in the framework of various cities in northern parts of Luhansk region.

The proposed development plan, of which this conceptual design report is one step, also aims to attract FDI-companies to the city. It is assumed that FDI-companies (especially investments in production facilities) will continue to move some of their operations from Western or Central Europe to the East. Last months of 2011 also showed higher activities of Asian investors, mainly those ones from China, Singapore and Tchai-wan.

This is due to their mobility and the permanent need to seek the most cost-effective conditions to compete at global markets. It is assumed that this move will take place within the next 10-15 years and that Ukraine has the potential of playing a significant role as one of the "hot spots" in Eastern Europe. Parts of the country will be able to accommodate the spatial requirements for the expected FDI influx. It is obvious that the best prepared sites will have the focus of foreign investors first.

Experience from the development of Central Europe shows that, for the location of foreign direct investments, the number of inhabitants of the city itself is relatively unimportant. Of larger significance are the infrastructural / logistical relations, accessibility and connectivity of the site (or city), the structure and strength of the regional economy, and the size of the site in relation to the economical strength of the city. This relation has been analyzed in the framework of this project and the outputs of the analysis are included in attachment No.1.

8.2. LOCAL DEVELOPMENT SPECIFICS AND PRE-CONDITIONS

From a local perspective, a strong commitment of the municipal government of Rubizhne should be the main driver of the development of a new industrial park. The government of Rubizhne intends to diversify its economic base by attracting more companies, both FDI and indigenous. It wants to offer both types of companies a higher-than-so-far quality industrial park for establishment, expanding or relocating their businesses.

Rubizhne is middle sized city with long industrial tradition located in north-west part of Luhansk region. On the north-west of the city large forest area is located offering to the city good recreational background. According to the indications of the representatives of the city approx. 80,000 inhabitants are living in the city and immediate surroundings today.

Now there is no new Master Plan approved in the city due to the lack of funds. The Master Plan concept was approved in 2003 but it does not take into account the identified land plots. No matter that, according to official decision of the city council the land of the selected site can be developed for industrial purpose, moreover and in fact, this plot of land is part of the industrial zone of the city of Rubizhne.

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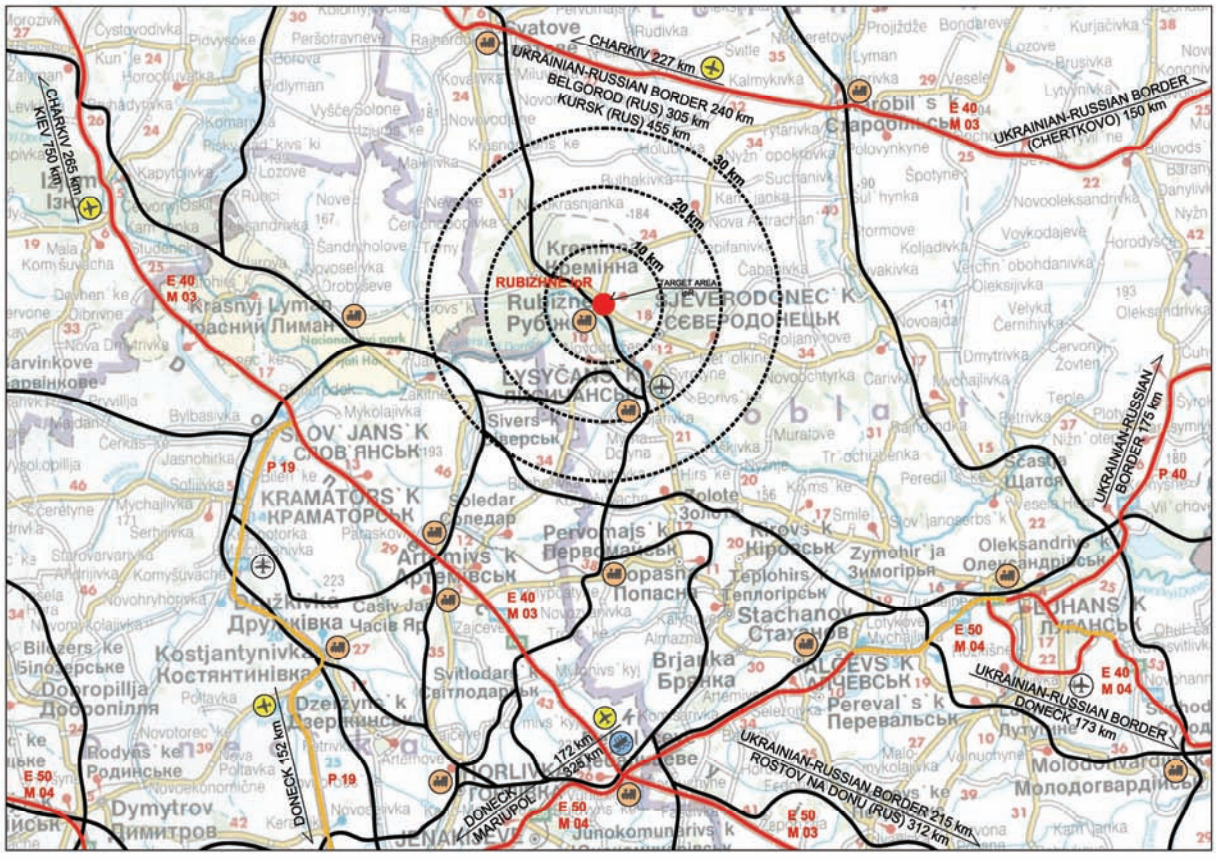
The city of Rubizhne is located in the middle of catchement area of smaller or medium sized cities of Kremina, Severodonetsk a Lysychansk. All these cities are located within 20 km circle with the middle in Rubizhne; thus making Rubnizhne very well accessible centre of economic development in the region. It is estimated that total populatruion living within the 20km circle is exceeding 350.000 inhabitants and represents sufficient labor force for the development of regional industrial park.



Rubizhne in the middle of catchement area in northern parts of Luhansk region

The government of Rubizhne has an active role in supporting the development of a new industrial park and stimulating local economic development. During the process of site preparation, the city identified a number of reasons why companies should invest in Rubizhne:

- the city is actively promoting industrial development;
- industrial sites are available in the city (at least 2 of them);
- excellent location of selected site in city industrial part
- available infrastructure;
- skilled, competent and sufficient labor force;
- decision of city council from 1.7.2009 to establish industrial park at the territory of approx 40 ha (30 + 10) – this decision is approved by various institution concerned

The proposed industrial park could be combined with a commercial development. A phasing is proposed. The first phase will be available quickly and will offer rather small scaled industrial plots to allow for an almost immediate and easy start by interested investors.

A conceptual plan is prepared on the land, which is in the ownership of the city. It has to be taken into account that the site is bordered from the north by small private gardens area. Development of the industrial park in the immediate proximity could be therefore an issue. Anyway, city officials stated that majority of them is built illegally which create less tension against industrial development at city site.

For comparison: a typical industrial park of local/regional importance in Central Europe has the following spatial parameters:

- a site with 15-40ha of flat land, without any physical barriers or historical pollution;
- at least 50.000 inhabitants in the catchment area (up to 40-45min. accessibility by car/bus);
- no legal-ownership obstacles;
- the site offers flexibility, allowing a division into sub-sites/plots (0,5-3,5ha) for different owners;
- the plots accommodate industrial productive halls of various sizes (from 800 – 8.000 sq.m), or flexible spatial combinations of these;
- all business premises in the industrial park are free standing buildings/halls;
- a concrete plot offered to an investor should be able to accommodate future extensions of the investor's production facility - this means that the initial development shouldn't be too intensive;
- a step-by-step development ensuring the flexibility and opportunities to adapt to changing demands;
- a maximum distance of ten kilometers to the national and regional road network;
- the possibility of having special services on site (a multifunctional centre with some potentially shared services as a minimum: copying, legal services, catering, retail);
- the availability of infrastructure for an adequate accessibility of both the entire site and the individual building plots;
- a decentralized Park Management Unit (PMU) is recommended but not necessary; this can also be provided for by a city official from a centralized basis (e.g. city hall).

Concluding, the site in Rubizhne has almost all of the above features that are essential for a successful local / regional industrial park.

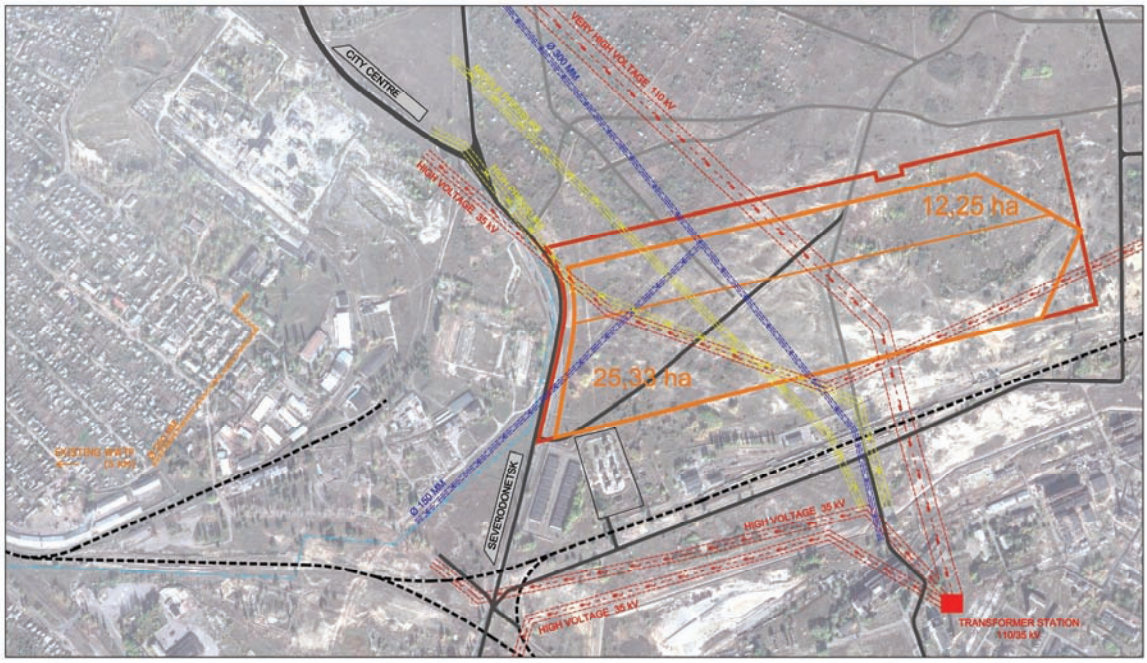
8.3. DEVELOPMENT VISION

The development vision is to create an combined industrial/commercial and logistic park that will play a significant role in accommodating the needs of both indigenous and FDI-companies to Rubizhne. Industrial park should also attract the labor force from neighboring cities in Luhansk region.

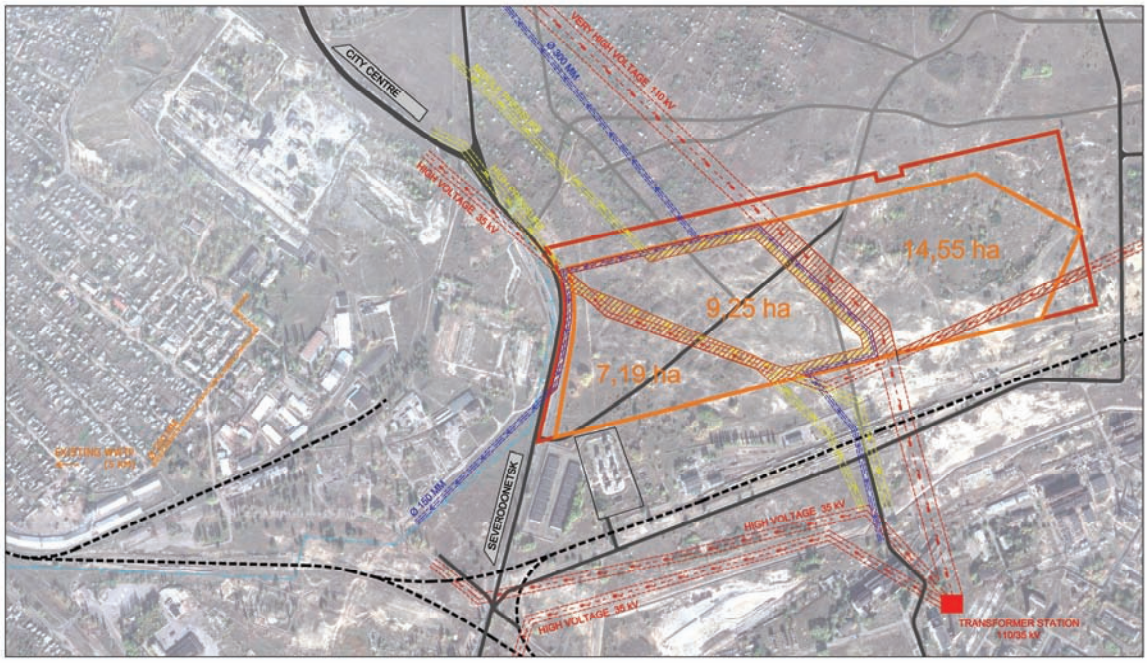
This includes the development of a flexible and attractive local / regional industrial park with the working title **Industrial Park Rubizhne** (abbreviation **ipR**) with a total size of 37,58 ha. The ipR should attract companies seeking good conditions for the establishment of their production/logistic base, including a stable and committed local government.

It is important to note: at this moment it is unknown what companies will locate in Rubizhne. Therefore the development concept needs to be flexible, meanwhile taking into account the general types of industries that can be expected on this location. Due to the local specifics (infrastructure on site, limited infrastructural capacities, rectangular shape of site with sloping in shorter dimension, rather small/medium sized cities in catchement area, difficult start-up phases) it seems to be realistic to develop first phases of the site with the aim to attract small sized investors with less energetic demanded industrial branches. This translates to a spatial concept that can be described as follows:

- The **phase zero** should start with relocation of some infrastructural lines to release substantial part of the site. At following pictures original situation and situation after relocation are shown (necessary to relocate water main of Dn300 mm as well as the middle pressure gas pipe)



Original situation on site



After relocation

- The start of the development will be in the part of the site which is adjacent to existing road T-13-02. It is proposed to assign and promote **phase I** for the development of very small industrial facilities (industrial halls, storages, manufactures) where the spatial needs of light manufacturing industries, logistics, storage facilities, assembly operations and reparation workshops can be accommodated.
- **Phase II** should continue logically in Eastern direction with the same type of spatial development parameters.
- **Phase III** is designed in such a way to attract intention of investors of larger industrial/logistic premises or even wholesale premises investors. Moreover, phase III is both the largest and offers the highest level of spatial flexibility and conditions for future expansion.

There is also some reserve on sites of phases I or II for the development of a "shared business services center". Optionally, this could be an investment by the city itself. A fully occupied industrial park will usually generate demand for the following services and functions: office accommodation, retail, catering, legal services, accounting services, reprography, and other commercial services that are not being developed with the industrial premises. If the ipR is managed by the city itself, then this would also be a suitable location for the Project Management Unit.

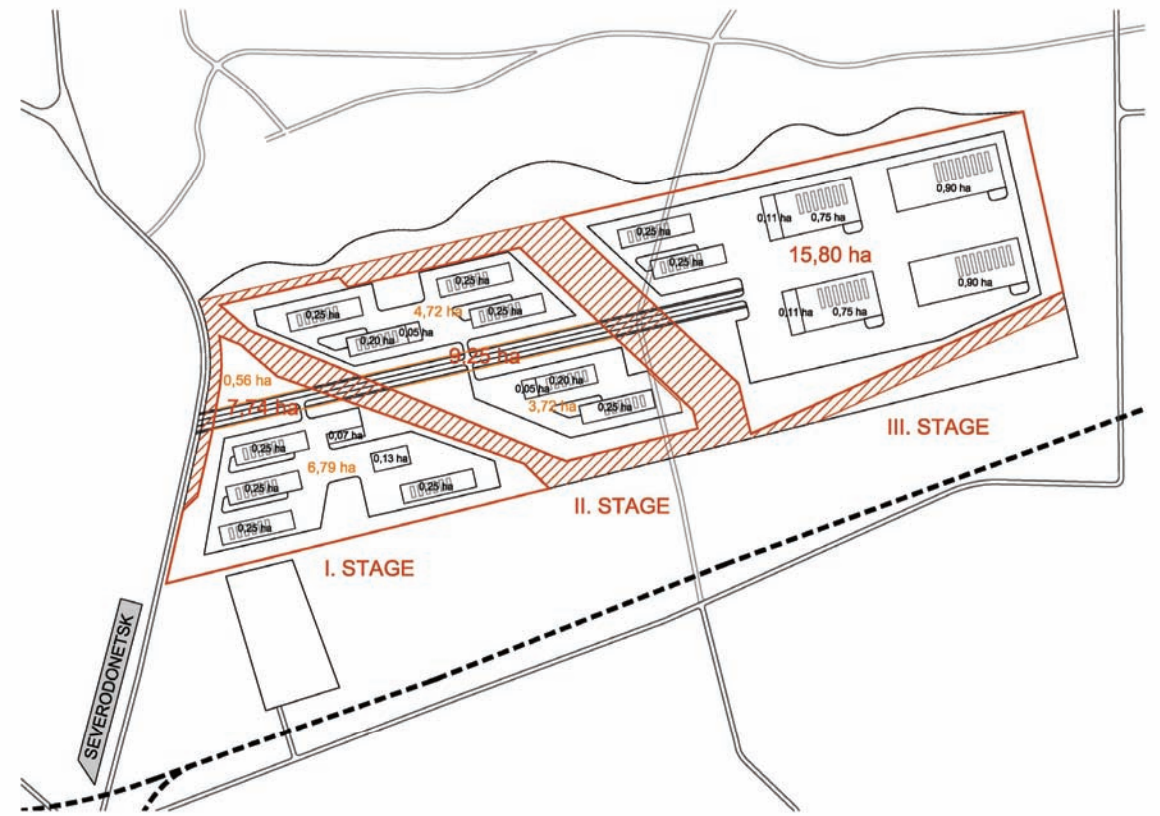
9. DEVELOPMENT PHASES

A site with a total area of about 33 ha[2] has been divided in phases to accommodate step-by-step development. At this stage, (with data currently available) we assume that the development will start at the Western edge of the site (phase I) and than continue in Eastern direction

Phase	Area (ha)	*Proposed general function*	*Not recommended*
Phase I	7,74	Small-sized light manufacturing industries, logistics, storage facilities, assembly operations and reparation workshops.	heavy machinery, production and next processing of metals, all segments of chemical industry, water consuming industries
Phase II	9,25	Small-sized light manufacturing industries, logistics, storage facilities, assembly operations and reparation workshops.	all industrial functions producing increased levels of noise or air-pollution (close to housing), water consuming industries
Phase III	15,80	Logistic, storages, warehouses, wholesale, commercial development.	all medium and heavy industries
Total area	**32,79**		

The proposed layout of each part, as well as its position in the overall framework of the site, is shown in the following scheme. This scheme includes the distances that have to be kept to technical infrastructures. There is an uncertainty about the location and/or functionality of the potential underground facilities. It is strongly recommended to make a detailed measurement and mapping of all underground infrastructure before starting the development process.

[2] 37,58 ha is the size of the whole site. Excluding the protection areas it gives only 32,79 ha



Plots available in Rubizhne

10. SPATIAL DEVELOPMENT FRAMEWORK

The development framework of the site aims to provide a flexible spatial layout, while making optimal use of the available land. When developing and zoning the site, a number of protection areas have to be taken into account. The conceptual design has thus taken into account the following parameters:

- good accessibility from the west
- accessibility from the east is difficult at present, this could be improved by the future
- northern border is in immediate contact with the "unofficially built" private gardens – border is not recognizable in situ
- southern border clear and can't be moved
- electricity (transformer station) and gas (gas reduction station) in proximity to the site
- a spatial plan that can be developed flexible in time
- air high-voltage cables, middle pressured gas pipes and water mains are crossing the site – relocation needed – it influences the overall size that could be developed as well
- sloping of the site
- proximity of residential zones
- existing WWTP

A key factor of success for the ipR is the attraction of a so called 'anchor investor' to either phase I or phase II. This 'anchor investor' is a strong enterprise with a sound brand, being either an indigenous or a foreign company. Usually other investors will then be attracted to the site as well. The profile of the 'anchor investor' often determines the profile of the park as a whole. Thus, it will function as a promoter for the future development of the entire park.

Phase I: description of the spatial development framework

Phase I has an expected functional mix of small-sized light manufacturing industries, storage facilities, assembly operations and reparation workshops. Relatively small plots will be adequate for the proposed functions and provide the necessary flexibility. On the other hand, density of proposed development is not high and allows the future extensions. Total size of the phase 1 is 7,74 ha incl. small site for the development of the shared services

centre in location the most adjacent to the road and city centre. The spatial needs of approx. 6 various investors can be satisfied in the framework of the phase 1.

Phase II: description of the spatial development framework

Phase II has generally repeats the spatial concept of phase 1. this phase offers a little bit more spaces in production facilities and can accommodate approx. 6-7 various investors as well. Total size is more than 9 ha. It is assumed that the plots of phase II will be developed after the completion of phase I. This allows for the reinvestment of the revenues from phase I, thus decreasing the need to rely on external funding sources.

Phase III: description of the spatial development framework

A special development framework is proposed for the sub-sites of phase 3. Relatively large storage and logistic units are proposed to be located there to be visually hidden from the city side. They can be also used as major production units if the demand will exceed the demand in phases 2 and 3. The total size is almost 16 ha and it is expected, that these plots will be developed at the end.

Spatial analysis of sites in Czech cities

A thorough spatial analysis of more than 40 industrial sites in Czech Republic has been made in the framework of this study. To have comparable outputs, this study focused at small and medium sized sites. The results of this analysis are shown in attachment No. 1 to this report, including unique mapping material. Our consultancy found the following conclusions as a result of this analysis, which can be used as an argument for the development of ipR:

- there is a direct relation between the economical strength of a city and its opportunities to properly develop and maintain an industrial park. Although some exceptions exist, larger cities are stronger economically, and will therefore be able to develop larger parks.
- for the category of cities with 20.000 – 25.000 inhabitants[3], in Central Europe a typical industrial park has a size of between 12,0 and 25,0 ha., which represents approximately 2%-9% of the total city area
- for the category of 50.000 – 80.000 inhabitants cities industrial parks are generally larger but lot of exceptions exits
- however the map inputs are not showing the current situation, it is known to the consultant that some of the Czech sites developed at the beginning of the 21st century are not yet fully occupied in 2011.

Conclusion

Taking into account the economical status and differences of central European and Eastern Ukrainian cities it can be concluded that the site is adequate enough for the development of an industrial park for the city of Rubizhne with broader than just local ambitious. Reasons for this are seen in the the good location of Rubizhne within sub-region of northern Luhansk area, the flexibility of the plots in the draft plan and the available regional labor force.

The development of all phases is conditionally based and assumes the relocation works on infrastructure lines to release particular parts of the site. These works should be done as an initial and conditional investment.

11. INFRASTRUCTURE DEVELOPMENT NEEDS, REQUIREMENTS AND ASSUMPTIONS

The energy demand and consumption has been calculated for following development stages and parameters:

Phase	*Size (ha)*	*GFA/site size (%)*	*Gross floor area of production and business facilities and storage halls (sq.m.)*	*Estimation of people employed[4] (person)*
Phase I	7,74	19%	15.000	150-160
Phase II	9,25	16%	15.000	180-200
Phase III	15,80	25%	40.200	230-250
Total	**32,79**		**70.200**	**560-610**

[3] As a typical comparable representants consultant considers examples of the cities of Vyskov, Blansko, Havlickuv Brod, Zdarn. Sazavou, Krnov, Louny – for details pls refer to attachment No.1. Of course there is also exceptional example of the city of Koprivnice with industrial site with more than 80 ha or village Nosovice where Hyundai developed its own factory at the site with more 100 ha. These exceptional examples had not been taken into account.

[4] rounded-off

Other technical assumptions accepted for phases 1-3:

- All sites are considered "dry sites" as for the consumption of water.
- Production industries that are mainly "water-based" are not recommended due to a lack of water sources (for example paper/pulp production, iron/steel production, chemical industries, similar types of industry heavily relying on the use of potable and industrial water);
- It is assumed that the production facilities will have no special / extremely high demand for gas or electricity.
- Small / medium-scaled businesses in manufacturing, assembly and storage are welcomed only.
- All municipal sewage water of the developed ipR will be properly treated in the existing WWTP which is located away from the site
- If one of the production facilities will emit industrially polluted water, a special industrial WWTP will have to be located at the ipR or at the investor's own site.
- Based on experience from Central Europe logistic, warehousing and less labor intensive productions: 15 person employed/ha while assembly, electronic, light machinery, processing, manufacturing: 20 persons employed/ha
- Total number of jobs which can be created on site is approx. 600 working places

11.1. GAS

Demand for gas

Formula	*Qmax= size (ha) x average relative consumption in m³/hour*					
	ha	avg estimated consumption m³/hour, ha	number of working hours	number of working days	flexibility adjustment factor	approx. estimated total demand for gas m³/year[5]
Phase I	7,74	60	8	260	1,1	1.063.000
Phase II	9,25	60	8	260	1,1	1.270.000
Phase III	15,80	40	8	260	1,1	1.446.000
Total	**32,79**					**3.778.000**

Conclusion

The demand for gas at the fully developed ipR is expected to be about 3,8 million m³ / year for the phases I – III. This equals to approximately 1.650 m³ / hour. Due diligence has shown that, according to city officials and utility providers, a gas quantity of 88 mil. m³/year can be delivered. This means that gas will be available for the development of phases I – III.

A potential gas connection point is available at the southern part of the area where GRS of Zarja plan is located. A new connection incl. sub-station to distribute the gas of middle pressure will have to be made between this connection point and the proposed sites of phases I – III.

11.2. ELECTRIC ENERGY

Demand for electric energy

Formula	*Qmax= size (ha) x average relative consumption in KW/ha*					
	ha	avg consumption KW/ha	number of working hours	number of working days	flexibility adjustment	total demand for electricity MW[6]
Phase I	7,74	100			1,1	0,85
Phase II	9,25	100			1,1	1,01
Phase III	15,80	60			1.1	1,01
Total	**32,79**					**2,87**

[5] rounded-off

[6] rounded-off

Conclusion

The demand for electricity at the ipR is expected to be about 2,8 – 3,0 MW for the phases I – III. Due diligence has shown that, according to city officials and utility providers, an electrical power of 25 MW can be delivered. This means that enough electrical power will be available for the development of phases I – III.

A potential electrical connection point is the existing transformer station TS 110/35 located 200 m to the south of the proposed site (Zarja property). A new connection and sub-stations will have to be made between this point and the proposed site of phases I – III.

11.3. WATER

Demand for water (not industrial)

Formula	*Qmax= size (ha) x average relative consumption in l/s, ha*					
	ha	avg consumption l/s, ha	number of working hours	number of working days	Flexibility adjustment	total demand for water l/s[7]
Phase I	7,74	0,8			1,1	6,81
Phase II	9,25	0,8			1,1	8,14
Phase III	15,80	0,6			1,1	10,43
Total	**32,79**					**25,38**

Conclusion

The expected demand for water at the ipR is expected to be about 25,38 l/s for the phases I – III. This equals to approximately 91,37 m³/hour. Due diligence has shown that, according to city officials and utility providers, a water supply of 328 m³/hour can be delivered. This means that sufficient water will be available for phases I-III.

A potential water connection point is the existing pipe of Dn 300 mm leading through the site. A new distribution system have to be developed to deliver the water into sub-sites of phases I – III.

Depending on the distance from an existing city fire station to the proposed site, a reserve for fire water may be needed. When a fire station is within 2 km. distance, no provisions have to be made. When the fire station is further away, a reserve for fire water of 6,0 l/s has to be made. In this case, the overall capacity of the park is 31,38 l/s (which leads to approx. 115 m³/hour) which is still in the framework of existing capacities in the city.

Anyway a final technical solution for delivering fire water to the site still has to be discussed carefully.

11.4. SEWAGE WATER

Sewage water calculation

Formula	*Qmax= size (ha) x average relative usage in l/s, ha*					
	ha	avg production l/s, ha	number of working hours	number of working days	Flexibility adjustment	total demand for water l/s[8]
Phase I	7,74	0,8			1,1	6,81
Phase II	9,25	0,8			1,1	8,14
Phase III	15,80	0,6			1,1	10,43
Total	**32,79**					**25,38**

[7] rounded-off

[8] rounded-off

Conclusion

The assumption behind the sewage water calculation is that all water that is being brought into the site will be used, and should thereafter be treated properly by a sewage system and a waste water treatment plant (WWTP). The expected amount of waste water from ipR is 25,38 l/s for the phases I-III. This equals to approximately 91,37 m^3/hour of waste water with an 8 hour shift.

Due diligence has shown that, according to city officials and utility providers, the municipal WWTP is available at a distance of 2 km from the site accessible by both gravitation and pumped sewage lines. This WWTP has a capacity of 40.000 m^3/days while its current loading 6.000m^3/day. This means that the existing WWTP has sufficient capacity to treat the waste water that will be produced at the industrial estate, including phases I-III. This does not take into account other development projects in the city. Also, it is assumed that no industrially polluted water is included in the total amount calculated. This water has to be treated properly by companies themselves.

11.5. SURFACE WATER

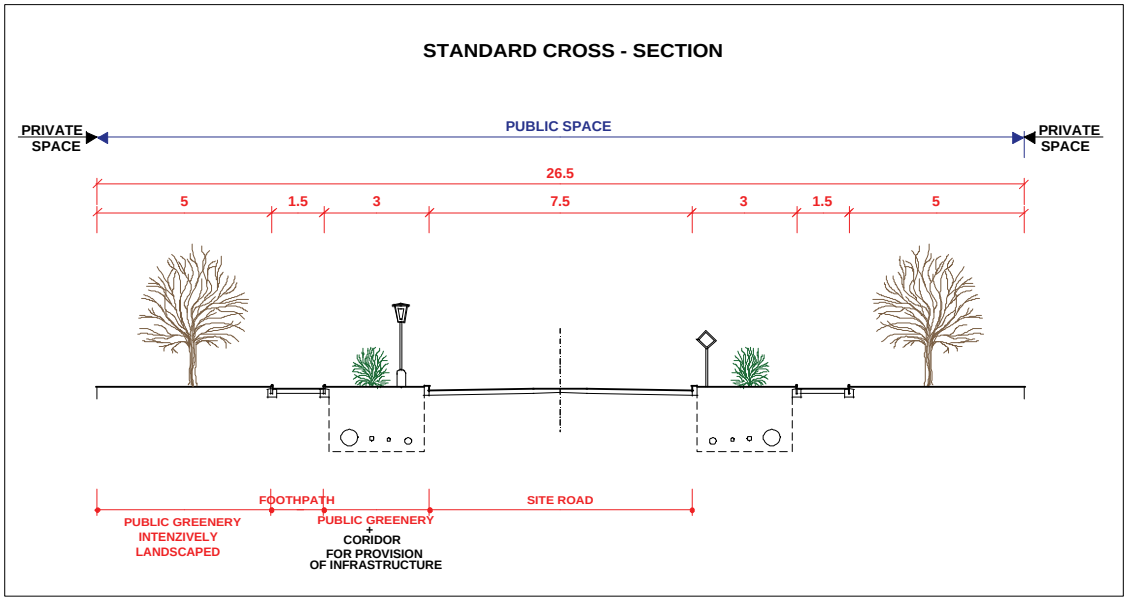
Calculation of surface water for phases I-IIII

Qmax= size[9] phase I-II-III (ha) x 0,6 x 60l/s = 32,79 x 0,6 x 60 = 1.180 l/s

Conclusion

The paved and built up areas within the ipR will be large, meaning that the needed discharge of surface water after heavy rainfall will also be sizeable. This water should be treated properly. A partial retention (up to 3.500 m^3) is recommended for the lowest part of the site in the form of a retention lake, which will also help to enhance the environmental qualities of working space. This retention facility should be designed in such a way to be able to collect approx. 80% of rain-fall water from sites I-III created by 60 min of heavy rainfall (which equals approx. to 3.400 m^3/hour). Secondly, a part of the surface water in amount of 20% (which equals approx. to 849 m^3/hour) must be treated by the private companies at their own sites or discharged by rain-water sewage line of at least DN 600mm out of the site.

11.6. STANDARD CROSS-SECTION



[9] Size of the paved parking places + paved roads + paved footpaths + total size of the roofs of the production facilities and other buildings, approx 60% of the size of site is considered as a built-up area

Conclusion:

A spatial configuration of a cross section is proposed to be able to maintain the public space of the industrial park in the future. Good maintenance is needed to preserve the quality of the park and thus keep it attractive for future investors. The layout (e.g. width) of the road and the footpath can be adjusted to local road standards, safety regulations or other local rules. If the road crosses through the ipR, a footpath is recommended on both sides of the road. If it's at the edge of the park, a single-sided footpath is sufficient. The so called "public space" usually remains in public ownership and is maintained by the city itself (highlighted in blue on the picture above).

12. BILL OF DEVELOPMENT QUANTITIES

The table below roughly and provisionally shows the public investments that will be needed to realize phases I-III of ipR, based on the calculation of the development quantities. The breakdown of quantities into the phases is done according to expected approx. rati0 24:28:48, taking into account the sizes of the different phases. The assumption is made that the public sector will be responsible only for back-bone infrastructure and public spaces development; the investments in building plots will be the matter of private investment.

The breakdown of quantities is an estimation that will turn out to be different in reality. Yet, it is sufficient for the conceptual thinking in the current stage of development; it provides the city with a clear picture of the investments that are needed for the initial development. The calculation also shows how the initial costs could be divided among the investors or tenants of different phases. Final remark: additional investment actions realised outside of the development site of ipR are not included in the bill of quantities[10].

Bill of quantities

Item No.:	*Item*	*Unit*	*phase I*	*phase II*	*phase III*	*total*
			7.74 ha	*9,25 ha*	*15,80 ha*	*32,79 ha*
			24%	*28%*	*48%*	*100%*
1.	Purchase of the land	ha	0	0	0	0
2.	Public paved site roads w. 7,6 m incl. road signs	sq.m	1.368	1.596	2736	5.700
3.	Public parking places incl. road signs	sq.m	n.a.			
4.	Public footpaths w. 1,5m incl. orientation system	sq.m	540	630	1.080	2.250
5.	Public green strips w. 3,0m incl. landscaping	sq.m	1.080	1.260	2.160	4.500
6.	Public green barriers with landscaping	sq.m.	one value: approx. 30.000			
7.	Backbone infrastructure - gas network incl. sub-connection points, Dn 150-200 mm	m	180	210	360	750
8.	Backbone infrastructure - water network inc. sub-connection points, Dn 300mm	m	180	210	360	750
9.	Backbone infrastructure - electric network incl. sub-transformer station	m	180	210	360	750
10.	Backbone infrastructure - sewage network incl. sub-connection points, Dn up to 600 mm	m	180	210	360	750
11.	Backbone infrastructure - surface water network/drainage incl. sub-connection points, Dn up to 800 mm	m	180	210	360	750

The table below shows the bill of quantities regarding the land to be sold to investors and the land alongside the back-bone infrastructure which should remain in public ownership.

[10] E.g. mainly: road crossing, roundabouts, bridges, necessary upgrade of the existing WWTP, necessary upgrade of the existing transformer station, necessary upgrade of the existing gas reduction station , necessary upgrade of the existing water sources and other similar additional investment projects caused by development out of site territory. To assess and to quantify this investment seriously a more detailed study is needed.

Bill of quantities – land for sale v. land to remain in public ownership

Item No.:	*Item*	*Unit*	*phase I*	*phase II*	*phase III*	*total*
			7.74 ha	*9,25 ha*	*15,80 ha*	*32,79 ha*
1.	Land for sale to investors	ha	7,35	8.44	15,80	31,59
2.	Land to remain in public ownership (public space: roads, foothpaths, greenery areas within the site)	ha	0,39	0,81	0,00	1,20

13. DEVELOPMENT COSTS

The table below shows the approximate initial investments that have to be done by the public sector to meet the standard requirements of the investors coming to the park[11].

Bill of quantities - initial public investment

Item No.:	*Item*	*Unit*	*Units needed with all plots fully developed*	*unit price[12] (EUR)*	*total price (EUR)*
1.	Purchase of the land	ha	0		0
2.	Public paved site roads incl. road signs	sq.m	5.700	60	342.000
3.	Public parking places incl. road signs	sq.m			
4.	Public footpaths incl. orientation system	sq.m	2.250	30	67.500
5.	Public green areas incl. landscaping	sq.m	4.500	15	67.500
6.	Public green barriers	sq.m.	30.000	5	150.000
7.	Backbone infrastructure - gas network incl. sub-connection points, Dn 150-200 mm	m	750	120	90.000
8.	Backbone infrastructure - water network inc. sub-connection points, Dn 300mm	m	750	210	157.500
9.	Backbone infrastructure - electric network incl. sub-transformer station[2]	m	750	150	112.500
10.	Backbone infrastructure - sewage network incl. sub-connection points, Dn up to 600 mm	m	750	250	187.500
11.	Backbone infrastructure - surface water network/drainage incl. sub-connection points, Dn up to 800 mm	m	750	250	187.500
	total EUR				**1.362.000**

It is estimated that approx. 70 – 80 % of the total cost should be spent to open the sites of phase I. This requires an investment of 0,95 – 1,10 mil. EUR, not taking into account additional investments that will be needed

[11] The cost of a new artesian well and the retention lake are not yet taken into account

[12] Based on approx. Central European unit prices, approx. price level 2009-2011. To be recalculated according to local price level with inclusion of all additional investment specified in the text above.

around the site as well as the cost of the necessary connection/access rights to infrastructural property of second parties. This investment will produce a fully serviced industrial site with more than 300.000 square meters that can be sold/leased to investors in order to develop there the industrial facilities with total size more than 70-80.000 sq.m. and to create approx. 600 working places in the city.

14. FEASIBILITY REPORT, RISK ANALYSIS AND FOLLOW UP ACTIONS IDENTIFICATION

The aim of this chapter is to identify the potential risks of possible development and propose a combination of measures to minimise them. The risks are evaluated only from the point of view of the technical and environmental aspect. There are certainly other risk portfolios at business, political, institutional and organisational level, but these are not managed in this concept.

No. :	*Specification of risk*	*Level*[13]	*Proposed measures*
1.	Uncertainty if the gas, el. Energy and water supply will be sufficient for phases I-III.	C	Evaluate / measure the use of energies when phase II is halfway finished. Include additional investments in the budget if necessary. Discuss total consumption of the park and possible methods of upgrading the network with administrator of utility providers in the city
2.	Insufficient information about the underground infrastructure on site.	B	Perform a technical study on on-site infrastructure before the start of the development.
3.	Air/Noise pollution in relation to the existing housing/gardening.	B	Heavy industry should be avoided at the site. For specific types of lighter industry, an air and noise spread study might be required to avoid negative impact on the nearby housing area. To develop the green barriers. The prevailing direction of the wind should be taken into account.
4.	Pollution of surface water	B	Surface water should be treated in a waste water treatment plant before being discharged in a river. Industrially polluted water has to be cleaned by companies themselves, this should be regularly checked and enforced by city officials.
5.	Soil contamination	C	Any possibility of local soil contamination must be eliminated by organisational regulations and construction alterations in the industrial areas. Companies must adhere to the system for handling waste; this should be enforced by city officials.
6.	Potential risk of contamination of groundwater (by production facilities).	B	Foundations should correspond to hydrogeological conditions. All the functional areas of the industrial site must have paved surfaces. Substances harmful to water should be stored in special purpose areas only in the necessary amounts.
7.	Industrial accidents	B	Prepare accident measures plan for the park management and require accident planning from all investors entering the ipR

[13] Level A: highest risk category (project as whole is jeopardized if proposed measure is not taking into account properly)

Level B: risk still important, but lower than level A

Level C: lowest risk