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# ENVIRONMENTAL REVIEW CHECKLIST FOR IDENTIFYING POTENTIAL ENVIRONMENTAL IMPACTS OF PROJECT ACTIVITIES AND PROCESSES

for: Product Development Research Center (Pilot Plant) at the Food Technology Park in Leskovac

Implemented under: Sustainable Local Development Project (SLDP)

DCN: 2013-SRB-022

Prepared by: Chemonics International Inc

# ENVIRONMENTAL REVIEW CHECKLIST FOR IDENTIFYING POTENTIAL ENVIRONMENTAL IMPACTS OF PROJECT ACTIVITIES AND PROCESSES

The Environmental Review Checklist for Identifying Potential Environmental Impacts of Project Activities and Processes (ERC) is intended for use mainly by implementing partners to: assess activity-specific baseline conditions, including applicable environmental requirements; identify potential adverse environmental effects associated with planned activity(s) and processes; and develop environmental mitigation and monitoring plans (EMMPs) that can effectively avoid or adequately minimize the identified effects. This ERC can also be substituted for other ERC versions that may have been attached to project initial environmental examinations (IEE). If implementing partners are in doubt about whether a planned activity requires preparation of an ERC, they should contact their Contracting Officer's Representative (COR)/Agreement Officer's Representative (AOR) for clarification.

## A. Activity and Site Information

| | |
|---|---|
| **Project Name:** ***(as stated in the triggering IEE)*** | Sustainable Local Development Project (SLDP) |
| **Mission/Country:** | **Republic of Serbia** |
| **DCN of Triggering IEE:** | *2013-SRB-022* |
| **Activity/Site Name:** | Establishing Product Development Research Center (Pilot Plant) at the Food Technology Park in Leskovac |
| **Type of Activity:** | Facility Assessment and Design |
| **Name of Reviewer and Summary of Professional Qualifications:** | Pedja Cerovic, Agribusiness Specialist |
| **Date of Review:** | July 13, 2014 |

## B. Activity Description

### 1. Activity purpose and need

The USAID Sustainable Local Development Project (SLDP) is a five-year program designed to support Serbian local governments, businesses and civil society organizations to increase their efficiency and achieve economies of scale through Inter-Municipal Cooperation (IMC) aimed at accelerating economic growth. SLDP's core activities are focused on supporting inter-municipal partners to expand the private sector, add jobs and reduce unemployment in regional economies. Within the SLDP, the eight IMC partnerships have been established by 32 local governments. Accordingly, SLDP has developed eight sector specific inter-municipal programs, one for each of the eight established IMC partnerships, which will proximately add jobs to IMC areas by expanding their private sectors. These inter-municipal programs were identified under a set of SLDP, business-oriented criteria, and their execution includes all three following components of SLDP:

1. Inter-Municipal Cooperation Programming
2. Public Administration Reform
3. Youth Development and Participatory Mechanism

Under the component 1, SLDP supported establishment of Inter-Municipal Cooperation (IMC) between the cities of Nis and Leskovac and municipalities of Merosina, Doljevac and Gadzin Han and developed IMC program named "Grow South" which targets a 15% increase in processed food products sold. Keystone of the proposed program in Nis-led IMC area is to develop regions' agribusiness food processing potential in order to add jobs to the region. The subject of this Environmental Review Checklist is the project initiated in Leskovac.

As part of the program "Grow South", SLDP is supporting establishment of the Food Processing and Product Development Research Pilot plant at the Food Technology Park in Leskovac. The Food Technology Park (FTP) is limited liability company established as private-public partnership between the City of Leskovac, Faculty of Food Technology in Leskovac, and five food processing enterprises. Technical assistance for its establishment and operations was provided by the EU. Among other goals, the manufacturing members of the FTP, who have established a common brand called Top Foods, wish to innovate and develop new flagship products for their brand, thereby increasing sales potential and markets. In order to develop cost-effective and technically feasible new products and meet the challenges of the marketplace through application of new technologies, food processors of the FTP need to establish a modern, fully equipped product development research pilot plant. The pilot plant will be able to perform all stages of product development, from idea generation through concept development to production of trial samples in small batches. It will be also used for testing of raw materials, evaluation of new ingredients, formulations, and processes on a small scale, as well as for trainings and demonstrations. The pilot plant will allow use of low quantities of inputs for the production of small test series of products and manufacture them with assurance of safety and quality.

The pilot plant will be property of FTP private-public consortium and operations will be managed by FTP management. Pilot plant facility will be used by FTP member companies free of charge for research and development of new products. It will be open for their food processing technologists and engineers to conduct experimental production, testing and other food related R&D activities. At the point when the new products are confirmed by the food technologists and tested at the sample markets, developed know-how for new product and technological process for production will be transferred into food processors factories for serial industrial production. At this stage, the pilot plant will be equipped for the development of new food products from bakery and confectionary industries, while in the later stages it is envisioned to expand the pilot plant to the other sectors of the food processing. Pilot plant will be equipped based on the specification of necessary small-scale equipment including various mixers and blenders, variety of dough process machinery, including depositor for dough, dough divider machines, dough rollers and molders, and heating technologies such as bakery ovens. Technological Faculty will use the pilot plant for the implementation of instructional activities, laboratory exercises, training of students, practical training and as scientific-educational base.

This Project activity will contribute to the program "Grow South" of the Nis-led IMC by expanding the markets and capacities of existing food processors that source raw material supplies from local farmers. An added benefit is in the area of youth work force development, in that students and post graduates from the Faculty of Food Technology in Leskovac will use the product development pilot plant to conduct their practical studies. This will increase the number of skilled food technologists in the IMC region which is a prerequisite for attracting FDI in the food processing industry. The manufacturers of Top Foods brand of the FTP will be enabled to innovate and develop new flagship products. 10 new products will be developed during the implementation of this activity, 3 new member companies will join the FTP, and new jobs and revenues will be generated.

**Detailed description of requested assistance**

SLD Project has been requested to provide support to the Food Technology Park (FTP) in Leskovac by providing grant award for:

- equipping the product development pilot plant,
- development of new products (consulting services, design of packaging),
- preparation and implementation of internship program for food technology students,

- joint marketing activities of FTP member companies for their Top Foods brand (marketing plan, web page, brochures, product catalogue, etc).

Using the grant funds awarded by SLDP, the Food Technology Park will procure the food processing equipment for trial production and development of various bakery, pastry and confectionary products within the pilot plant (special types of breads and rolls from whole-wheat flour, tea biscuits and muffins, puff pastry, etc.). Small pieces of equipment, utensils, accessories and spare parts will be financed and procured by FTP. FTP will also fund works on the adaptation of the premises for pilot plant and prepare them for the installation of the equipment. These are just soft works on the interior of the rooms, which include the replacement of worn-out and broken ceramic tiles, painting of walls, doors and windows, which do not require any permits or engineering projects and plans. Works will be performed in the premises within the industrial zone, so that residents of Leskovac will not be disturbed in any way. Here is a detailed description of the equipment that will be procured, as well as the processes that procured equipment will perform:

a) **Depository**, a multifunctional machine for the production of different types of tea cookies. Cut cookies are formed by the wire cutter attached to the machine. Injected biscuits on the same machine are done with tools, molds and dough injection programs. Biscuit soft dough (sponge cake) is dosed with the use of special pair of rollers, which function as gear pumps and do not allow uncontrolled leaks of soft dough on baking pans. Depository is composed of a number of essential components:
    - The hopper for dough
    - One pair of rotating rollers for dough dosage
    - A system with tools for dough cutting
    - Tools and molds for dough injection
    - The pump system of rollers for soft sponge cake dough
    - Belt transporter for carrying of the pans
    - Electronic system for machine control

    Along with the computer program and a choice of tools and molds, depositor allows preparation of various types of bakery and confectionary products. Machine capacity is 18-20 kg per product type. By quick and easy replacement of tools and molds every half hour, it is possible to do tests for other products. In the industrial production, the capacity of machines for making tea biscuits are manifold and such lines can produce from 200 to 1,000 kg per hour of work.

b) **Rotary Rack oven** with a gas burner. The oven is made of stainless steel up to the EU standards related to quality and safety in the operation. The oven is to bake biscuits and bakery products on trolley dimensions 600 x 800 mm, which is the standard size for all manufacturers. Trays with dough are placed on a trolley to be placed in the oven and the system to lift and rotate the trolley starts to work immediately after the closing of the oven door and setting the desired temperature and baking time. Oven door has glass in the middle that allows visual monitoring of baking and physical chemical processes that take place in the dough during the baking process. Rotation of the trolley in the oven and hot air circulation allow even baking and equal color of baked pieces of dough. These ovens are ideal for such complex products and provide security and stability of quality. At the oven, there is a ventilation system for extraction of water vapor generated during the baking process. Depending on the type of product, the oven can complete 2-4 baking cycles per hour. The oven is built to comply with the accident prevention, hygiene and electric standards in force.

c) **Volumetric divider**, machine for volumetric dough division in pieces of the same weight. Mixed dough is poured into the receiving basket. A piston vacuum pulls the dough into a cylinder and dough fills the space in the cylinder, after which the rotation of the machine head cuts off the dough. Adjusting the stroke of the piston decreases or increases the amount of dough. Periodical checks of the accuracy of the weight of dough are performed on the precision balance. Since the dough that is divided in this machine is knead with yeast and quickly begins to ferment, the machine is the best solution because the manual process of cutting and measurement would last too long, which would undermine the quality of the finished product. After the division, the dough pieces are fed into a machine for making the dough balls.

d) **Conical rounder**, machine for shaping pieces of dough into dough balls. The dough is shaped so that after resting it would better form into desired shapes ready for baking. The process of forming of dough balls is performed by inserting the irregularly shaped pasta pieces into the conical rounder. Pieces of the dough move from the wall of the machine and cone-moving segment which has an eccentric movement and on thus take the form of balls. The formed dough balls are laid on the desk on which the process of resting and pre-fermentation takes place. The capacity of these machines is very high because it is very important that the process of forming the dough balls is done quickly. The technological process of working with yeast dough requires fast and accurate operation to prevent the occurrence of premature fermentation.

e) **Long molding machine**, machine for forming - shaping the dough into a loaf. The process of formation of the loaf is done so that the ball of dough inserted into the slot on top of the machine. The system of rotating rollers is located inside the machine and dough transporting belt made of fabric enables the creation of desired length of pieces that pass through the system as formed loaves. Adjusting the distance between the rollers achieves the desired length and thickness of the loaf. The capacity of the machine follows the capacity of dividing machine and machine for forming balls of dough. This machine can do a loaf of bread, rolls, croissants, baguettes, toasts, and many other products.

f) **The planetary mixer** is a kind of eccentric orbit mixer and is used for the homogenization of fat, powder and liquid raw ingredients for making tea biscuits and for mixing whip creams, sauces, and soft dough. Planetary mix has two pots of 50 - 60 l. The capacity of the planetary mixer has to meet the capacity of the paddle arm mixer which is where the final treatment of dough for tea biscuits is done. The planetary mixer has three different tools:

- Wire whisk for whip cream and soft creams
- Hook for soft dough
- Spatula for the harder dough and cream

These tools meet the needs of the majority of the planned experimental production. The planetary mixer works in a wide range of speeds - from slowest to very high speed which brings the quality of the preparation of creams and fine - foamy structure. By adding an electric or gas heater under the pan of the dough mixers, it can produce cooked cream for cookies and cream cakes.

g) **L-shaped / Paddle arm mixer** with a rotating kibble, volume up to 80 liters, used for kneading bakery and confectionery products. This mixer has proven to be ideal for making crust for pies, cheese pies, puff pastry dough in and all kinds of breads and pastries. Mobile hand of the mixer mimics manual kneading and puts a lot of air into dough which allows a greater volume of the finished product. L-shaped mixer is used for the final processing of dough for tea biscuits which unites and homogenizes foamy mass of planetary mixer and flour and produces the fine dough for tea biscuits.

h) **Laminator (Puff pastry / dough sheeter machine)** is a machine for making puff pastry. The machine consists of two mobile wings with the fabric transport belts between which are two steel rolls placed horizontally, and the machine control system. The process of work on this machine starts by placing on one side of the conveyor belt a measured amount of dough, then starting the belt that runs the dough through the rollers so it thins and forms it. By reducing the distance between the rollers, the dough with each new trip between them becomes increasingly thinner. When the dough is thinned to the desired thickness, on it is placed a metered amount of margarine for puff pastry that is covered with dough. Once margarine is coated by dough, they are thinned together. After that, the stretched dough with margarine is manually covered in layers and then another thinning is performed. The process of covering and thinning of the dough is repeated until a desired number of sheets of puff pastry is reached.

i) **Baking oven with a system for intensive blowing** is an electric oven for baking gingerbread, cakes, puff pastry and smaller fermented dough. The oven is a standard 5-6 working floors measuring 600 x 400 mm, which is the standard size for all manufacturers of the equipment. Furthermore all the trays that are used in the depository and both ovens are of uniform dimensions 400 x 600 mm. Oven has glass door through which you can track all physical - chemical processes that take place during the baking process. The oven has a fermentation chamber where yeast dough rises before baking. The fermentation chamber is a chamber in which a great amount of water vapor is created - up to 80% and maintains a constant temperature of around 35° C. These conditions are necessary for the proper and quality process of fermentation of dough. The dough has the precise management system for temperature and cooking time. The system of circulation of hot air through the oven provides ideal conditions for baking of the finest products.

**Implementation timeframe and schedule**

The overall grant project will be implemented during ten months, from ocber 1, 2014 - June 30, 2015, through a set of ten main activities:

| No | Activity | Timeframe |
|---|---|---|
| 1. | Works on renovation of the 100 m2 of space for pilot plant | Oct 1-30, 2014 |
| 2. | Equipping and installment of technical equipment, includes 4 sub-activities: | Oct 1, 2014 - Jan 30 2015 |
| | *a) procurement for selection of the subcontractor for equipment delivery* | *Oct 1-30, 2014* |
| | *b) equipment delivery and installation* | *Dec 1, 2014 - Jan 30, 2015* |
| | *c) training of the equipment operators* | *Jan 1 - 30, 2015* |
| | *d) technical trial operation of installed equipment conducted by technical consultants, food technologists from FTP member companies and Faculty of Food Technology in Leskovac* | *Jan 15 - 30, 2015* |
| 3. | Market Demand Survey preparation | Oct 1 - Dec 30 2014 |
| 4. | Opening ceremony of Pilot plant and start of operational functioning | Feb 15-30, 2015 |
| 5. | Development of new products and improvement of existing products | Feb 1 - June 15, 2015 |
| 6. | Accession of new members to FTP consortium | Feb 1 - May 30, 2015 |
| 7. | Preparation and implementation of internship program | Feb 1 - June 15, 2015 |
| 8. | Preparation and implementation of innovation vouchers program | Feb 1 - May 30, 2015 |
| 9. | Preparation and implementation of joint marketing activities | Dec 1, 2014 - June 15, 2015 |
| 10 | Evaluation and closure of grant project | June 15-30, 2015 |

**Number of employees and annual revenue**

A total of ten food processing companies now operate under the FTP public-private consortium and industrial complex and use services of the FTP. The FTP directly employs two people who are its management, while approximately a thousand people are employed in the ten member companies of the FTP. The gross annual revenue of the FTP is around 150,000 USD and is mainly derived from trade of food products of FTP's member companies' joint brand "Top Food". The brand consists of 15 retail packaged food products, manufactured by TFP members and jointly distributed through TOP Foods in Serbia, Croatia, Montenegro, Macedonia and Kosovo. Member companies of the FTP also have their own sales of products that do not go through a common brand. Besides companies and their employees, final beneficiaries of this activity will also be students from the Food Technology Faculty in Leskovac, which will be involved in internship and innovation vouchers program (80 each year). Indirect beneficiaries will be capable working population of Leskovac region and Jablanica district that will be employed during the, and as a result of this Project.

## 2. Location of activity

The city of Leskovac is administrative centre of Jablanica District which is located in southeastern part of Serbia on the area of 2,769 km2. The Jablanica District consists of six municipalities, Leskovac, Bojnik, Lebane, Medvedja, Vlasotince, and Crna Trava, with a total population of 215,463 people. The municipality of Leskovac is located on the area of 1,025 km2, and with the population of 162,000 people situated in 144 settlements, it is the fifth municipality by its size in Serbia and the biggest municipality in south Serbia. The three of the settlements are urban type settlements where the city of Leskovac is the economic, socio-political, and cultural and immigration center of the municipality and the District. The North geographical width of the City is 42°52' and the East geographical longitude is 21°57'.

**Figure 1 - Location of Jablanica District**

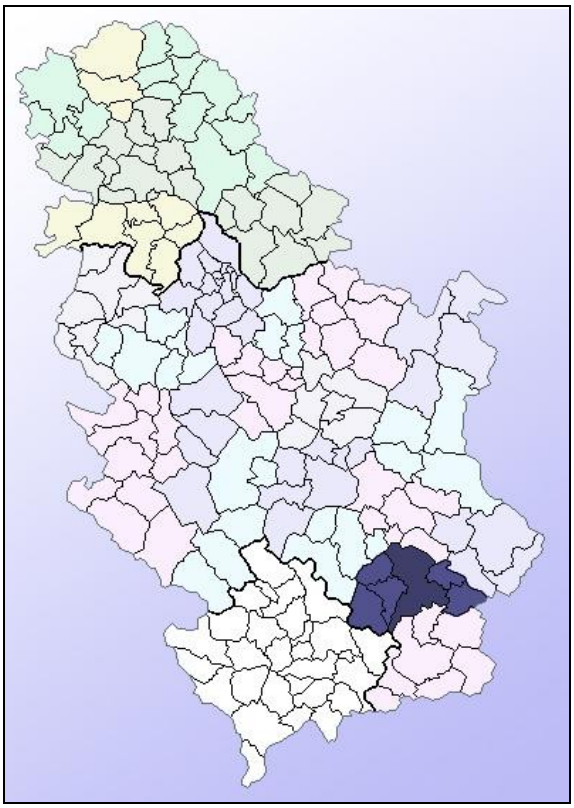


**Figure 2 - Jablanica District**

The main feature of the geographical-traffic position of Leskovac municipality is its position in the composite Morava - Vardar valley which has been crisscrossed with many different roads and railways. The main network of the trans-European transport including even the intercontinental roads and rail transport passes along it. Leskovac is the significant transit center connecting Southern Europe (Greece) through Belgrade to North West Europe.

The most important is the E 75 road which connects the borders of Hungary and Macedonia. Through regional roads, Leskovac is also connected to the Adriatic Sea through Pristina and through Sofia and the Black Sea to the Euro Asian corridor.

Leskovac is on Pan European corridor 10 (highway Belgrade- Skopje). Through Leskovac passes railway Beograd- Athens. International trains traveling from Europe to Skoplje, Thessaloniki and Athens pass through this city every day. The distance from Leskovac to the nearest cities with the airport is: Niš - 45km, Pristina - 100km, Sofia - 155km, and Belgrade - 280 kilometers.

**Figure 3 - Main Transit Roads through Leskovac**

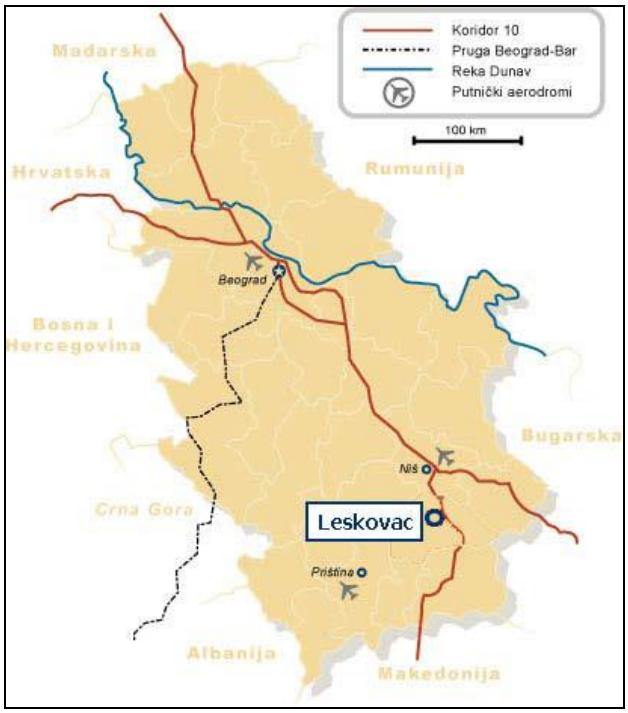



**Figure 4 - Work Zone No. 9, Block 84**

## Detailed description of site

The location of Food Technology Park is within the boundaries of the General Urban Plan of the City of Leskovac, in the Northern Industrial zone which represents a unique complex of an area of 59.6 hectares with the usable area of over 70%. Ownership within the zone is mixed (state, private and public). FTP is defined as Work Zone No. 9, Block 84, covering an area of 27 hectares.

Within the Block 84 are situated processing facilities of ten private food companies that are co-owners and/ or members of the FTP: Jug-Prom, DCP Hemigal, Dairy Leskovac, Umipek, Tomaco Line, Moravka, Primanova, Bonte Italiano, Pionir and Arena. All these companies were established within the process of privatization of the former big socially owned agro-industrial companies of ex-Yugoslavia, so they inherited all necessary business infrastructures.

The location of the FTP complex has constructed business related infrastructure and installed technical equipment within the area, including traffic and logistic areas, water supplying system, sewage system, drainage, electrical power supplying system, fence, greenery, movables, lighting, video monitoring system and space for solid waste containers.

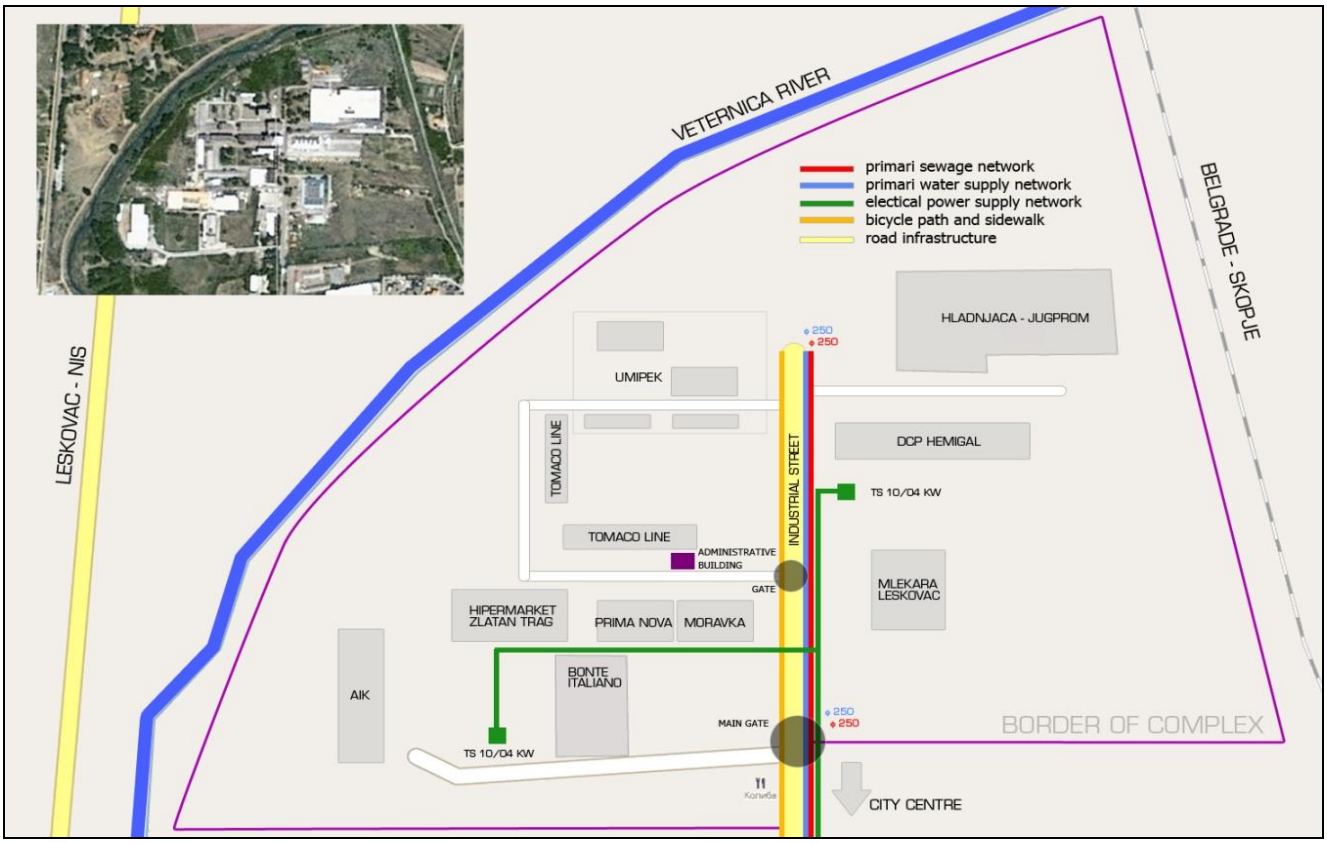
Infrastructure capacities of the FTP complex are as follows:

- primary water supplying system are PVC pipes of Ø 250 mm in diameter;
- measuring points (water gauges) for individual consumption of water within the complex are separated;
- atmospheric sewer network drains of pipe diameter Ø 250 mm are constructed;
- existing curtain of granite cubes is combined with asphalt curtain;
- bicycle path and sidewalk for pedestrian access for employees to the complex are constructed;
- complex is dissociated with light fence, with predicted zones of free communication to the administrative building located within the complex and limited communication with an entrance ramp within the production area;
- the whole border of complex and the internal roads within the complex are equipped with external lights at each other a distance of 40-50 meters;
- locations (space) to set up containers for communal solid waste have been constructed and equipped with adequate movables;
- electricity infrastructure includes three power stations TS 10 / 0,4 kV which are connected with 10 kV cable lines to the main electrical power supply system;
- technical equipment (video monitoring system, entrance gate, identification system) have been installed;

Above mentioned infrastructure within FTP complex enables efficient and effective usage of business location and maintenance of production premises.

The exact location of the future pilot plant within the FTP will be at 43°0’47” N latitude and 21°56’24” E longitude, in the building no.8 at the cadastral parcel 388/1 KO Leskovac. The pilot plant will be established in the premises of one of the members of the FTP, TomaCo Line Ltd, in the factory where firm carries out the manufacture of all of its confectionery and bakery products. The pilot plant premises will be consigned to the use of the FTP and all its members.

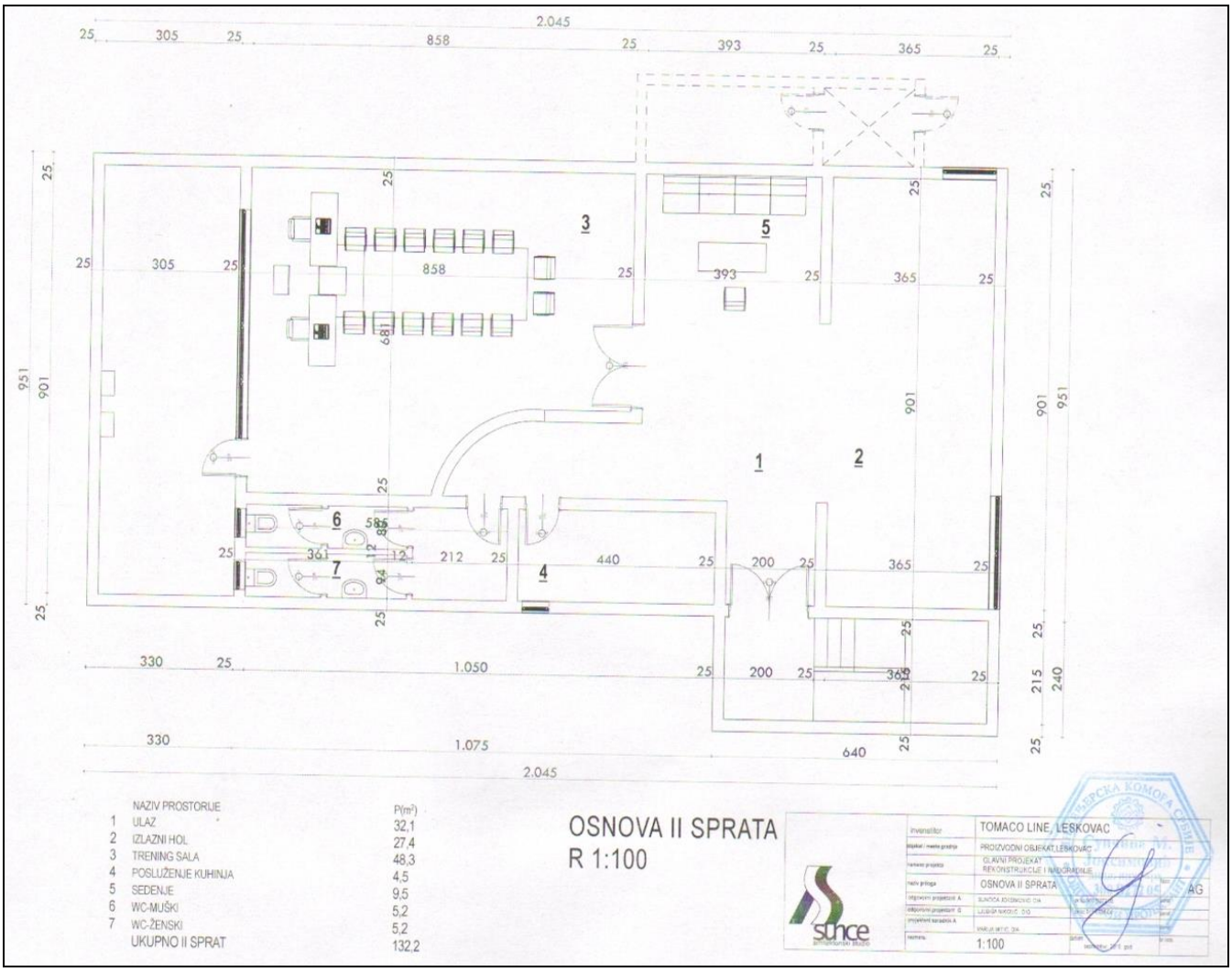
**Figure 5 - Schematic view of FTP in Work Zone No. 9, Block 84, of Northern Industrial Zone**



The building in which the equipment will be installed and the pilot plant established, has been built in accordance with all standards and local regulations in the field of civil engineering and environmental protection. There is no risk of soil contamination and the risk of previous land use. The facility is located on the land that is protected from floods and was built according to all seismic regulations and of materials that are not hazardous to health and the environment. The building was constructed in 1975, as a production facility with a ground floor and two upper floors and fully organized infrastructure. It is constructed of solid material, reinforced concrete structure and bricks.

The pilot plant will be established on the second floor of the building at the production premises of 150 square meters of total area, of which 100 m2 will be the operating area and 50m2 support facilities (handling space, hall, corridors, stairs, toilets, etc.). The premises are equipped with all required electrical, water supply, sewage and gas installations. Electrical installations are conducted through a connection to the city's low-voltage network; it has a separate measurement point with three-phase connection and multi-storey panel with automatic fuses/ circuit breakers. Water supply installation is carried out with the connection to the city water supply and sewage system is carried with the connection to the city sewer. The facility has installed a central ventilation system, as well as gas installations with a connection to butane gas station. The premises of future pilot plant have plastered and smoothed walls, painted with dispersive colors and covered with ceramic tiles of up to 2 meters, while the floors are covered with acid-resistant ceramic tiles. There is no humidity inside the building.

**Figure 6 - The basis of the second floor of the building where Pilot plant will be established**



### 3. Existing or planned certifications

The pilot plant will be stablished within the premises of TomaCo Line Ltd factory which has all necessary permits, approvals and studies, including those required by environment protection legislation, to operate and carry out activities applicable to this project.

Since the FTP's pilot plant will use the facility and entire infrastructure and logistics of TomaCo Line Ltd, these permits and certificates will be applied to the small-scale operations carried out in the pilot plant, which are compatible with operations of TomaCo Line factory.

1. Location Permit, ID No. 353-534/10-02
2. Technical acceptance of the facility (Certificate of Occupancy), reg.no. 34/03.02.2010
3. The expert finding on testing of electrical installations, reg.no. N-2/10
4. The expert finding on testing installation for lightning protection, reg.no. G-14/10
5. Fire protection and prevention measures and guidelines, 2012
6. Fire emergency evacuation plan and the fire procedure, 2012
7. Study on Environmental Impact Assessment of the present condition of the steam boiler facility for coal combustion and steam production within the TomaCo Line Ltd factory, March 2012.
   Steam boiler facility produces heat energy from coal combustion and uses it for production of steam for the heating of business and manufacturing premises during the winter. Steam boiler facility has installed purification system, a cyclone dust collector used to reduce emissions of polluting powdery / dust substances. The Study concluded that the steam boiler facility for coal combustion and production of steam, of the project holder TomaCo Line ltd, cannot significantly affect the quality of the environment, or to change the concentration of pollutants in air, water and soil and reach their limits.
8. Report on measurements of air pollutant emissions from coal-fired steam boiler of TomaCo Line manufacturing plant, reg. no. 02-125 (Institute for Safety, Quality, Environment and Health in Niš, 2011). Results of conducted measurements of air pollutant emissions of the emitter, TomaCo Line steam boiler, confirmed that the measured values are within permitted limits of emissions, according to the Article 22 of the Regulation on limit values for emissions of air pollutants (Official Gazette of the Republic of Serbia no. 06/11 and 71/10, Annex III, Part I and part IV).
9. Quality Management System ISO 9001; 2008 reg.no. Q-1269-R
10. HACCP system reg.no. 0223-H-R for the TomaCo Line Ltd factory food operations

The subject Report on measurements of air pollutant emissions and Study on Environmental Impact Assessment, are not related to the environmental impact of food processing operations in the factory, but with the impact of the coal-fired steam boiler facility intended for heating the plant premises. Therefore, both documents are not applicable to pilot plant operations since the planned equipment will not use the energy from steam boiler.

## 4. Site map

**Figure 7 – Satellite Image of the Project location (view from a height of 2.44 km)**

**Figure 8 - Satellite Image of the Project location (view from a height of 787 m)**

## 5. Photos of Site

Photo 1 - Facility of the future pilot plant

Photo 2 - Stairs to the pilot plant premises at 2nd floor

Photo 3 - Entrance door of the pilot plant

Photo 4 – Premises of the pilot plant

Photo 5 – Walls and ceiling of the pilot plant premises

Photo 6 - Central ventilation system

Photo 7 - Ventilation system and electrical installation

Photo 8 - Premises of the pilot plant

## C. Activity-Specific Baseline Environmental Conditions

### 1. Population characteristics

According to the last census, the city of Leskovac has 65,000 inhabitants, while the municipality has 162,000, of whom majority are Serbs. Other significant ethnic groups include Roma, Montenegrins, Macedonians and Yugoslavs. In January 2007, there were an estimated 500 persons of Chinese origin living in Leskovac. Apart from the city of Leskovac, there are 143 settlements in the municipality of which the largest are Vucje and Grdelica, classified as "urban settlements" (towns), with about 3,000 residents each, while the rest of settlements are villages (mountain, mountain- hills, hills and valley villages and settlements).

**Table 1. Ethnic/national structure of population**

| Ethnic Group | Municipality | | District | | Serbia | |
|---|---|---|---|---|---|---|
| | Number | Share in total population (%) | Number | Share in total population (%) | Number | Share in total population (%) |
| Serbs | 147,414 | 94.34 | 225,092 | 93.43 | 6,212,838 | 82.86 |
| Roma | 6,989 | 4.47 | 9,900 | 4.11 | 108,193 | 1.44 |
| Montenegrins | 284 | 0.18 | 725 | 0.30 | 69,049 | 0.92 |
| Macedonians | 251 | 0.16 | 326 | 0.14 | 25,847 | 0.34 |
| Yugoslavs | 122 | 0.08 | 147 | 0.06 | 807,721 | 10.77 |
| Bulgarians | 85 | 0.05 | 109 | 0.05 | 20,497 | 0.27 |

*Data source: Agency for local economic development of Leskovac*

**Table 2. Structure of population by type of neighborhood**

| | Municipality | | District | | Serbia | |
|---|---|---|---|---|---|---|
| | Number | Share (%) | Number | Share (%) | Number | Share (%) |
| **Urban population** | 68.826 | **44.05** | 98.420 | **40.85** | 4.225.896 | **56.36** |
| **Other population** | 87.462 | **55.95** | 142.503 | **59.15** | 3.272.105 | **43.64** |
| **Total population** | 156.252 | **100** | 240.923 | **100** | 7.498.001 | **100** |

*Data source: Agency for local economic development of Leskovac*

Work-able population in city of Leskovac consists of 46% of total population and more than 30% are supported persons. Most of the work-able population is occupied in agriculture, forestry and food processing sectors of economy. It is estimated that there are 28,000 people who are connected to agriculture directly or indirectly, which makes 17% of people or 39% of active people which can be considered as high percentage of agriculture-related population. The main characteristic of Leskovac municipality is unequal population density. The most people live in the Leskovac valley and the city of Leskovac. The municipality is also characterized by depopulation (this does not apply only to the city of Leskovac and a few nearby settlements). Number of citizens increased over the last four decades but it slowed down significantly between two censuses. According to the natality and mortality rates in period from 1996-2002 it is obvious that the trend is negative and it loses the power of natural generator and regeneration of people, while emigrational potentials from immediate surroundings are used, so it is now a neutral factor of growth. Therefore, age structure of citizens is obviously ageing, which leads to disharmony among age groups. It is not stable yet and changes are still expected towards even bigger ageing with growing demographic consequences. Out of total number of citizens, 49.7% are male and 50.3% are female. The most common age group for both sexes is between 45 and 49 years old. The average age of men in the municipality is 38.7 and of women 40.9. The measuring of population in general is done through the Age Index (how many people over 65 there are in comparison to 100 people younger than19). The Age Index for Leskovac municipality is 0.73 (73/100).

**Table 3. Structure of population by age and gender**

| | | Municipality | Share in total population of municipality (%) |
|---|---|---|---|
| **Total population** | Total | 156.252 | 100 |
| | male | 77.641 | 49.69 |
| | female | 78.611 | 50.31 |
| **0-4** | Total | 7.548 | 4.83 |
| | male | 3.956 | 2.53 |
| | female | 3.952 | 2.53 |
| **5-9** | Total | 8.689 | 5.56 |
| | male | 4.586 | 2.94 |
| | female | 4.103 | 2.63 |
| **10-14** | Total | 9.461 | 6.05 |
| | male | 4.836 | 3.10 |
| | female | 4.625 | 2.96 |
| **15-19** | Total | 10.362 | 6.63 |
| | male | 5.299 | 3.39 |
| | female | 5.063 | 3.24 |
| **20-24** | Total | 10.462 | 6.70 |
| | male | 5.315 | 3.40 |
| | female | 5.147 | 3.29 |
| **25-29** | Total | 10.774 | 6.90 |
| | male | 5.445 | 3.48 |
| | female | 5.329 | 3.41 |
| **30-34** | Total | 10.037 | 6.42 |
| | male | 5.065 | 3.24 |
| | female | 4.972 | 3.18 |
| **35-39** | Total | 10.437 | 6.68 |
| | male | 5.326 | 3.41 |
| | female | 5.111 | 3.27 |
| **40-44** | Total | 10.816 | 6.92 |
| | male | 5.534 | 3.54 |
| | female | 5.282 | 3.38 |

| | | Municipality | Share in total population of municipality (%) |
|---|---|---|---|
| **45-49** | Total | 12.291 | 7.87 |
| | male | 6.405 | 4.10 |
| | female | 5.886 | 3.77 |
| **50-54** | Total | 11.563 | 7.40 |
| | male | 5.895 | 3.77 |
| | female | 5.668 | 3.63 |
| **55-59** | Total | 7.832 | 5.01 |
| | male | 3.919 | 2.51 |
| | female | 3.913 | 2.50 |
| **60-64** | Total | 9.667 | 6.19 |
| | male | 4.648 | 2.97 |
| | female | 5.019 | 3.21 |
| **65-69** | Total | 10.088 | 6.46 |
| | male | 4.632 | 2.96 |
| | female | 5.456 | 3.49 |
| **70-74** | Total | 8.006 | 5.12 |
| | male | 3.463 | 2.22 |
| | female | 4.543 | 2.91 |
| **75-79** | Total | 4.803 | 3.07 |
| | male | 1.905 | 1.22 |
| | female | 2.898 | 1.85 |
| **80-84** | Total | 1.843 | 1.18 |
| | male | 742 | 0.47 |
| | female | 1.101 | 0.70 |
| **85-89** | Total | 511 | 0.33 |
| | male | 204 | 0.13 |
| | female | 307 | 0.20 |
| **90-94** | Total | 159 | 0.10 |
| | male | 62 | 0.04 |
| | female | 97 | 0.06 |

| | | Municipality | Share in total population of municipality (%) |
|---|---|---|---|
| **95 and over** | Total | 31 | 0.02 |
| | male | 11 | 0.01 |
| | female | 20 | 0.01 |
| **unknown** | Total | 872 | 0.56 |
| | male | 393 | 0.25 |
| | female | 479 | 0.31 |

*Data source: Agency for local economic development of Leskovac*

## 2. Geography and Climate

**Geography -** The territory of the municipality of Leskovac is situated at an altitude between 210 and 240 meters above sea level, and lies in the vast and fertile valley of the Leskovac basin, (50km long and 45km wide), the biggest morpho-tectonic depression in Serbia. It covers the part of the South Morava river valley and part of its principal left affluent valleys– the Vetrenica and Jablanica rivers. Leskovac municipality is bordered by mountains of Babicka Gora (1,098 m), Selicevica (903 m) and Suva planina to the East and Radan (1,409 m) and Pasjaca to the West and Kukavica (1,442 m) and Cemernik (1,638 m) to the South. It is opened to the Nis basin to the North and through Grdelica canyon connected to the Vranje-Bujanovac basin. It opens out towards the Valley of Niš to the north, and through the Grdelič Gorge towards the Vranje-Bujanovac Valley to the south. The main feature of the geographical-traffic position of Leskovac municipality is its position in the composite Morava – Vardar valley. The main network of the trans-European transport including even the intercontinental roads and rail transport passes along it. Its largest settlement, the city of Leskovac, is located where natural communications with intersection of all directions leading to the valleys of the Juzna Morava, Veternica, Jablanica and Vlasina rivers flow in or out.

**Climate -** The climate of Leskovac is moderately continental and mainly influenced by the geographical width (430 average), moderate sea level (210-240m) and relief (favorable layout of lowland and highland), while the openness of Leskovac valley towards North and closure towards South leads to the specific microclimate. All these factors have contributed to the region's very mild winters and moderately warm summers, with two transitional periods, spring and autumn, where autumns are warmer than springs. The average annual temperature in Leskovac is 11.4° C, and the average air humidity is 77% (64% in summer, and 84% in winter). January is the coldest month with the average temperature of - 0.4 $^{o}$ C, while July and August are warmest, with average temperatures of 21.4$^{o}$ C. The average temperatures vary during the year by 20.8 °C.

The rainfall is different in the valley and the outskirts. The outskirts of the valley (especially Southern) are very developed morphologically and they are characterized by big annual rainfalls, from 800 to over 1,000мм. The average annual rainfall for the valley itself is around 600 mm per square meter. The most precipitation falls in spring season (March, April, May) with monthly average of 58.8 mm, while May is the month with the highest rainfall with an average of 66 mm. The least rainfalls happen in winter months (December, January and February) with the average of 40.3 mm. The average rainfalls in summer period are 46.4 mm per month, while the driest month is August with 39 mm. The difference in precipitation between the driest month and the wettest month is 27 mm. During winter it snows on the average for 31 days. Leskovac has annually average number of 79 sunny days.

Leskovac is a city in which there are on average 160 days annually without wind. The most common wind at the territory of Leskovac municipality is Northern wind, with the biggest strength of 3 m/s, which blows in winter season and lowers the temperature. The warm Southern wind is also common in March. North- Western wind (strength 2.5 м/s) is also common. The winds are fastest in March and slowest in July, August and September.

According to its seismological – geological characteristics, the area of the town and municipality of Leskovac belongs to the region of very rare and moderate earthquakes.

**Figure 9 - Precipitation graph for Leskovac**

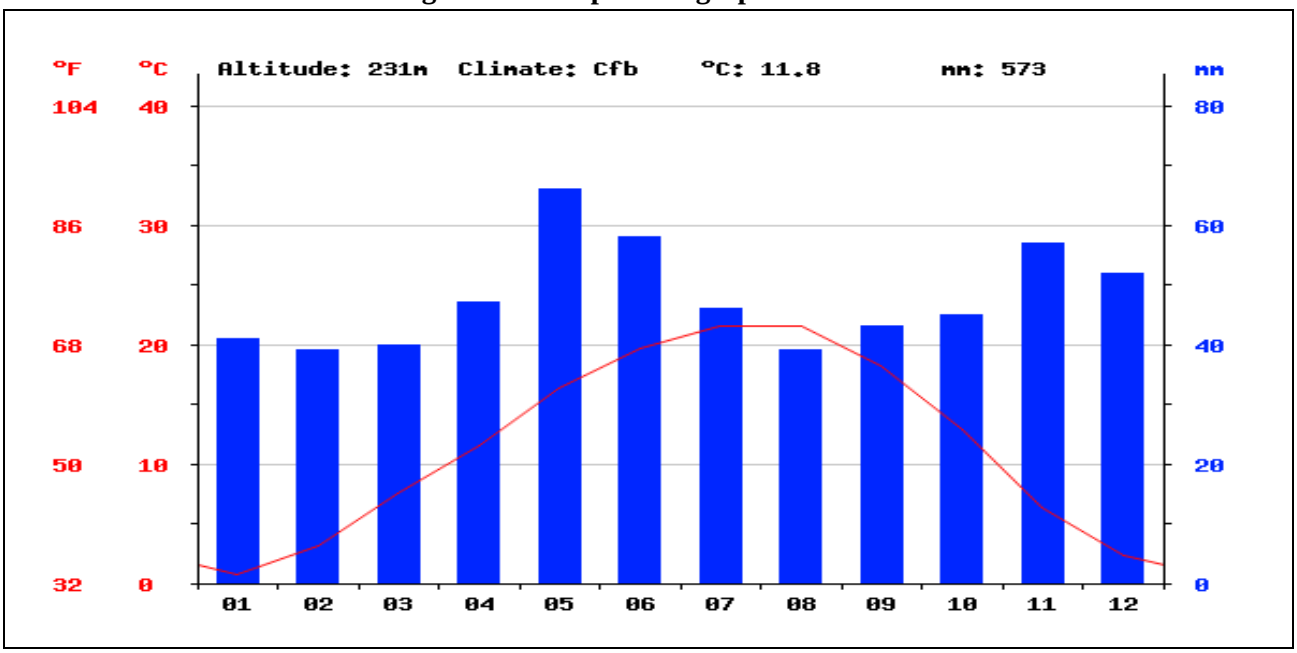
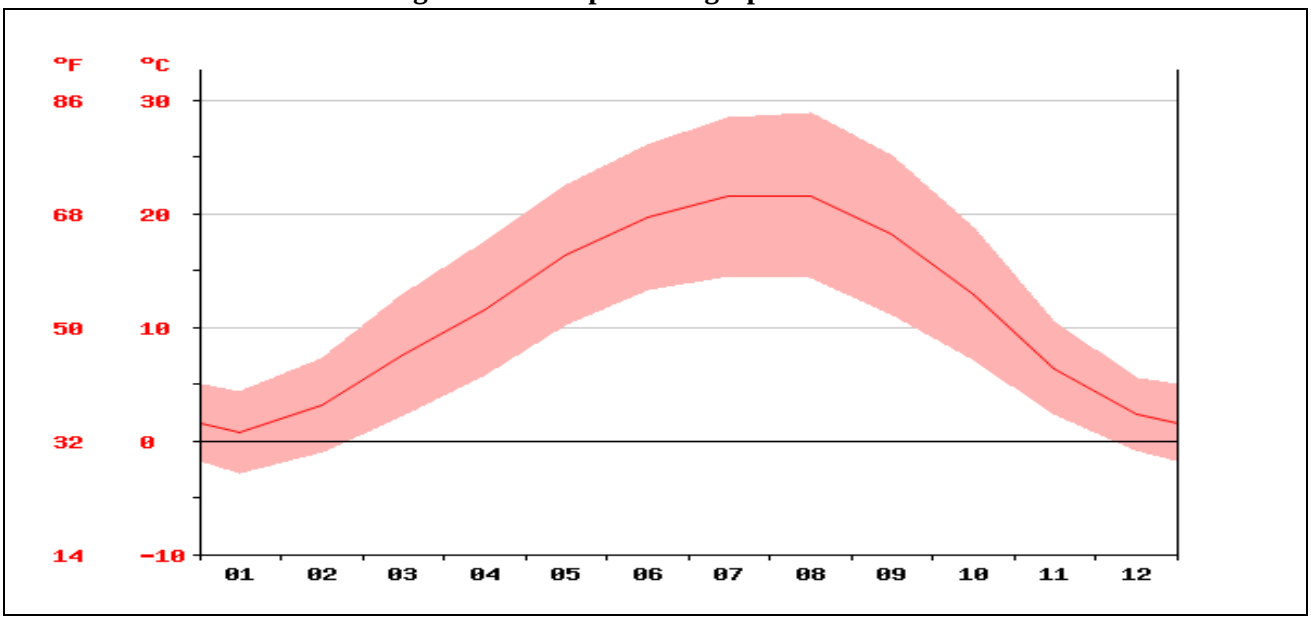



**Figure 10 - Temperature graph for Leskovac**




### 3. Natural resources, e.g., nearby forest/protected areas, ground and surface water resources

In the municipality of Leskovac there are no any protected areas of natural resources. The closest protected area is Vlasinsko Lake located in the municipality of Surdulica, 80 km far from Leskovac, which is protected as a nature preserve of special interest at category 1. In addition, 45 kilometers from Leskovac on the slopes of Ostrozub Mountain located in the municipality of Crna Trava, there is a protected area of 25 kilometers of the territory where very rare and endemic plant species grows.

**Rivers -** Leskovac municipality is mainly the area of valleys with hills and mountainous parts with many rivers that flow through it. The bases of energetic resources are the rivers in the area. Leskovac municipality area is rich in water resources, with South Morava as the main river and several tributaries, the biggest one being Vlasina, Veternica and Jablanica. South Morava that flows from south towards north and together with West Morava makes Great Morava. The river belongs to the Black Sea basin and the total area of its basin is 15,469 km2, of which 1,237 km2 is in Bulgaria. South Morava is river typical for valleys, with unpredictable character, since during heavy rains it receives the flows from its many tributaries (157 in total). This river, by changing the riverbed in centuries, has developed a wide river valley and important part of arable land. As for mineral raw materials, there are deposits of energetic resources for the industry of construction materials.

The biggest tributary of the river South Morava in this area is 70 km long river **Vlasina**, which also drains the Eastern outskirts of the valley. This river is particularly prone to flooding. On the Western part of the valley, 76 km long river **Veternica** and 74 km long river **Jablanica** flow. River Veternica springs at Kukavica Mountain. Its upper stream shows the characteristics of a mountain river, while in the middle and lower stream the river is more quiet and tamed. The Jablanica River is very unpredictable and may cause floods in rainy seasons, while it can also drain out in dry summer seasons. The river **Vučjanka** springs at Kukavica Mountain and it has extremely flooding character. It flows through Vučje and runs into river Veternica near Beli Potok village.

**Land -** Leskovac municipality area is a real mosaic of types of land formed under the influence of specific heritage that influenced the look, production qualities and potential of the land. In terms of energy, the most important land is fertile arable land, potential land for agriculture and land covered by forests. Agricultural land of Leskovac municipality covers the area of 58,919 ha. These zones comprise the arable areas and meadows. The arable land consists of tilths and gardens, orchards, vineyards and meadows. The areas under vegetables are the most common ones, crop farming cultures are 70%, vegetable gardens 15%, orchards 6%, vineyards 5%, meadows 2% and some pastures in traces.

**Forests -** Forest as resource is described through the situation of woods that is determined by area, quantities of wood and young trees. Leskovac municipality is moderately covered by forests. The forests of Leskovac municipality cover the area of 39,490 ha. The level of woods coverage is 38.53%. According to the ownership, the state owned woods are 36.22% (14.304 ha), privately owned ones 61.90% (24.446 ha) and socially owned ones 1.88%, or 7,500 ha of the municipal territory. The area of woods in the municipality per citizen is 0,239 ha.

**Flora and Fauna -** Natural resources of Leskovac area are favorable for great variety of plants and animals. Most common wild animals are: deer, wild boar, rabbit, partridge and pheasant. A great variety of herbs and other useful plants grow here. The first flora research in this area was conducted by the founder of Serbian botanist, Josif Pančić at the end of 19$^{th}$ century. He found a very rare plant on Ostrozub Mountain, endemorelict bay-cherry (Prunus Laurocerasus). For over a hundred years this plant attracts attention of botanists from the whole world, since it was found only here, in Bulgaria and on 2-3 other locations. That is why Ostrozub Mountain in the municipality of Crna Trava is protected as a natural reserve. There are around 50 rare medicinal and aromatic plants, mainly good for health, plants in Leskovac area.

## 4. Current land use

Almost two thirds of the Leskovac municipality area is hills and valleys. The rest is flat, which, in broader sense, constitutes the so called Leskovac valley. Basic geological characteristics of the Leskovac basin are tertiary layers of alluvial entities, which means, the youngest sediments. The tertiary sediments (lake clay, gravel and sand sediments) cover large areas of the middle part of the basin terrain. The alluvial plain around the rivers Juzna Morava, Vlasina, Jablanica, Pusta Reka and their estuaries was built from the quaternary sediments and its maximum depth is 20-50 meters. In the urban planning sense, according to the geo-mechanical characteristics, the wider city area is characterized by a stabile ground.

The majority of land types in Leskovac are of medium-heavy mechanic content and medium porous. As per chemical content, the land is typically acid, while the content of humus is low, with a moderate share of physiologically active phosphorus and potassium. The quality of arable land is not satisfactory. It is further deteriorated by the decrease of humus percentage in soil in past decades. The reasons for this are: influence of erosion (wind, water and sun), intensive agricultural production, use of mineral fertilizers and pesticides, inappropriate agro technical measures applied, low development of cattle breeding, deficit of organic fertilizers, and imbalance of macro and micro elements in the soil. The soil condition is also influenced by several other unfavorable factors: industrial polluters, illegal garbage dumping, and exhaust gases from the traffic on arable land near high way and busy roads.

Leskovac Municipality has at its disposal 102,500 ha of the entire land, out of which 57.614 ha are classified as agricultural land (56.21% of total land), of which 37,102 ha are arable (64.4% of agricultural land and 36.20% of total land). Leskovac municipality is moderately covered by forests. The forests of Leskovac municipality cover the area of 39,490 ha (38.53% of total land). One of the most important problems in the Jablanica district and Leskovac municipality is the low rate of usage of agricultural land. By the share of use of available agricultural land, the Jablanica district and Leskovac municipality are significantly lagging behind the rest of Serbia, and are classified in category IV (out of V). Abandoned/non used agricultural land is usually located away from the urban and rural centers. Mainly belongs to the category of meadows and pastures (lower quality classes). This land is weedy and in most cases cannot be used in the future without big cultivation activities. Additional problem of local households in land use is dominant presence of small and divided plots for cultivation, since the land consolidation was not done in this part of the Serbia. In past ten years, average Serbian household increase land surface for 1 ha, from 3.5 to 4.5 ha, while in Leskovac opposite trend is recorded. Small and fragmented production is obstacle in potential specialization of agriculture production.

Municipality of Leskovac has 57.614 ha of agricultural land, of which 37.102 ha (64.40% of total agricultural land) of the highest quality, arable, land. Out of all agricultural land available in Leskovac only 30,659 ha or 53.20% are utilized by 15,500 registered agricultural holdings (households and enterprises). The average size of the agricultural holding owned by individual farmers is about 2 ha. Most of the farmers (9,200) owns 1 to 5 ha of agricultural land, while a very small number (120) owns land larger than 10 ha. These figures are far behind Serbian average (4.5 ha) and are result of presence of huge number of small and mixed agriculture households. The agricultural land is irrigated by 5,528 holdings on the total of 2,939 ha, which represents 9.6% of utilized and 7.2% of all available land of agricultural holdings.

**Table 4 - Farm size in Leskovac**

| Farm size | Number of farms | Share in total number |
|---|---|---|
| Total number | 15.507 | 100 % |
| Smaller than 1 ha | 5.526 | 35,64 |
| 1-2 ha | 4.905 | 31,63 |
| 2-5 ha | 4.340 | 27,99 |
| 5-10 ha | 557 | 3,59 |
| 10-20 ha | 91 | 0,59 |
| 20-30 ha | 16 | 0,10 |
| 30-50 ha | 5 | 0,03 |
| 50-100 ha | 4 | 0,03 |
| More than 100 ha | 3 | 0,02 |

*Data source - Agriculture census, 2012*

There is significant land area in Leskovac that officially belongs to the state and which is managed by the local government. In many of these state owned land areas there is a problem of unresolved property issues. Most of the state owned land belongs to category of meadows and pastures, but still there is a significant land area that

belongs to the category of arable land. In Leskovac there are also significant state owned agriculture land that is rented (1.500 ha). Rented agriculture land is commonly used for crop and fodder production, but also for vegetable and fruit production. State owned land is significant resource that is not properly used at the moment. This land is potentially source of financial incomes for the local government, but also, this land can be used as significant tool in support to local farmers in intention to increase production and reach product specialization.

**Table 1 - Use of state owned land**

| Local self-government | State owned land, ha | Rented state owned land, ha |
|---|---|---|
| Leskovac | 4 | 1.500 |

*Data source - LSG – Local economic development offices, 2013*

At the territory of Leskovac Municipality dominates crop husbandry on arable land. Basic husbandry crops are grains (corn and wheat), and forage crops, while vegetables as the most intensive cultures cover only about 9% of the land. In the examined region there are around 5.069 ha of meadows and 8.786 ha of pastures. The pastures and meadows are usually not cultivated lands. Presence of meadows and pastures is typical for hilly and mountainous areas of the investigated region and they are largely represented in remote areas of Leskovac.

**Table 6 - Structure of the total agricultural land area in relation to land use, 2007**

| | | Leskovac (ha) | Share in total agricultural area (%) |
|---|---|---|---|
| **Area – Total** | | **102.500** | **/** |
| **Agricultural area – Total** | | **57.614** | **100,00** |
| Arable land and gardens | Total | 37.102 | 64,40% |
| | Wheat | 23.917 | 41,51% |
| | Industrial plants | 986 | 1,71% |
| | Vegetables | 5.433 | 9,43% |
| | Forage crops | 5.307 | 9,21% |
| Orchards | | 3.474 | 6,03% |
| Vineyards | | 3.183 | 5,52% |
| Meadows | | 5.069 | 8,80% |
| Pastures | | 8.786 | 15,25% |
| Fishponds, swamps and marshes | | 5 | 0,01% |

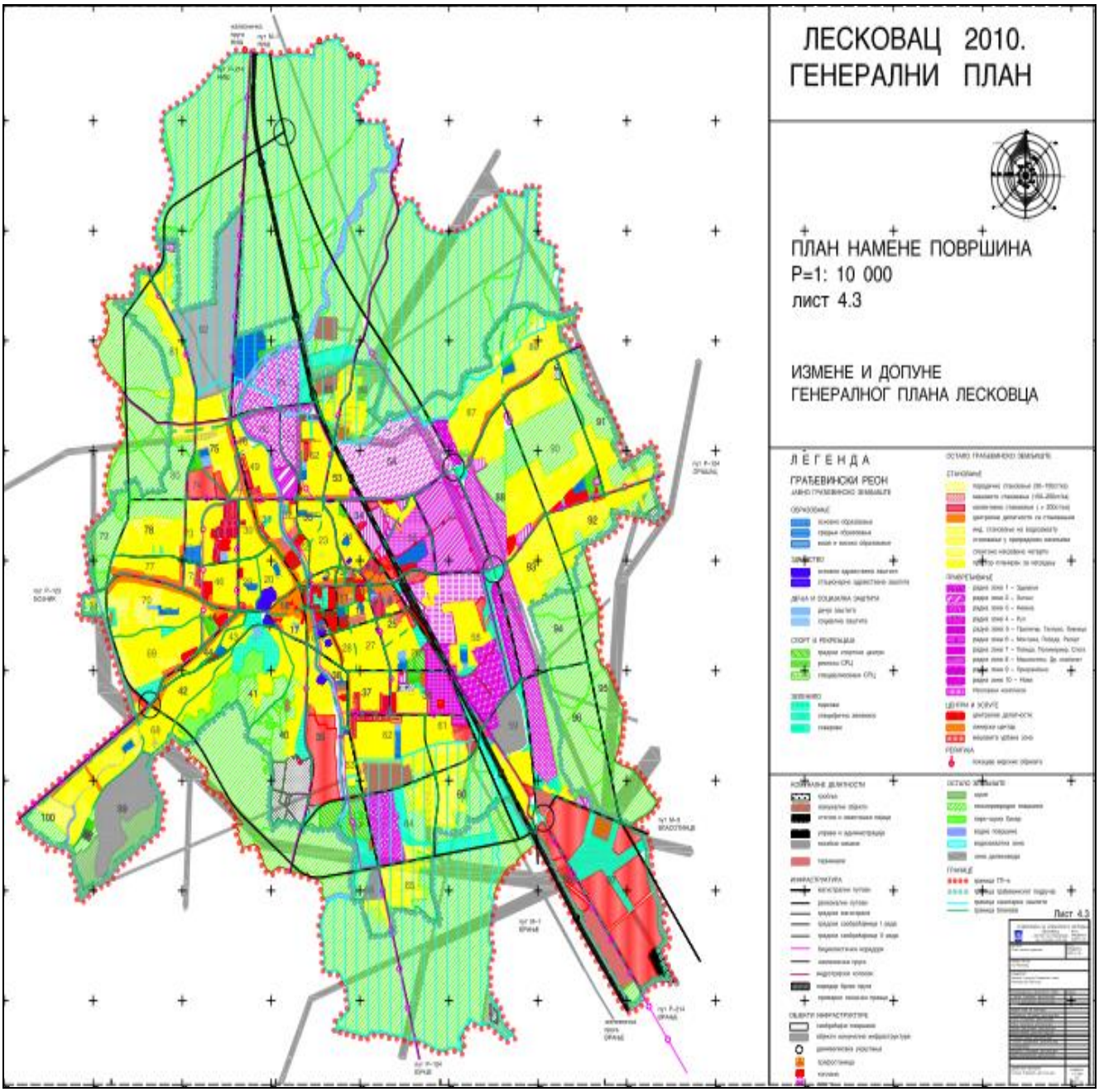
*Data source - LSG – Local economic development offices*

According to the decision on construction land the total territory of the municipality of Leskovac has been divided into seven zones, and they are: the zone of the inner city core or extra zone, then the first, second, third and the fourth zone for the territory covered by the General Urban Plan, the fifth zone refers to the larger settlements on the territory of the municipality of Leskovac and the sixth zone which covers the settlements outside the General Urban Plan of the municipality of Leskovac.

The municipality of Leskovac has a spatial development plan outlined by 2020 by adopting the new General urban plan (GUP). GUP is defined in accordance with the Law on Planning and Construction (Official Gazette RS no. 47/2003), the Spatial Plan of the Republic of Serbia (Official Gazette RS.br.13/96) and the Spatial Plan of the Municipality of Leskovac. Spatial development plan foresees new areas in the industrial zones for all purposes that can be activated at any moment due to the needs and regulation plans. New and spacious areas for all types of production engaged capital in the industrial zones are planned. Modifications and amendments of

GUP allow building of new objects, due to the current needs, on other locations. The spatial plan of the republic of Serbia shows that Leskovac is, despite high level of industrialization, the zone of middle spatial loading. Land use plan has been presented in General Urban Plan of Leskovac.

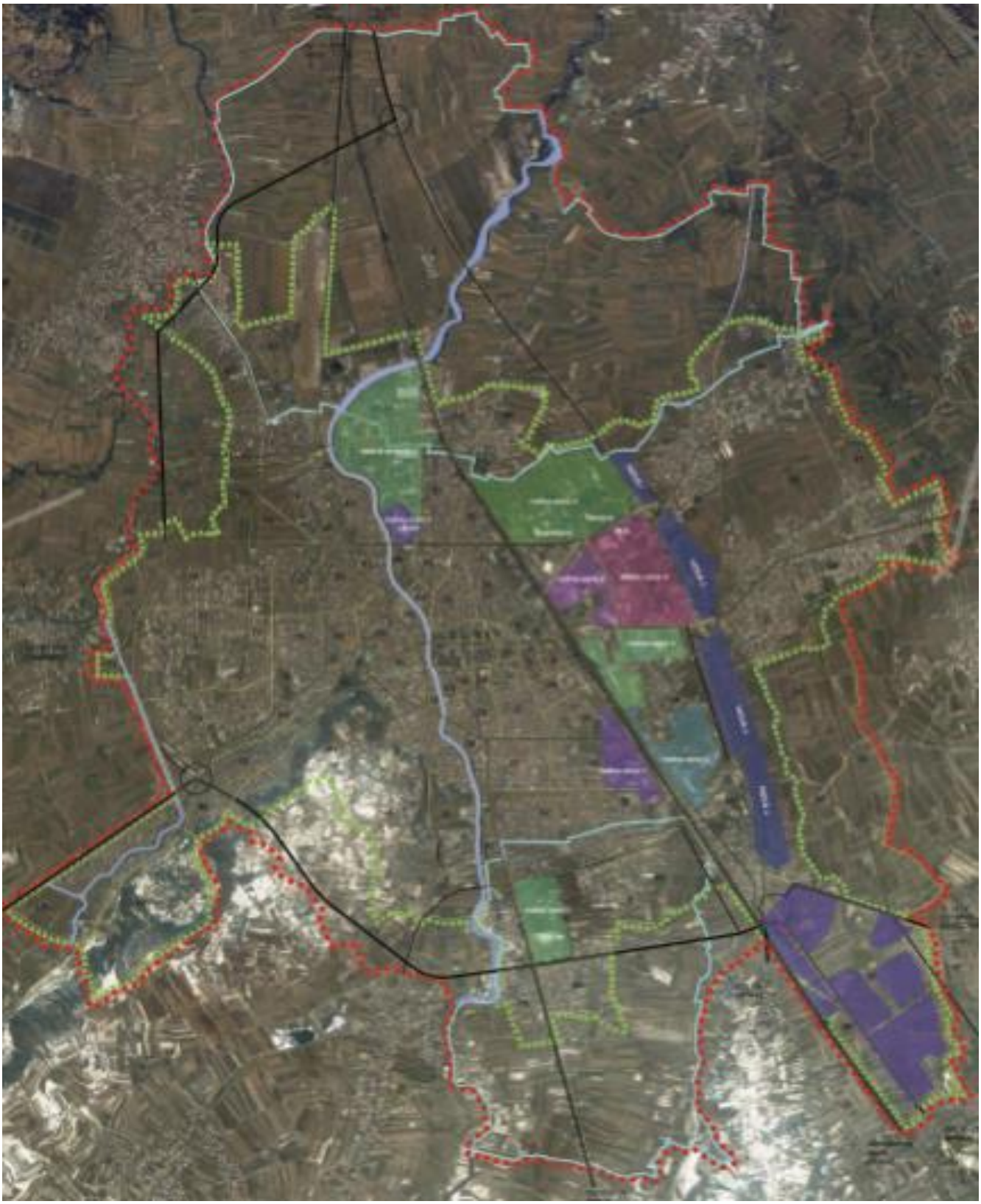
**Figure 11 - Land Use - General Urban Plan of Leskovac**




## 5. Proximity to public facilities, e.g. schools, hospitals, etc.

Most facilities of the public institutions are located in the city center which is 3 km away from the industrial zone. The nearest hospital is 3.5 km far from the location of the pilot plant, the nearest primary school is about 1.7 km and the nearest kindergarten is about 1.2 km located. The nearest secondary school is located about 0.5 km in a beeline (across the river) and 1.5 km through the road transit path.

**Figure 12 - Industrial Areas / Zones of the City of Leskovac**



**Major types of industry in Leskovac**

The four predominant industries in Leskovac are food, chemical, textile and wood industry. Industrial offer is also completed by metal, electrical and industry of construction materials. According to the number of active enterprises and entrepreneurial activities, the most dominant industries in Leskovac are: food processing, with 116 registered businesses, the production of wood products and furniture (a total of 72 active companies and entrepreneurs), the production of textiles and garments with 63, followed by metal, rubber and plastics production and chemical industry.

*The total number of enterprises and entrepreneurial activities of dominant industries, 2012*

| | |
|---|---|
| Production of nonmetallic minerals | 16 |
| Production of chemicals and chemical products | 16 |
| Production of rubber and plastic products | 18 |
| Furniture production | 21 |
| Production of garments | 30 |
| Production of metal products except machines | 32 |
| Textile production | 33 |
| Production of wood products | 51 |
| Production of food products | 116 |

According to the number of employees in Leskovac, the predominant industries are: food processing, pharmaceutical, wood processing, chemical and textile. The largest number of workers is employed by the businesses in the food industry, followed by pharmaceutical, wood, textile (manufacturing of garments and textiles) and chemical.

*The total number of employees in enterprises and entrepreneurial activities of dominant industries, 2012*

| | |
|---|---|
| Production of food products | 1,088 |
| Production of wood | 441 |
| Production of basic pharmaceutical products | 441 |
| Production of chemicals and chemical products | 370 |
| Production of garments | 363 |
| Production of metal products except machines | 302 |
| Production of rubber and plastic products | 302 |
| Production of nonmetallic minerals | 256 |
| Production of basic metals | 183 |
| Textile production | 121 |
| Furniture production | 106 |

As part of chemical industry, predominant is production of pharmaceutical raw materials, medicines, cosmetic products, polypropylene and polyetilenic products, thermo insulation and hydro insulation materials. In the wood industry the production of final products is predominant (massive wood products, school furniture, pre-school furniture and office furniture, construction joinery, piece furniture, upholstery, veneer, palettes and briquettes.

In metal and electro industry predominant is production of casting, panel boards, agricultural machinery, central heating boilers, stoves, ovens, and lightning products. Factory for the production of electronic components for the automotive industry has been built recently by South Korea's "Yura Corporation". This company has so far employed more than 1,000 workers, and by the end of the investment period, it is envisaged that this factory will have a total of 2,500 people working for it.

Within the food industry, in the city of Leskovac, the most common is the production and processing of fruit, vegetables and meat. Total number of companies and entrepreneurs of this industry is 116, and working in them, according to the average values for the year 2012, a total of 1,088 employees.

*The major companies in the food processing industry according to the number of employees, 2012*

| | |
|---|---|
| TP Mesokombinat-promet | 157 |
| Jugprom | 125 |
| Mlekara Leskovac | 86 |
| Moravka Pro | 73 |
| Fungo-Ju | 56 |
| MK | 50 |
| Tomaco Line | 47 |
| Total number of employees | 594 |

The capacities of cold storages in Leskovac are over 40.000 tons of vegetables and berry fruit (cherries, strawberries, raspberries). Over 80% of these products are intended for the EU market. There is a fifty-year old tradition in the manufacture of confectionary products (candies, waffles, chocolates, creams) and powdered products, soups and spices, with a total annual production of 4,000. Production of bread, pastry and fodder is also developed with the following manufacturing capacities: 3 automatic lines for the production of bread and pastry (45.000 loaves of bread and one tone of pastry daily), annual mill capacity of 27.000 tons and silo capacity of 3,200 tons with automatic drier. The region is also well known for the production of raw and processed meat with the famous „minced meat for barbecue“ with a geographic origin mark.

The biggest food processing company is Mesokombinat-promet, modern slaughterhouse and meat packing facility registered for import and export of meat. It is located in the village Turekovac, ten kilometers from Leskovac, where about 8 ha of land is fenced for a slaughterhouse and processing facility, supporting facilities and administrative buildings with a total area of over 7,000 m2. Capacity of the slaughterhouse is 90 heads of cattle, 300 pigs and 1,000 lambs a day, while the capacity of processing is around 15t per shift, or 2,500 tons annually depending on the meat structure. Mesokombinat-promet in its production program has all kinds of pre-fabricated fresh meat, and over 60 types of meat products. In addition to these activities, Mesokombinat-promet deals with the import and export of fresh meat (veal, beef and pork), as well as pre-fabricated meat.

Second biggest food processor is Jugprom Ltd., which purchases and processes 9,000 tons of various fruits annually and exports over 7,500 tons of finished frozen products to the European Union, generating income of EUR 7 mill.

Directly or indirectly, as a secondary vocation, around 30,000 citizens of Leskovac are connected to agricultural production. This is, apart from the major industries, the most important economic activity in the City and a linkage industry to the food processing; particularly crop farming vegetable, fruit and grape production and cattle breeding.

## D. Legal, Regulatory, and Permitting Requirements

1. National environmental impact assessment requirements for this activity

   There are no environmental impact assessment requirements for supply and installation of the subject equipment by the project holder (grantee).

2. Applicable National or local permits for this activity, responsible party, and schedule for obtaining them:

| Permit Type | Responsible party | Schedule |
|---|---|---|
| Zoning | - | - |
| Building/Construction | - | - |
| Source Material Extraction | - | - |
| Waste Disposal | - | - |
| Wastewater | - | - |
| Storm Water Management | - | - |
| Air Quality | - | - |
| Water Use | - | - |
| Historical or Cultural Preservation | - | - |
| Wetlands or Water bodies | - | - |
| Threatened or Endangered Species | - | - |
| *Other* | | - |

Procurement and handling of requested equipment does not require any of the above-mentioned permits. The production facility of the FTP member company where the future Pilot plant will be established has all necessary permits, approvals and studies to operate and carry out activities under this project.

3. Additional National, European Union, or other international environmental laws, conventions, standards with which the activity might be required to comply
   a. Air emission standards N/A
   b. Water discharge standards N/A
   c. Solid waste disposal or storage regulations N/A
   d. Hazardous waste storage and disposal N/A
   e. Historical or cultural preservation N/A
   *f. Other*

Legislation relating to the emission of air pollutants that may arise during the production of yeast leavened bakery products and the use of ovens powered by natural gas is located in the following laws:

- Law on Environmental Protection ("Official Gazette of RS", no. 66/91, 83/92, 53/93 - other law, 67/93 - other law, 48/94 - other law 53/95 and 135/04).
- Law on Air Protection ("Official Gazette of RS", No. 36/09)

The production of yeast leavened bakery products in dough fermentation and yeast propagation leads to the formation of alcoholic fermentation, and this is when a certain amount of ethyl-alcohol is formed which in the further process frees up a certain amount of carbon dioxide. The quantities of ethyl alcohol and carbon dioxide, which are formed during the process of manufacture are negligible and do not cause any kind of air pollution. Taking into account that the small-scale production equipment that will be purchased for the pilot plant is not intended for mass-industrial production, the possibility of air pollution is virtually impossible.

One of the two planned ovens in the pilot plant is powered by natural gas. Products of burning propane-butane gas are thermal energy (consumed in the baking of bread and baked goods), water vapor, and a certain amount of carbon dioxide, all in minute amounts that cannot be treated as pollutants. This furnace consumes less than 3 liters of gas per effective hour of work, but the reality is that consumption does not exceed 1.5 - 2 liters of gas / 1 working hour. Also, the subject furnace will not be exploited in full-time work but sporadically, depending on the types of new products being developed in the pilot plant.

Equipment that will be purchased for the purpose of a pilot plant, in terms of the Law on Air Protection, are not stationary sources of pollution, are not subject to the issuance of the license pursuant to Art. 56 of the said law, and are not subject to the control of the municipal nor republic inspector for environmental protection.

Tomaco Line Ltd. factory, where a pilot plant will be established, performs a serial industrial production of confectionery and bakery products at larger scale, using the production equipment of high industrial capacity, at which certain regulations must be complied. The factory has the necessary license to operate, which cannot be issued if the company has not taken all the planned technical, technological and other measures for the protection of air pollution, and if the pollutant emissions from stationary sources of pollution are not below the prescribed emission limit values. Operating license determines that the requirements of protection of air from pollution are met, approves the work of the stationary pollution source and determines the frequency of emission measurement and / or levels of pollutants.

However, industrial gas consumption and industrial production carried out at Tomaco Line Ltd. factory cannot at all be compared with the small-scale trial production which will be performed in a pilot plant.

**E. Engineering Safety and Integrity**

1. Will the activity be required to adhere to formal engineering designs/plans? N
2. Have these been or will they be developed by a qualified engineer? N
3. Do designs/plans effectively and comprehensively address:
   a. Management of storm water runoff and its effects? N/A
   b. Reuse, recycling, and disposal of construction debris and by-products? N/A
   c. Energy efficiency and/or preference for renewable energy sources? N/A
   d. Pollution prevention and cleaner production measures? N/A
   e. Maximum reliance on green building or green land-use approaches? N/A
   f. Emergency response planning? N/A
   g. Mitigation or avoidance of occupational safety and health hazards? Y
      Procured work equipment must be attested in accordance with local regulations in the respective institutions. The equipment must have the necessary certificates and technological and technical documentation. Food technologists that will operate on requested equipment will receive training from the equipment suppliers and STTA experts on the equipment safe handling. Protocols and procedures to properly and safely operate the equipment will be developed by STTA experts. Personal protective clothing for pilot plant users will be provided. There is no need for any type of formal engineering plans or designs. The building already has designed and enforced fire protection and prevention measures and guidelines, and fire emergency evacuation plans for each of the rooms within the building.
   h. Environmental management of mobilization and de-mobilization? N/A
   i. Capacity of the host country recipient organization to sustain the environmental management aspects of the activity after closure and handover? N/A

The activity (procurement, installation and operation on the requested equipment) will not be required to adhere to any formal engineering designs/plans, nor is it due to local laws and regulations. Even the arrangement and layout of equipment within the rooms of the pilot plant will not require any engineering plan. The envisaged equipment is not heavy industrial equipment intended for use in the assembly line production. It is not the equipment that performs complicated technological processes that are interconnected and mutually conditioned between different machines which will be used. The arrangement and location of procured equipment within the rooms of the pilot plant are not conditioned by anything other than the position of available AC power plugs and sockets. Any specific and complicated installation setup for the equipment installment is not required. All equipment runs on electrical power of standard voltage and frequency which is provided through a public network in Serbia. Only the rotary rack oven with gas burner works on propane butane gas for which there is a gas installation in the facility. The equipment is generally small in size and capacity, envisaged for trial production, and very easy to handle. The equipment will be placed at the standard working desks, while

only two pieces of equipment that are little larger will be placed on the floor. Although formal engineering plans are not required, the project activity envisages that FTP hire STTA experts in the field of food processing technology, which will develop an informal plan of the equipment layout at the beginning of the project implementation. Detailed description of food technology processes that will be performed in the pilot plant has been already developed by the food technologist. Prior to the procurement process STTA experts will also develop final and detailed technical specification of the equipment. Whenever it is possible, the equipment technical specification should take into account preference for renewable energy sources and energy efficiency.

4. Are there known geological hazards, e.g., faults, landslides, or unstable soil structure, which could affect the activity? If so, how will the project ensure structural integrity? N
5. Will the site require grading, trenching, or excavation? Will the activity generate borrow pits? If so, how will these be managed during implementation and closure? N
6. Will the activity cause interference with the current drainage systems or conditions? Will it increase the risk of flooding? N
7. Will the activity interfere with above- or below-ground utility transmission lines, e.g., communications, water, sewer, or natural gas? N
8. Will the activity potentially interfere with vehicle or pedestrian traffic? N
9. Does the activity increase the risk of fire, explosion, or hazardous chemical releases? M
   There is a very low risk of accidental explosion and fire due to improper handling of Rotary Rack oven with a gas burner during operation of the project, particularly by untrained and/ or careless personnel. The pilot plant will be established and equipped at the production premises of one of the FTP member companies, at the second floor of the building. The local government authority has issued a Certificate of Occupancy in 2010, attesting that the building and its premises have been built and maintained according to the construction and urban planning regulations. The Certificate of Occupancy includes also regulations that govern the safety of all installations in the facility, as well as the fire protection safety approved by the fire department. As part of the fire protection safety measures each room within the building has developed fire emergency evacuation plan. Fire protection measures are also presented in the Environmental Impact Assessment Study for the existing coal-fired steam boiler of TomaCo Line factory where the equipment will be placed, and are foreseen by the defined risk zones and by external and internal hydrant network fed from the city water supply and appropriate mobile fire suppression systems / fire extinguishers. The premises are equipped with all required electrical, water supply, and sewage installations. The facility has installed a central ventilation system, as well as gas installations with a connection to butane gas station. Food technologists of FTP member companies that will operate on requested equipment will receive training from the equipment supplier on proper handling and the use of equipment. The premises of the Pilot plant must be equipped with the fire extinguishers according to defined fire protection measures, and fire exits must be clearly marked according to designed evacuation plan.
10. Does the activity require disposal or retrofitting of polychlorinated biphenyl-containing equipment, e.g., transformers or florescent light ballasts? N

## F. Environment, Health, and Safety Consequences

### 1. Potential impacts to public health and well-being

a. Will the activity require temporary or permanent property land taking? N

b. Will activities require temporary or permanent human resettlement? N

c. Will area residents and/or workers be exposed to pesticides, fertilizer, or other toxic substances, e.g., as a result of farming or manufacturing? N

If so, how will the project:

i. Ensure that these chemicals do not contaminate ground or surface water? N/a
ii. Ensure that workers use protective clothing and equipment to prevent exposure? N/a
iii. Control releases of these substances to air, water, and land? N/a
iv. Restrict access to the site to reduce the potential for human exposure? N/a

d. Will the activity generate pesticide, chemical, or industrial wastes? Could these wastes potentially contaminate soil, groundwater or surface water? N

e. Will chemical containers be stored at the site? N

f. Does the activity remove asbestos-containing materials or use of building materials that may contain asbestos, formaldehyde, or other toxic materials? Can the project certify that building materials are non-toxic? If so, how will these wastes be disposed of? N

g. Will the activity generate other solid or hazardous wastes such as construction debris, dry or wet cell batteries, florescent tubes, aerosol cans, paint, solvents, etc.? If so, how will this waste be disposed of? N

h. Will the activity generate nontoxic, nonhazardous solid wastes (subsequently requiring land resources for disposal)? N

i. Will the activity pose the need to handle and dispose of medical wastes? If so, describe measures of ensuring occupational and public health and safety, both onsite and offsite. N

j. Does the activity provide a new source of drinking water for a community? If so, how will the project monitor water quality in accordance with health standards? N

k. Will the activity potentially disturb soil contaminated with toxic or hazardous materials? N

l. Will activities, e.g., construction, refurbishment, demolition, or blasting, result in increased noise or light pollution, which could adversely affect the natural or human environment? N

All food processing and technology operations that will take place in the pilot plant will be carried out on a small scale only for product development and testing purposes. The quantities of raw materials and inputs to be used will not be at the level of industrial production and thus of potential waste that occurs will be insignificant and nonhazardous. Materials, raw materials and ingredients that will be used do not contain hazardous substances; these are: lecithin, flour, sugar, cocoa, vegetable fat, whey, milk powder, hazelnuts, almonds, dried fruit and vegetables, fruit syrup, starch, soy flour, candy syrup , fruit powder, flavorings and water. Food additives and ingredients that are hazardous to human health and the environment will not be used. Food technologists and students who will work in the pilot plant will wear protective clothing, coats, disposable caps, gloves and masks, but not because their safety is threatened, but because of the application of usual food safety procedures for this type of food processing operations. The only chemicals that will be used are hygiene items for washing and disinfecting equipment parts, cleaning and disinfecting the work surfaces without rinsing, and for maintaining the personal hygiene of the equipment operators and food handlers.

## 2. Atmospheric and air quality impacts

a. Will the activity result in increased emission of air pollutants from a vent or as fugitive releases, e.g., soot, sulfur dioxide, oxides of nitrogen, volatile organic compounds, methane. N
Only combustion products of burning propane butane gas from the rotary rack oven in insignificant quantities, considering the small capacity of the machine.

b. Will the activity involve burning of wood or biomass? N

c. Will the activity install, operate, maintain, or decommission systems containing ozone depleting substances, e.g., freon or other refrigerants? N

d. Will the activity generate an increase in carbon emissions? N

e. Will the activity increase odor and/or noise? N

**3. Water quality changes and impacts**

a. How far is the site located from the nearest river, stream, or lake?
The site is located 200 m far from the nearest river Veternica that has built coastal defense system and regulated river flow.

b. Will the activity disturb wetland, lacustrine, or riparian areas? N

c. What is the depth to groundwater at the site? N/A

d. Will the activity result in increased ground or surface water extraction? If so, what are the volumes? Permit requirements? N

e. Will the activity discharge domestic or industrial sewage to surface, ground water, or publicly-owned treatment facility? Y
The FTP member, food processing company which will provide production premises for the establishment of mini pilot plant, is involved in manufacture of confectionery products. The company periodically conducts preventive control of drinking water (as a raw material in the food production processes) four times a year, and waste water analysis twice a year. Water analyses are regularly carried out by the Institute for Public Health in Leskovac. Any wastewater derived from the pilot plan will be analyzed as part of these periodic controls. According to local regulations and analytical results of water analysis, business activity performed by this company is not recognized as a polluter and producer of hazardous waste water, and therefore, is not subject to specific environmental protection measures. Planned pilot plant will have small-scale operations and non-industrial function. Very small, almost insignificant amount of nonhazardous wastewater, equivalent to wastewater from household kitchen, will be discharged from the pilot plant. Even if the laboratory will conduct such operations that lead to discharge of hazardous wastewater, it would have no impact on the environment due to already applied mitigation measures.
Currently, the wastewater is not discharged in the public sewer and South Morava River before it is pre-treated and purified. Few years ago, FTP's manufacturing companies operating in the Northern industrial zone, have built through a European RSEDP program, a mutual sewer network for the wastewater disposal that goes directly into the public central plant for the treatment of industrial wastewater. Through a shared sewer network, the wastewater from the industrial area is first being brought to the industrial sewage collection and disposal system that further empties into the city's central treatment plant for waste water which is located 6 kilometers from the industrial zone. There, the wastewater is treated and purified before being discharged into the public sewer which finally flows to South Morava River. The new central treatment plant in Leskovac is in the third phase of construction that began in October 2013. The construction of the plant is worth 25 million euros of which 10 million are provided by the European Union, 5 million by the Government of the Republic of Serbia, and the remaining funds are donated by the Kingdom of the Netherlands. The new plant is partly operational and partly used, and upon its scheduled completion in 2015 all wastewater from the industrial zone will be treated in the new plant according to the strict EU standards and regulations.

f. Does the activity result in increased volumes of storm water run-off and/or is there potential for discharges of potentially contaminated (including suspended solids) storm water? N

g. Will the activity result in the runoff of pesticides, fertilizers, or toxic chemicals into surface water or groundwater? N

h. Will the activity result in discharge of livestock wastes such as manure or blood into surface water? N

i. Does the site require excavation, placing of fill, or substrate removal (e.g., gravel) from a river, stream or lake? N

4. **Land use changes and impacts**
   a. Will the activity convert fallow land to agricultural land? N
   b. Will the activity convert forest land to agricultural land? N
   c. Will the activity convert agricultural land to commercial, industrial, or residential uses? N
   d. Will the activity require onsite storage of liquid fuels or hazardous materials in bulk quantities? N
   e. Will the activity result in natural resource extraction, e.g., granite, limestone, coal, lignite, oil, or gas? N
   f. Will the activity alter the view shed of area residents or others? N

5. **Impacts to forestry, biodiversity, protected areas and endangered species**
   a. Is the site located adjacent to a protected area, national park, nature preserve, or wildlife refuge? N
   b. Is the site located in or near threatened or endangered (T&E) species habitat? Is there a plan for identifying T&E species during activity implementation? If T&E species are identified during implementation, is there a formal process for halting work, avoiding impacts, and notifying authorities? N
   c. Is the site located in a migratory bird flight or other animal migratory pathway? N
   d. Will the activity involve harvesting of non-timber forest products, e.g., mushrooms, medicinal and aromatic plants (MAPs), herbs, or woody debris? N
   e. Will the activity involve tree removal or logging? If so, please describe. N

6. **Historic or cultural resources**
   a. Are there cultural or historic sites located at or near the site? If so, what is the distance from these? What is the plan for avoiding disturbance or notifying authorities? N
   b. Are there unique ethnic or traditional cultures or values present in the site? If so, what is the applicable preservation plan? N

## *Further Analysis of Recommended Actions.*

☐ **1. Categorical Exclusion:** The activity is not likely to have an effect on the natural or physical environment. No further environmental review is required.*

☒ **2. Negative Determination with Conditions:** The activity does not have potentially significant adverse environmental, health, or safety effects, but may contribute to minor impacts that can be eliminated or adequately minimized by appropriate mitigation measures. EMMPs shall be developed, approved by the Mission Environmental Officer (MEO) (and the BEO if required by the IEE) prior to beginning the activity, incorporated into workplans, and then implemented. See Sections H and I below.*

☐ **3. Positive Determination:** The activity has potentially significant adverse environmental effects and requires further analysis of alternatives, solicitation of stakeholder input, and incorporation of environmental considerations into activity design. A Scoping Statement must be prepared and be submitted to the BEO for approval. Following BEO approval an Environmental Assessment (EA) will be conducted. The activity may not be implemented until the BEO clears the final EA. For activities related to the procurement, use, or training related to pesticides, a PERUSAP will be prepared for BEO approval.

☐ **4. Activity Cancellation:** The activity poses significant and unmitigable adverse environmental effects. Adequate EMMPs cannot be developed to eliminate these effects and alternatives are not feasible. The project is not recommended for funding.

***Note regarding applicability related to Pesticides (**216.2(e): The exemptions of §216.2(b)(l) and the categorical exclusions of §216.2(c)(2) ***such as technical assistance, education, and training*** are not applicable to assistance for the procurement or use of pesticides.

## G. EMMPs

### 1. Activity-specific environmental mitigation plan (Upon request, the MEO may be able to provide your project with example EMMPs that are specific to your activity.)

| | | | | |
|---|---|---|---|---|
| Procurement and use of equipment | Engineering Safety and Integrity | *Will the activity be required to adhere to formal engineering designs/plans? NO*<br>*There is no foreseen significant adverse impact. No further environmental review required. Non-the-less, certain mitigation measures may be applied.*<br>Procurement, installation and operation on the requested equipment will not be required to adhere to any formal engineering designs/plans, nor is it due to local laws and regulations. Even the arrangement and layout of equipment within the rooms of the pilot plant will not require any engineering plan. Although formal engineering plans are not required, the project activity envisages that FTP employ experts in the field of food processing technology, which will, develop an informal plan of the equipment layout at the beginning of the project implementation. Detailed description of food technology processes that will be performed in the pilot plant has been already developed by the food technologist. The building already has designed and enforced fire protection and prevention measures and guidelines, and fire emergency evacuation plans. | Develop informal plan of the equipment layout / arrangement within the rooms of the pilot plant to instruct FTP management on the most efficient and productive usage of equipment.<br>Develop final and detailed technical specification of the equipment for procurement process.<br>Whenever it is possible, the equipment technical specification should take into account preference for renewable energy sources and energy efficiency. | Verification of the plan of the equipment layout at pilot plant and the final technical specification of equipment. |
| | Occupational safety | *Mitigation or avoidance of occupational safety and health hazards? Y*<br>*Increase in risk of fire, explosion, or hazardous chemical releases/MAYBE*<br>*The foreseen adverse impact is less than significant. Certain mitigation measures are required.*<br>Very low risk of accidental explosion and fire due to improper handling of Rotary Rack oven with a gas burner during operation of the project, by untrained and/ or careless personnel. | All work equipment must be attested in accordance with local regulations in the respective institutions. Equipment must have the necessary certificates and technological and technical documentation.<br>Do not operate the equipment unless the operators have received the training and information on the | Attests and certificates obtained<br>Site inspection of equipped pilot plant<br>Training on safe handling and use of |

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| | | The local government authority has issued a Certificate of Occupancy in 2010, attesting that the building in which the equipment will be installed has been built and maintained according to the construction and urban planning regulations. The Certificate of Occupancy includes also regulations that govern the safety of all installations in the facility, as well as the fire protection safety approved by the fire department. As part of the fire protection safety measures each working room within the building has developed fire emergency evacuation plan. Fire protection measures are also presented in the Environmental Impact Assessment Study for the existing coal-fired steam boiler of TomaCo Line factory where the equipment will be placed, and are foreseen by the defined risk zones and by external and internal hydrant network fed from the city water supply and appropriate mobile fire suppression systems / fire extinguishers. | safe handling and use of the equipment.<br>Establish protocols and procedures to properly and safely operate the equipment.<br>Provide fire suppression systems / fire extinguishers and clearly mark fire exits based on existing design of fire protection measures and evacuation plan.<br>Provide personal protective clothing for pilot plant users and enforce their use. Provide first aid kit.<br>Try to use equipment suppliers that will take back end of life products.<br>Apply sustainable procurement principles in equipment purchasing. | equipment completed<br>Developed procedures and protocols on safe handling and use of equipment.<br>Portable fire extinguishers, personal protective clothing, and first aid kit provided.<br>Fire exits marked. |
| | Discharge of wastewaters | *Will the activity discharge domestic or industrial sewage to surface, ground water, or publicly-owned treatment facility? YES*<br>*There is no foreseen significant adverse impact. No further environmental review required. Non-the-less, certain mitigation measures may be applied.*<br>Very small, almost insignificant amount of nonhazardous wastewater will be discharged from the pilot plant. The wastewater will not be discharged in the public sewer before it is pre-treated and purified. The building of the pilot plant is located in Northern industrial zone which by the general plan of the city of Leskovac is intended for industrial purposes, and all companies within the zone use mutual sewer network for the | All discharges to the sewer from the proposed project would be required to meet the city's wastewater discharge regulations and must be done through a common sewer system of the Norther industrial zone.<br>No specific mitigation measure required if wastewater disposed of according to the regulation. | Site inspection<br>Record on wastewater test results |

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| | | wastewater disposal that does not go directly into the city sewer. Through a shared sewer network, the wastewater from the industrial area is first being brought to the industrial sewage collection and disposal system that further empties into the city's central treatment plant for waste water which is located 6 kilometers from the industrial zone in the village of Navalin. There, the wastewater is treated and purified before being discharged into the public sewer. | | |
| | Atmospheric and air quality impacts | *Will the activity result in increased emission of air pollutants from a vent or as fugitive releases, e.g., soot, sulfur dioxide, oxides of nitrogen, volatile organic compounds, methane. NO*<br><br>*There is no foreseen significant adverse impact. No further environmental review required. Does not pose the risk due to low capacity of the equipment and insignificant emission of air pollutants.*<br><br>Emission will only contain combustion products of burning propane butane gas from the rotary rack oven. These will be in insignificant quantities, considering the small capacity of the machine and used gas fuel, as well as lower frequency of use of the oven in relation to industrial use. | | |

## 2. Activity-specific monitoring plan

| | | | |
|---|---|---|---|
| Audit of the equipment layout plan and the final technical specification. | At beginning of the project, before the procurement process | Mitigation & reporting: FTP | Equipment layout plan<br>Final equipment specification |
| Audit of equipment attests and certificates | 1. At the procurement process, equipment bid evaluation.<br>2. At the supply of the equipment | Mitigation - FTP, Equipment supplier(s)<br>Reporting - FTP | Equipment attests and certificates |
| Provided training on safe handling and use of equipment completed. | At the supply of the equipment, and periodically for new users throughout the duration of the pilot plant project | Mitigation - FTP, Equipment supplier(s)<br>Reporting - FTP | Records on training completion |
| Developed procedures and protocols | At the supply of the equipment | Mitigation - FTP, Equipment supplier(s) | Procedures and protocols |

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| on safe handling and use of equipment | | Reporting - FTP | |
| Fire exits marked | At the supply of the equipment | Mitigation & reporting: FTP | Site photos |
| Portable fire extinguishers, personal protective clothing, and first aid kit provided and enforced their use. | At the supply of the equipment | Mitigation & reporting: FTP | Site photos, and receipts or purchased equipment and accessories. |
| Analytical results of wastewater | Quarterly reporting from the start of the pilot plant operations | Mitigation & reporting: FTP | Record on wastewater test results.<br>Listing of wastewater discharges |
| Equipment disposal | After a life-time of procured equipment | Mitigation - FTP, Equipment supplier(s)<br>Reporting - FTP | Equipment handover record |

**I. Certification of No Adverse or Significant Effects on the Environment**

The undersigned certifies that all foreseeable significant adverse effects on the environment have been adequately and effectively eliminated or mitigated by the attached Environmental Mitigation and Monitoring Plans (EMMPs) to be implemented at DCN-SER-022. If new adverse effects or the need for new or improved mitigation measures are identified, I will immediately notify the USAID activity manager/COR/AOR.

Implementer Project Acting Director/COP
Ana Martinovic

Aug 6, 2014
Date

**J. Approvals:**

Contracting Officer Representative, Sinisa Cadjo

08/21/2014
Date

Ivan Vukojević

Mission Environmental Officer, Ivan Vukojevic

03/03/2014
Date

Mark Kamiya

Bureau Environmental Officer, Mark Kamiya

09/25/2014
Date