

ENVIRONMENTAL AND SOCIAL COMPATIBILITY STUDY OF ALTERNATIVE FIFA STADIUM SITE CHOICE FOR NIZHNY NOVGOROD

prepared by

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1. The reason for an independent study

The FIFA 2018 Stadium location choice is of a great interest for the citizens and environmental groups in Nizhny Novgorod because it is a chance to improve life quality for thousands of inhabitants. Following FIFA Football Stadiums Technical Recommendations and Requirements, paragraph 1.6, "...choosing the location and design of a stadium, it is vital that early contact and consultation is established with local community representatives, environmental groups and local and national football authorities" [1].

Initially, the regional authorities of Nizhny Novgorod province (oblast) decided to put the stadium on the Volga bank. Public discussion of that site choice was not initiated. During and after the FIFA experts visit to Nizhny Novgorod in June 2011 alternative sites were included in consideration. On July 15, 2011 the Nizhny Novgorod authorities declared beginning of public discussion on the stadium site choice [2, 3]. Nizhny Novgorod authorities declared that only two sites were chosen for further consideration: Village **Olginо (VO)** Prioksky district Nizhny Novgorod and **Komsomolskaya Square (KS)** Leninsky district Nizhny Novgorod. Voting voucher for the Premier league match held on July 21, 2011 follows this alternative choice [4].

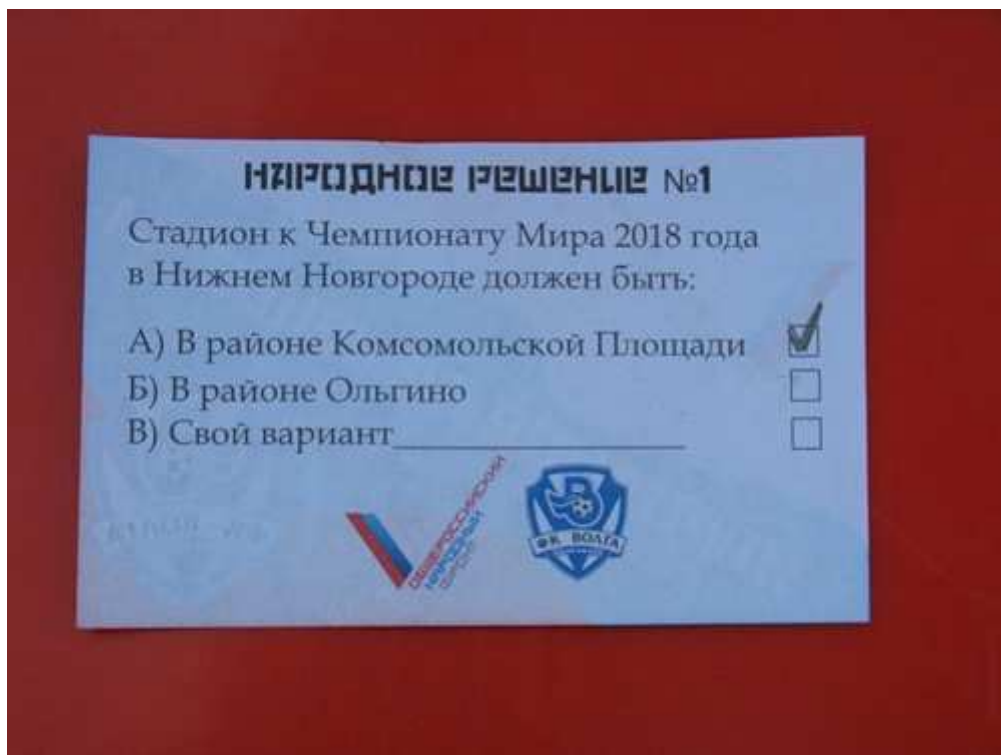


Figure 1 The Stadium site choice Voting voucher distributed among fans on July 21, 2011

On July 24, 2011 the governor of Nizhny Novgorod oblast Valery Shantsev declared his decision to build the FIFA Stadium at Village **Olginо (VO)**. He explained his choice [5].

The attention to the new stadium site choice is reasonable because it will become not only the football matches site. A new arena will become another centre of the city, sound object to determine the development of adjacent area for many years to come. It will become a magnet to attract tens of infrastructural objects. Thus, making a decision we tried to take into account all tunes and details [Unofficial translation].

3. FIFA 2018 Stadium for Nizhny Novgorod

FIFA 2018 Stadium for Nizhny Novgorod includes stadium having capacity more than 40 thousand spectators and area 18...24 hectares and hotel, fan zones, shops, café, restaurants museums, sport schools and studios, gymnastic halls, fitness clubs located on adjacent area. Green area separates the stadium from residential and business areas.

Close breath and sights of the Volga and its big inlet Oka has spiritual importance both for Russian and foreign visitors. Unique sites include the right bank hills crowned by The Kremlin, Volga and Oka confluence place called Strelka and boundless Volga floodplain (left bank) which are known as the most beautiful places in Russia. It is important to include them in easy to visit option for football guests.

Stadium as a multipurpose system could also include gym and technical schools, open air sport facilities, extreme sport facilities, facilities for disabled people, offices directly or indirectly linked to sport of great achievements.

All relevant facilities will be used mainly by local inhabitants and by citizens living at zone of transport accessibility. Easy transfer at least two times per week is important precondition. Medium and high level employers usually consider 10 km long distance from residence to job as acceptable option. But the Stadium creates also jobs preferably for adjacent area inhabitants (women, disabled people).

Sport of high achievements provides load for the stadium during 200 hours per year or less. Premier League Football matches in Nizhny Novgorod usually start at 17.00...21.00 on Saturday. Saturday is a day of low business activity and low traffic in inner part of the city. Existing transport infrastructure and public transport for spectators transfer could be used. This conclusion is not valid for workday time plus one hour during workweek. The weekend traffic jam occurs at the city margins on Friday evening, Saturday morning, Sunday evening and Monday morning. It restricts use of margin areas for the stadium site during weekend.

The Stadium creates more than 20 thousand jobs as it was calculated by Yekaterinburg experts, were football arena has similar capacity [8]. Jobs will be created both during Stadium construction and operation period. Jobs include design and construction jobs, facility technical assistance, shops, restaurants, café and education.

4. FIFA Green goal for Nizhny Novgorod

Following to paragraph 1.4 FIFA Technical recommendations and requirements Green goal includes **reduction of greenhouse gases emissions**. This goal should contribute to the establishment of a neutral climate as far as greenhouse gas emissions are concerned.

4.1. Sustainable sites

This category deals with site choice and integration of development with natural environment, social environment and existing transport network.

Nizhny Novgorod is shrinking City with painful process of transformation from industrial to post industrial economics. During last 20 years population reduction was 200 thousand. Following to census 2010 it is 1250 thousand. Nizhny Novgorod is number one City in the RF concerning absolute population reduction. NN is the only Russian big city with declining population. Nizhny Novgorod is Russian Detroit concerning economic profile and troubles in post-industrial development.

During last two decades tax base is declining. Small salaries and high prices in comparison with Moscow generate migration flow from Nizhny Novgorod. City social facilities have no sufficient financing. Houses of culture, schools, hospitals and kindergartens are the first to suffer from budget reduction. For instance construction of the swimming pool at Kosmicheskaya str. started 20 years ago and was suspended. The declining trend is stable with no reasons to cease.

Exploration of suburb lands for the FIFA will increase impact an environment with no economic and social benefits. Expansion of the city with declining population kills environmental and social sustainability. When former waste site is not rehabilitated during last

28 years the practice of exploration of virgin lands close to spoiled area looks aggressive and unfriendly to environment. Vice versa development of inner areas could help more effective use of existing infrastructure and to sustainable development.

4.2. Transport

An important area of stadium and event management is the transport of spectators to the facility. Green Goal™ encourages the avoidance of unnecessary transport and the use of public transport systems [1,4th edition]

Sustainability aspects that are important for stadium site choice are considered in this paper including:

- *the avoidance of unnecessary transport and reduction of greenhouse gases emissions in the context of spatial structure and of Nizhny Novgorod and existing public transport system*
- *the preferable use of public transport systems*
- *the avoidance of unnecessary loss of energy for water supply,*
- *demolition waste site rehabilitation for Komsomolskaya square and municipal waste site rehabilitation located at the neighborhood of stadium site close to village*

5. Alternative sites description

5.1. Olgino

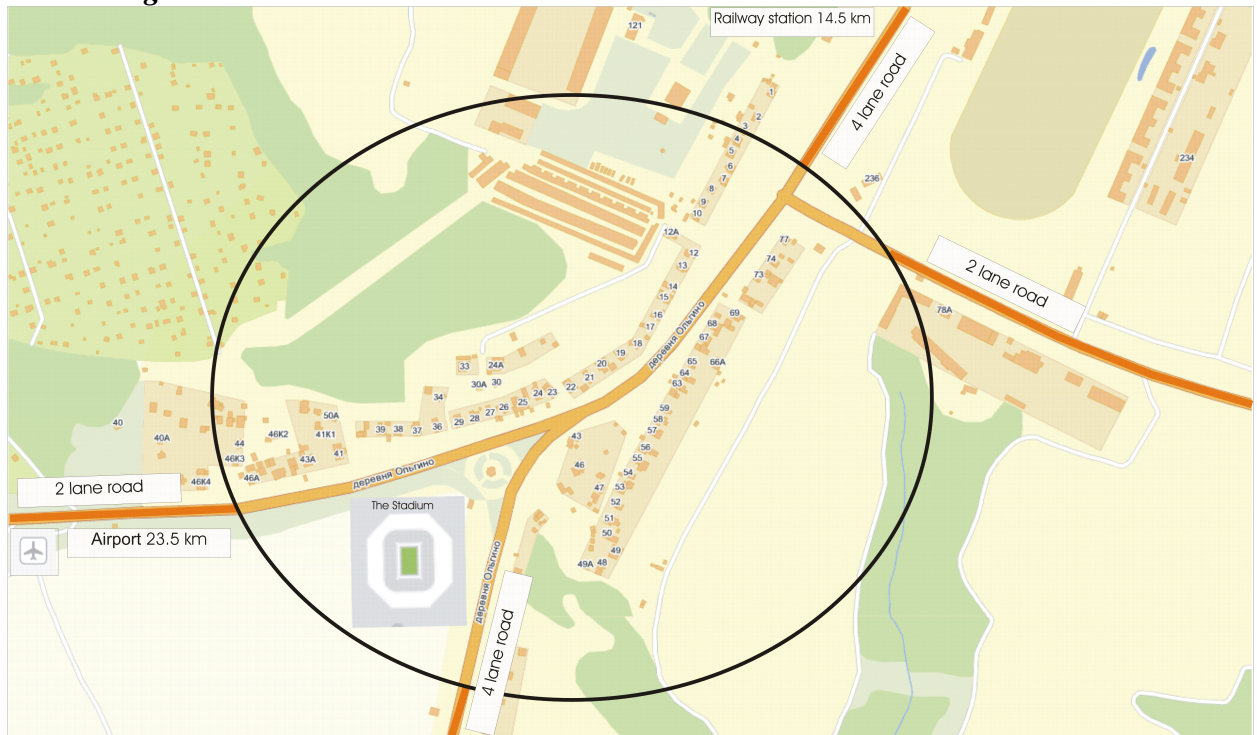


Figure 4. The Village Olgino site.

Stadium site adopted by regional authorities is located close to village Olgino Prioksky district Nizhny Novgorod. Exact place still is not selected. The site is restricted by ravines and buffer sanitary zone of Municipal solid waste site. Solid waste site is located 1500 m southward from Olgino.

The village is located close to microdistrict Scherbinki 2 on the dual-dual highway to Arzamas and Pavlovo. Height of the village is 177 m according to Baltic sea system. Key feature of the transport system is the only way connecting the village with Nizhny Novgorod via the dual-dual highway called Academician Sakharov Ave.

Two lane road to Bogorodsk could be used for transfer to Strigino airport. Two lane road to Kstovo is alternative way to Nizhegorodsky district. Alternative ways are sufficiently longer than direct way via Academician Sakharov Ave. Distance from VO to railway station is 14 km. Village Olgino has spare but narrow 23.5 km long road to airport.

The Village Olgino now is a small settlement with private one-family houses. Population is 200 inhabitants. It is known among Nizhny Novgorod inhabitants as illegal drug trade place. Forest located close to the village is protected as regional nature heritage “Malinovaya gryada”. On the southern side of the village agricultural fields are located.

1500 m southward from Olgino old municipal solid waste landfill was located. This landfill was officially closed in 1983. It was used for disposal of upland part of Nizhny Novgorod from approx. 1960 to 1983. The landfill is seen on Google map of Nizhny Novgorod. Its size is approx. 10...12 ha. (see figure 5 and 6).



Figure 5, 6. Margin of landfill disturbed by scrap diggers.

Waste layer height exceeds 10 m. Waste volume could reach 1 mln cubic meter. In fact it is ravine filled by pressed wastes. Hydroisolation does not exist. Springs located under the hill are poisoned by wastes and have very unpleasant odor. The Springs and surface water from the waste landfill are coming to river Kudma - inlet of the Volga. The landfill was not bordered. Fresh traces of trucks, excavators and bulldozers were clearly seen. Scrap diggers explore the site nowadays. To prevent further emission of pollution to environment the site should be rehabilitated.



Figure 7, 8. Landscape shaped by waste

The most powerful stationary source in Nizhny Novgorod is Avtozavodskaya energy plant located 4 km westward from Olgino. Emission source height is 180 m. Estimations indicated the highest concentration level close to Olgino. The energy plant is located on the floodplain 100 m lower than the village located upland on river bank. This feature is a factor that is strengthening pollution level near Olgino. This site is located at the area of high influence of the energy plant pollution including 40 source heights (7200 m). Transport coming via Olgino emits high level of noise and chemical pollution close to the road. Powerful stationary source,

noisy and contaminated roads and landfill are hazardous facilities. Health risk assessment is obligatory procedure for this site following to Russian legislation [9, 10].

No hospitals are located at Olgino.

5.2. The Komsomolskaya Square

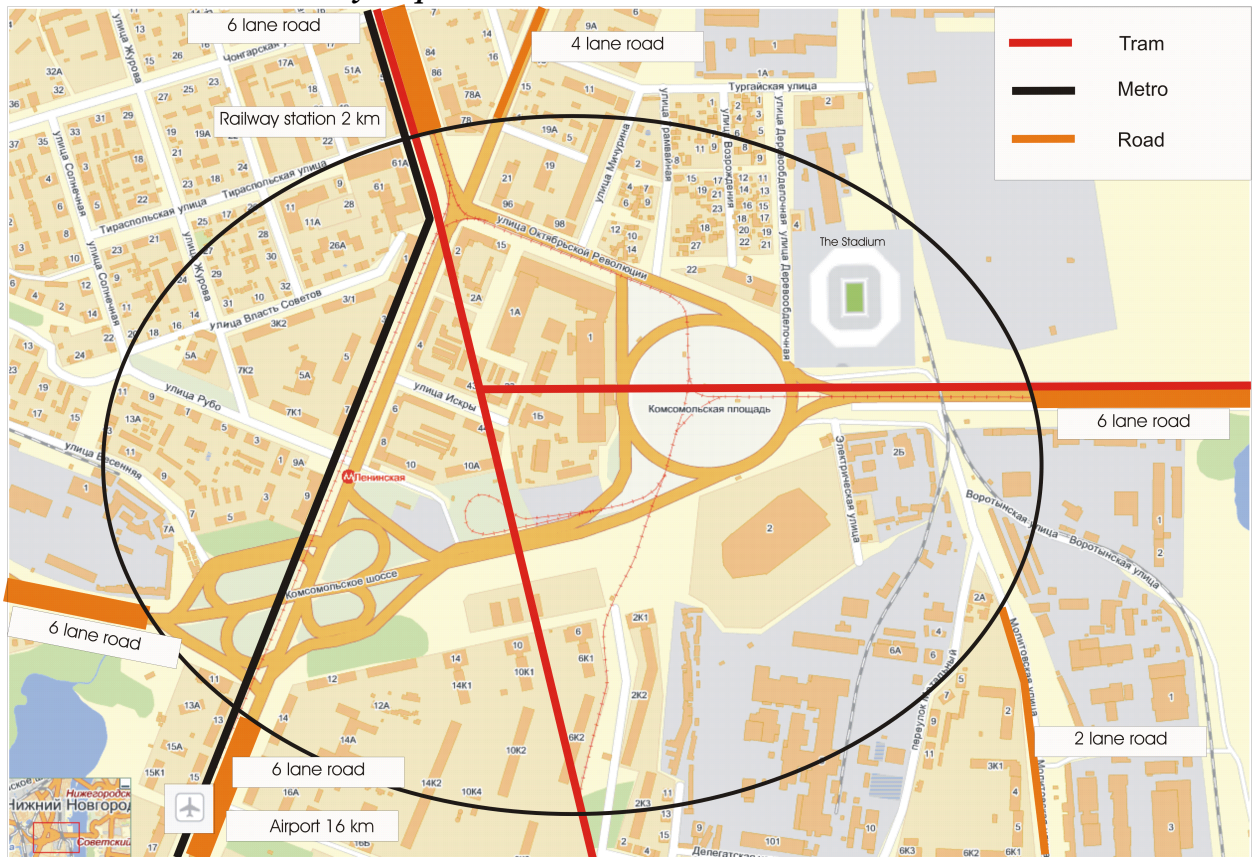


Figure 9. The Komsomolskaya Square stadium site.

The alternative stadium site is located close to the population centre and to geographic centre of Nizhny Novgorod at Komsomolskaya square District leninsky Nizhny Novgorod at the lowland (left bank of the Oka river). Left border of the site is located in Kanavinsky district. A core of the site is the bankrupt enterprise “Novaya Sosna”. The site is illegal demolition and construction waste site including destroyed buildings and wooden wastes. Another part of the site includes dilapidated housing and industrial enterprises of low effectiveness less than 1 million USD NPV per 1 ha per year. Following to the Municipal General Plan profile of the land use will be changed from industrial zone to administrative and business zone. The industry is planned to be replaced to another area.

Novaya Sosna square is approximately equal to 20 ha. Square of adjacent residential area is approximately equal to 5 ha. Square of Melinvest is equal to 7.1 ha. Total area for the Stadium exceeds 32 ha.

Level of the site is 70...80 m following to Baltic Sea system. The site has the best public transport system in Nizhny Novgorod. The site is located at the most convenient place: distance from the site to city districts is minimal. Highway adjacent area is polluted by vehicle emissions. Buffer zone between highways and the stadium is to be established. Hospital is located close to the site at Lenin Ave.

Railway station as a most comfortable link to Moscow is located 3 km far from this site. Airport is located 17 km far from KS.

6. Nizhny Novgorod Spatial Structure Impact on Site Choice

6.1. Public transport

The Oka river divides Nizhny Novgorod on two parts: left bank (lowland) and right bank (upland). Biggest share of Nizhny Novgorod population (71 %) resides on lowlands (left bank of the Oka river). Main share of jobs is located upland (the right upper bank) at historical and administrative centre of Nizhny Novgorod. In particular 220 thousand jobs are located in small historical centre of Nizhny Novgorod. The bridges are bottlenecks of transfer system because of diurnal commuting between residents and jobs.

Upland has relatively poor public transport system. Roads are narrow. The Capacity of different types of public transport coming via Scherbinki 2 is 10000 per half an hour (20000 passengers per hour) that is 23% of the Stadium capacity. (less that 50% recommended by FIFA)

Lowland has developed public transport and communication system including airport, railways and railway station, six lane highways, underground metro, bus, tram and trolley (now its use is suspended).

Komsomolskaya square is important public transport hub. It includes 31 route of middle size buses (53 passenger), 9 routes of big buses (96 passenger), 6 routes of tram (186 passenger per unit) and metro (4 carriages, 306 passenger per carriage).

Public transport capacity is close to 116 thousand per hour including 30 thousand passengers transferred by metro. That is 58 thousand passengers per half an hour. Half capacity of the system will solve the problem for football match transport.

Public transport at Village Olgino has insufficient capacity. VO site is located far from airport and railway station.

Public transport at Komsomolskaya square has sufficient capacity. The KS site is located close to railway station and 7.5 km closer to the airport than the VO site.

6.2. Bottleneck for use of private cars.

Village Olgino has the only one convenient link to Nizhny Novgorod. It is called Academitian Sakharov Ave. It is dual-dual highway close to Olgino and 6 lane close to Myzinsky bridge. The highway is planned to be reconstructed. Construction of the second string and broadening of the highway could provide not more than 7 lanes to one direction. The time for spectators transfer will exceed 3 hours even after improvement. Road capacity at village Olgino is insufficient to proper transfer of spectators from stadium.

Total capacity of Komsomolskaya square roads is 30 lanes (15 lanes in one direction). Key highways Komsomolskoye Roa, Lenin Ave. and Golubeva str. could easily be broaden to reach 36 lanes totally.

The road capacity exceeds 15000 vehicles per hour. It corresponds to FIFA requirements. Komsomolskaya square is not the last stop for public transport. **Every route could transfer spectators in two directions.** Village Olgino and Scherbinki 2 is the last stop of the routes. Olgino has no metro or tram. Public transport transfer capacity of village Olgino is 7 folds lower than of Komsomolskaya square.

Transport capacity calculation were made for spacing of buses, trams and metro equal to five minutes (typical spacing for peak hour).

Table 1

Village Olgino and Scherbinki 2				
Public Transport type	Number of routes	Quantity of Vehicle Units per 30 min.	Capacity of one unit	Quantity of passengers per 30 min (100 % load of public transport and 50% load of private cars)
Tram	0	0	186	0
Metro	0	0	1320	0
City Bus and trolley	9	54	96	5184
Commercial midibus	15	90	53	4770
Private cars	7500	7500	4	15000
Total public transport capacity per half an hour.				24954

As it is seen from the Table, Public transport capacity at village Olgino and Scherbinki 2 is 23,1 % of the Stadium capacity significantly less than FIFA Stadium book requires. Sufficient capacity could be achieved by 150 city buses and 300 commercial midi buses instead of 54 and 90 respectively.

The crucial bottleneck of the site is poor road capacity. All public transport routes are coming through Academician Sakharov Ave. For estimation simplified formulas were used recommended by [<http://inf-remont.ru/road/roa122/>]: One direction capacity for

two lane road is 1000 units per hour,
dual-dual highway 3050 units per hour,
six lane highway 4650 units per hour, as it was recommended by [11].

Using two absolutely spare lanes 7500 cars and 450 buses could remove spectators from the stadium area at Olgino in 2 hours 40 minutes. Alternative roads have two lanes. They are 20 km longer than usual way. Using additional roads, spectators could be removed in 1 hours 35 minutes. It does not fit to FIFA requirements.

Table 2

Komsomolskaya Square				
Public Transport type	Number of routes	Quantity of vehicles per 30 min.	Capacity of one unit	Quantity of passengers per 30 min (50 % load)
Tram	6	72	186	6696
Four carriage Metro (308 passengers per carriage)	1	12	1232	7392
City Bus	9	108	96	5184
Commercial midibus	31	372	53	9858
Total public transport capacity per half an hour				29130
Private cars	7500	7500	4	15000
Total private and public transport capacity per half an hour				44130

As it is seen from the Table, public and private transport at Komsomolskaya Square has capacity that twice exceeds Stadium capacity. Public and private transport capable to transfer 44130 passengers per half an hour with 50% load (50% load is taken because it is not first stop and some passengers started their trip before the Stadium). 15 spare lanes from Komsomolskaya Square are sufficient for transfer spectators in 21 min. 18 (planned) lanes are sufficient for

transfer spectators in 16 min. Additional metro and tram carriages also may be used for prompt transportation as a low cost decision.

There are several ideas to improve transfer capacity at Olgino on the basis of new public transport system.

1. Metro
2. The second string to Sakharov Ave
3. Light rail
4. High-speed railway line

Low population density makes inefficient metro construction. The project does not exist, but the concept of metro line to Olgino was included in the Nizhny Novgorod General plan (2011-2030).

Light rail project is an option to discuss for Prioksky district. But the trend during last 20 years for Nizhny Novgorod is to remove tram lines. Light rail idea was not included in the general plan (2011-2030).

The concept of high-speed railway line includes construction of railway station 800 m far from Olgino for high-speed railway line Moscow-Kazan-Ekaterinburg. The line was not included in the Russian Railway strategy – 2030 and financial sources are under discussion.

Bottleneck of the village Olgino site is concentration of all public transport routes on Sakharov Ave.

Traffic jam is usual phenomena at the Ave on weekend (Friday -16.00...20.00 Saturday – 7.00...12.00 Sunday 14.00-21.00) and during the week at (7.00...10.00 and 16.00 ... 19.00).

Direct and indirect Stadium Costs and sources of financing still remain uncertain.

Public transport investments for improvement of alternative site located at Komsomolskaya square could be sufficiently less expensive.

7. Economic, Environmental and Social Impact of the FIFA Stadium on Nizhny Novgorod

The most depressive part of Nizhny Novgorod is industrial heart of the city located on the lowland (left bank of the Oka river). Left bank population is approximately 900 thousand that is 71 % of total population. Lowland is transport centre of the city. Airport, railway station and logistic centre are located on the lowland.

Huge scale reduction of jobs during last years occurred at the biggest enterprises. For instance Gorky automobile plant (GAZ) reduced jobs from 110 thousand to 29 thousand. Similar reduction was held on other machinery plants of the lowland of the city.

People living on lowland really need better respectable jobs located close to their residential areas. Sufficient part of employers are women. They usually try to find job not very far from residence because everyday traffic jam has bad influence on their families. The job places on upland is a difficult challenge for lowland families. It is important to create new jobs at the lowland. The FIFA Stadium located at Komsomolskaya square could be smart decision.

7.1. Water use and energy saving

Usually the Stadium is active water user. Concerning water use two sites differ by level of their sites. Olgino level is 170...180 m (Baltic sea system) and Komsomolskaya square level is 80...90 m. Additional 80...100 m lift of water causes additional energy losses on pumping.

7.2. Waste reduction before the stadium construction

Both sites are contaminated by construction and demolition wastes.

Illegal wastes are distributed along the southward road from 300 m to 1500 m from Olgino. Bankrupt enterprise Novaya Sosna site is polluted by demolition wastes and by wooden wastes.

1500 m southward from Olgino former municipal waste site is located. It collected city municipal wastes till 1983. Its size is 10...12 ha. Waste volume is approximately 1 mln cubic meters (expert assessment).

Rehabilitation of illegal waste sites needs relatively small financing.

Rehabilitation of the former municipal waste landfill needs special investigation.

This landfill has no waterproofing. The springs located under the hill close to the dacha village Kusakovka have very bad odor. Rehabilitation costs of waterproofed sites do not exceed 40 mln rubles [12]. This site needs another solution based on complete treatment or removal of the wastes. Costs could exceed 100 mln rubles. Nizhny Novgorod has negative experience on rehabilitation of waste sites. Risk to be late with the site rehabilitation before 2018 still exist.

7.3. Avoidance of unnecessary transport

FIFA Green Goal supports avoidance of unnecessary transportations as a way to reduce greenhouse gases emission. Comparison was made concerning spectators transfer to alternative sites. ((Resource use at KS) minus (Resource use at Village Olgino)). Extra resource losses at VO in comparison with KS are considered as unnecessary losses.

Table 3

City districts	Population	Distance from the district to Village Olgino	Distance from the district to Komsomolskaya Square	Additional distance
Avtozavodsky (Lowland)	302,6	12,3	8,7	3,6
Sormovsky(Lowland)	172,1	18,8	8,7	10,1
Kanavinsky(Lowland)	156,9	16,6	6,1	10,5
Sovetsky (Upland)	151,6	12,7	8,2	4,5
leninsky (Lowland)	144,6	9,8	2	7,8
Moskovsky (Lowland)	129,8	16,8	6,7	10,1
Nizhegorodsky (Upland)	124,5	17	12,8	4,2
Prioksky (Upland)	93,2	2,2	11,7	-9,5
Total	1275,3			

Comparison indicates that Olgino site is more remote than Komsomolskaya square from 7 districts among 8. Visit to Olgino emit more greenhouse gases than visit to Komsomolskaya square. 20 matches per year will generate loss of time equal to 14,8 hours per person per year. Fuel losses are equal to 318 ton per year for 20 matches and full arena load. 30 years fuel use is 9540 ton. Greenhouse gas generation CO₂ will exceed 19800 ton.

Calculations were based on simple model of spectator distribution proportionally to population distribution among districts.

Table 4

City districts	Spectators	Loss of time per 1 spectator	Total Loss of time	Loss of fuel, ton
Avtozavodsky (Lowland)	10,2	7,2	73461,1	36,7
Sormovsky(Lowland)	5,8	20,2	117216,4	58,6
Kanavinsky(Lowland)	5,3	31,5	166644,0	83,3
Sovetsky (Upland)	5,1	13,5	69006,4	34,5
leninsky (Lowland)	4,9	23,4	114088,1	57,0
Moskovsky (Lowland)	4,4	30,3	132609,1	66,3
Nizhegorodsky (Upland)	4,2	12,6	52892,7	26,4
Prioksky (Upland)	3,1	-28,5	-89560,6	-44,8
Total	43,0		636357,2	318,2

Calculation of unnecessary fuel burning and loss of time is considered for 50-50 distribution of spectators between public and private transport 20 visits per year during 30 years for 30 thousand spectators per match. The cost of decision to place the stadium in village Olgino in comparison with Komsomolskaya square is as follows.

Loss of time per person per year is 15 hours.

Total loss of fuel is 318 ton per year and 9540 ton per 30 years.

Extra costs for transfer will exceed 10 thousand rubles per person per 30 years. Totally - 300 mln rubles for 30 years and 30 thousand person.

Unnecessary green gas CO₂ emission is equal to 983 ton per year and to 29486 ton per 30 years.

7.4. Increased vehicular traffic caused by football matches.

Usual premier-league matches start at 18.00...21.00 on Saturday. It is silent period both for central part of NN and for margin areas.

Traffic generated by football match in Olgino will cause collapse of transport system on Sakharov Ave during 2...3 hours before and 2...3 hours after the match.

At Komsomolskaya square and Lenin Ave traffic jam occurs during 7.00...9.30 and 16-00...19-30 from Monday to Friday. No traffic jam occurs during weekend there. Traffic flow generated by football match on Komsomolskaya Square is lower than maximum. No traffic jam will be generated by football matches during proper time.

7.5. Large numbers of noisy and often aggressive fans/pedestrians; noise from events; bright building and event lighting; overshadowing of adjacent properties

7.5.1. Village Olgino

Village Olgino is residential area of small 1...2 floor private houses. Authorities are planning to build in Olgino large residential district with population 30 thousand [14]. Noisy and aggressive fans could become negative factor for the living conditions. Share of fans among population usually is less than 3% of population. People in general suffer from noise. Bright stadium building and event lighting also is negative factor for Olgino.

Expected site for stadium construction is close to transport communication on the hill. It could become negative factor for insolation reduction. Lower sites is risky because 1500 m from Olgino former waste disposal site is located. It should be rehabilitated before construction.

City Bus station is planned to replace from the central part of Nizhny Novgorod to Olgino. Coincidence of football match time with suburb transport flow to the bus station will be real disaster for bus station visitors.

7.5.2. Komsomolskaya square

For the Stadium site at Komsomolskaya square noisy and aggressive fans will move down the river to fan zone located at Marat square and to public transport stops without visiting residential area. It is supposed that small houses close to Novaya sosna will be removed. Noise sources will be far from residential and business areas. The Oka bank is already prepared for planned level of Cheboksary reservoir. The stadium location will be the lowest position available in Nizhny Novgorod to save comfortable conditions for residential and business areas.

8. Scale of the project in relation to its surroundings.

Two scales were considered to evaluate involvement of local population during both non-event and event times. Small scale has radius 3 km. Large scale has radius 10 km.

8.1. Olgino

3 km area includes residential area of village Olgino and microdistrict Scherbinki 2. With total population approximately 40 thousand. 10 km zone includes upland Prioksky district completely, small part of Sovetsky district with total population 100 thousand and adjacent to Myzinsky bridge lowlands of Nizhny Novgorod with total population appr. 100 thousand. Stadium jobs and services are convenient for residents of Prioksky district. Bottle neck of Myzinsky bridge is a risk factor for users and employers from lowlands.

The Stadium located at Olgino could become a facility of the district (not city) scope.

Scale of the project does not corresponds to village Olgino. Population of the village is approx. a thousand. The village has no schools, kindergartens and hospitals. One small shop and several close to road café are located at the village now. Build environment includes small

private houses. Scope of the project does not fit to small size and residential status of the village. Planned enlargement of the village and construction of residential microdistrict close to the village does not change residential status of the area.

8.2. Komsomolskaya square

3 km zone includes lowland residential areas with population 80 thousand. 10 km zone includes residential areas on both sides of the Oka river with population 1 mln.

The scope of the Stadium located at Komsomolskaya square is a facility for the big city.

Build up area at Komsomolskaya square includes multi store buildings of scientific and educational organizations and Trade&Business centres. Office of the biggest Russian transport company Russian Railways is located close to the square. 2100 m far from the Stadium along the Oka river fan zone is planned to put. On the other side of the square large densely populated residential area is located. Scale of the stadium located on the bank of the big river close to core of the city transport system fits to scale of environmental objects and transport, business and social facilities.

8.3. Lack of activity around the stadium at non-event times

Village Olgino and micro district Scherbinki 2 could provide local activity for the stadium. Broader scope of activity is vague because of traffic jam on Myzinsky bridge, Sakharov and Gagarin Ave. Developer consider the *Village Olgino* adjacent area as low attractive for investors [13].

Metro and tram provide good communication between *Komsomolskaya square* and adjacent districts every day from the early morning to the dark evening. *Komsomolskaya square* is attractive for investors. Traffic jam exist during 30 hours totally per working week and does not occur during late evening and weekend. No obstacle exists to city scope activity during the whole week at *Komsomolskaya square* starting at 20.00 ...21.00 during working week and with no time restriction during weekend and holidays.

9. Final notes and conclusions

Comparison of two sites concerning sustainable urban development indicates great advantage of *Komsomolskaya square* site against *Village Olgino* site. Key advantages are:

1. The *Village Olgino* site exploration is expansion to virgin forest and agricultural lands close to spoiled area of municipal waste site. It means aggressive policy ignoring environmental protection and human health care. *Komsomolskaya Square* site fits to the SD principle of **compact development**.
2. *Village Olgino* site in comparison with *Komsomolskaya square* site generates
 - unnecessary spectator costs,
 - losses of time, fuel and
 - green house gases emission.
3. The stadium site at *Village Olgino* has unpleasant neighborhood including municipal waste site, ravines and breaks from nice river sites. Unpleasant sites of VO could ruin desire of guests to visit Nizhny Novgorod. Convenient geographical position and beautiful neighborhood of *Komsomolskaya square* attracts visitors and investors. Scale and scope of the stadium located close to KS could renovate the whole city life.
4. The stadium site at *Komsomolskaya square* can help smart social policy and tourism development.

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