



INFORMATION

**ON THE CLARIFICATION OF CERTAIN TECHNICAL
SOLUTIONS PRESENTED IN THE
ENVIRONMENTAL IMPACT ASSESSMENT
PROCEDURE ON THE IMPLEMENTATION OF THE
NEW NUCLEAR POWER PLANT UNITS AT THE
PAKS SITE AND ASSESSMENT OF THE
ENVIRONMENTAL IMPACTS THEREOF**

06 July 2016

Table of Contents

1	BACKGROUND.....	4
2	CLARIFICATION OF THE TECHNICAL SOLUTIONS PRESENTED IN THE ENVIRONMENTAL IMPACT ASSESSMENT ON THE IMPLEMENTATION OF THE NEW NUCLEAR POWER PLANT UNITS AT THE PAKS SITE AND THE ASSESSMENT OF THE ENVIRONMENTAL IMPACTS THEREOF.....	4
2.1	Clarified technical solutions.....	4
2.1.1	Location of Paks II. within the Paks Nuclear Power Plant site.....	5
2.1.2	The installation site of Paks II. substation.....	5
2.1.3	Position of the Paks II. units within the site.....	6
2.1.4	The separate hot water canal.....	7
2.1.5	Construction schedule of Paks II.	7
2.1.6	Operation schedule of Paks II.....	7
3	ASSESSMENT AND EVALUATION OF THE ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE TECHNICAL SOLUTIONS CLARIFIED.....	8
3.1	Review of the impact elements, processes and impact factors concerned by the clarifications of the technical solutions.....	8
3.2	Geology and groundwater at the site.....	9
3.2.1	Impacts and impact areas of the clarified technical solutions on the groundwater in the construction phase of Paks II.	9
3.2.2	Drinking Water resource analysis – Operating deep aquifer water works at Csámpa.....	9
3.3	Ambient air.....	9
3.3.1	Impacts and impact areas of the clarified technical solutions in the construction phase of Paks II.	10
3.3.2	Impacts and impact areas of the clarified technical solutions during normal operation at Paks II.	10
3.3.3	Impacts and impact areas of the clarified technical solutions during parallel operation of Paks II. and Paks Nuclear Power Plant.....	11
3.4	Noise control.....	11
3.4.1	Noise impact area determined on the basis of the clarified technical solutions during the construction phase of Paks II.	11
3.4.2	Cumulative impact area of the construction of Paks II determined on the basis of the clarified technical solutions.....	13
3.4.3	The impact area of the operation period of Paks II. determined on the basis of the clarified technical solutions.....	13
3.4.4	The cumulative impact area of the operation period of Paks II. determined on the basis of the clarified technical solutions.....	15
3.4.5	Noise impacts beyond normal operation determined on the basis of the clarified technical solutions.....	15
3.4.6	Noise impact area of joint operation of Paks II. and Paks Nuclear Power Plant determined on the basis of the clarified technical solutions.....	15
3.5	Environmental radioactivity - radiation exposure of the population living near the site.....	17
3.5.1	The impact of the clarified technical solutions on the environmental radioactivity – radiation exposure of the surrounding population.....	17
3.5.1.1	Emission points.....	17
3.5.1.2	Findings.....	17
3.6	Biosphere, ecosystem.....	17
3.6.1	The impact and impact area of the clarified technical solutions in the construction phase of Paks II.	17

3.6.2	Impacts and impact area of the clarified technical solutions during the operation of Paks II.	18
3.7	Cumulative impact areas determined on the basis of the clarified technical solutions	19
3.7.1	Paks II. - Construction	19
3.7.2	Paks II. - Operation.....	20
4	SUMMARY	21

1 BACKGROUND

Section 31 in Annex 1 to 314/2005 (XII. 25.) Gov. decree on the environmental impact assessment and on the unified procedure of licensing the use of the environment (hereinafter referred to as EIA Decree) determines the nuclear power plant among the activities where environmental licence is needed for the commencement of the implementation of the Project. The application for the Environmental Impact Assessment procedure shall include an Environmental Impact Assessment Report (hereinafter referred to as EIA report).

The EIA report for the Paks II. Nuclear Power Plant was elaborated pursuant to the provisions laid down in 314/2005. (XII. 25.) Gov. Decree according to the data available in March 2014, and was submitted on December 19, 2014 to the competent South-Transdanubian Environmental and Nature Conservation Directorate (DDKTF).

2 CLARIFICATION OF THE TECHNICAL SOLUTIONS PRESENTED IN THE ENVIRONMENTAL IMPACT ASSESSMENT ON THE IMPLEMENTATION OF THE NEW NUCLEAR POWER PLANT UNITS AT THE PAKS SITE AND THE ASSESSMENT OF THE ENVIRONMENTAL IMPACTS THEREOF

Since the submission of the EIA report on December 19, 2014 the Russian partner has specified the conceptual proposals for some of the technical solutions, therefore certain data previously presented in the EIA report was clarified accordingly.

Assessment was carried out on the basis of the clarified data available at March 24, 2016 provided by the Russian partner in relation to the conceptual proposals on the technical solutions.

2.1 SPECIFIED TECHNICAL SOLUTIONS

Compared to the EIA report submitted the following specific technical solutions were assessed, as currently known and identified by MVM Paks II. Zrt. on the basis of the discussions carried out with the Russian partner:

The units' buildings shifted to the north and their size increased, therefore the size and position of the operational and staging areas of the new units within the industrial economic area (hereinafter referred to as GIP area) are specified.
--

The location of Paks II. substation is modified, thus the length of the 400 kV unit lines and the 132 kV back-up feeder line will be reduced.

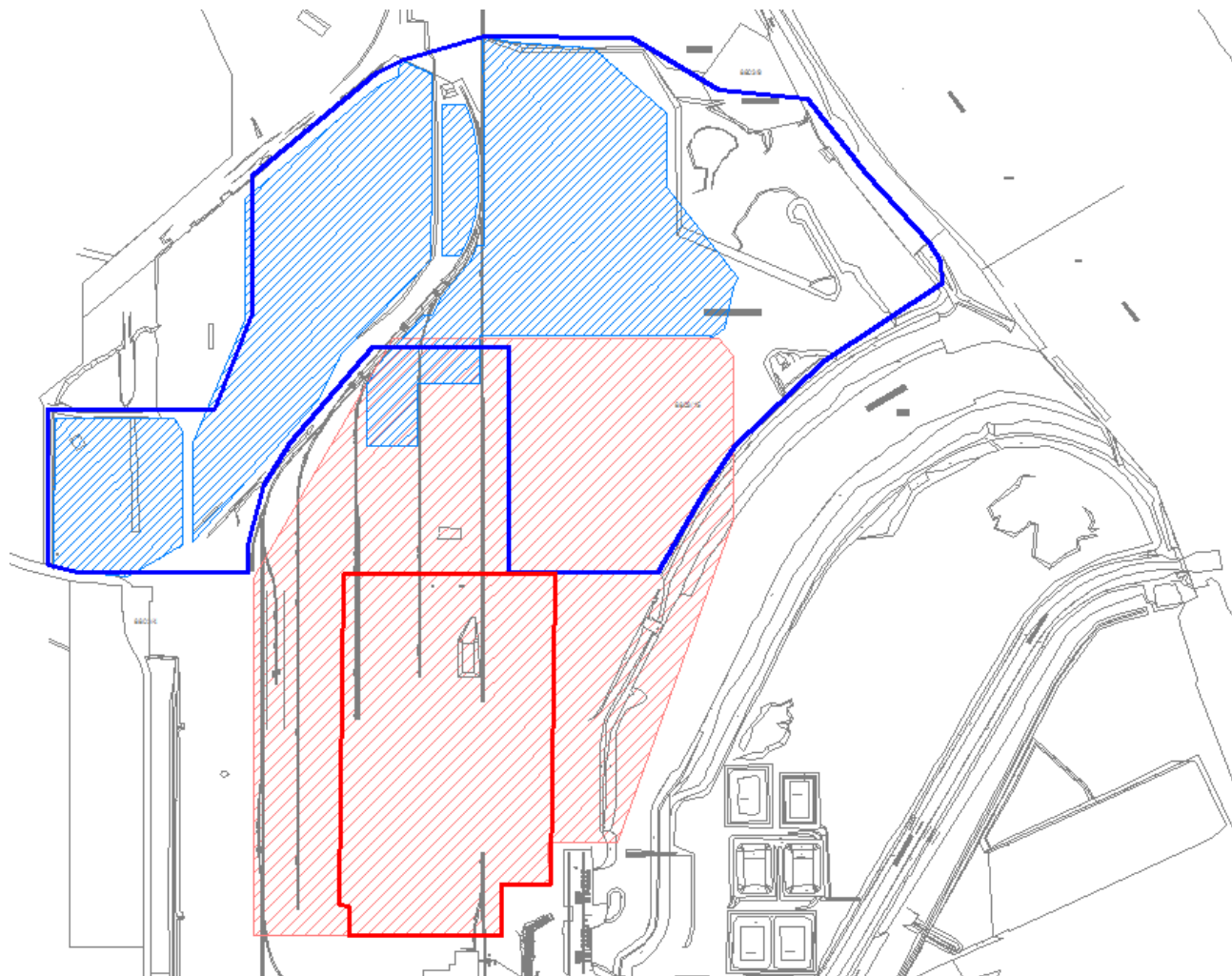
The warmed up cooling water will be discharged in a new open surface canal parallel with the existing hot water canal of the Paks Nuclear Power Plant.
--

A one year shift is taken into account in the construction schedule of the two new units.

Table 2.1-1: List of the specified technical solutions

2.1.1 MODIFIED LOCATION OF PAKS II. WITHIN THE PAKS NUCLEAR POWER PLANT SITE

The comparison of the previously presented site and the more precisely specified one can be seen on the figure below. The previously presented areas are marked using dark lines, while the more precisely specified areas of 2016 are marked with a thin line and cross-hatched.



Legend:
dark contour marks the earlier state, pale contour and cross-hatched areas mark the current state
blue: staging area (construction and erection base area)
red: construction area

Figure 2.1-1: Comparison of the earlier and more precisely specified sites assessed

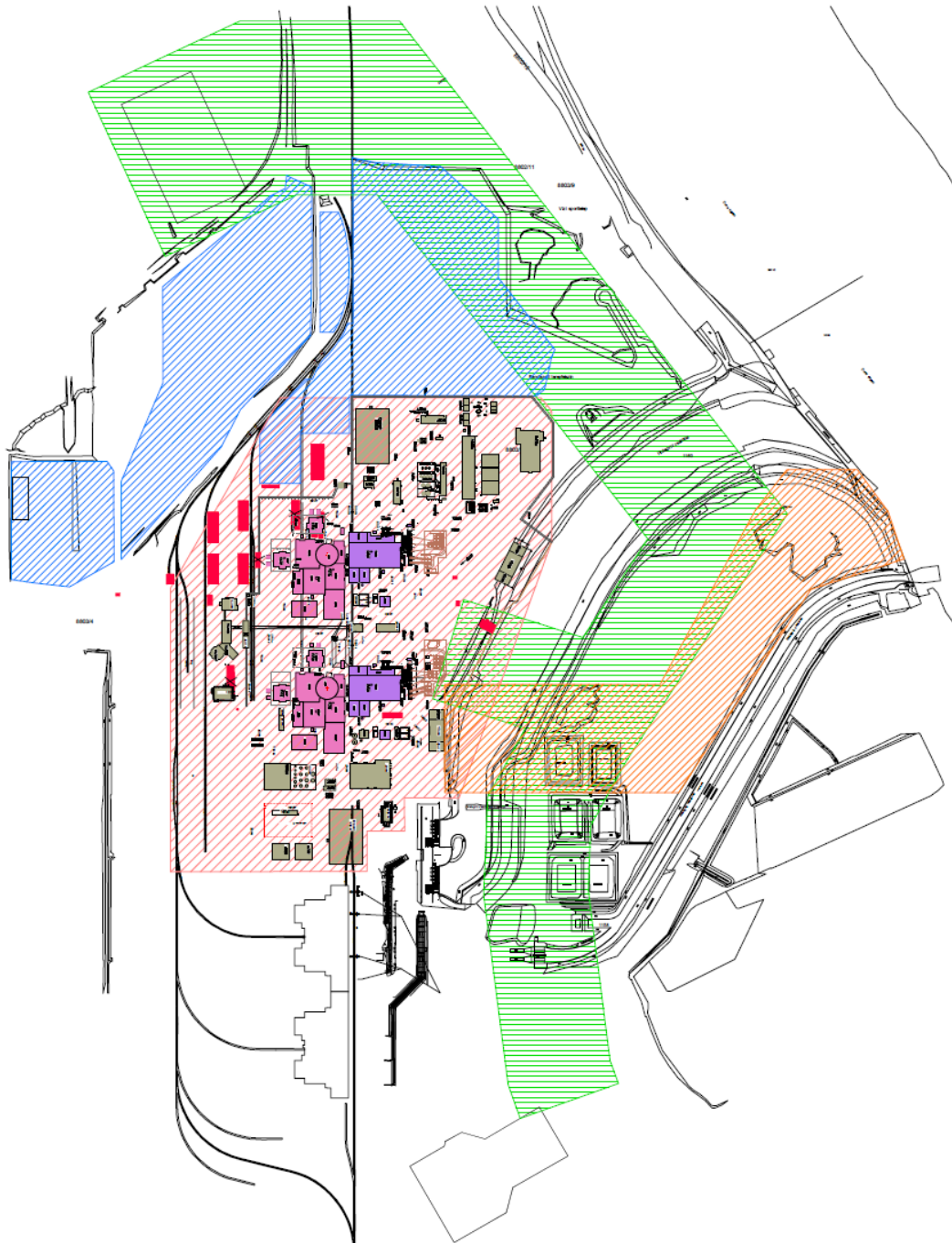
2.1.2 THE MODIFIED INSTALLATION SITE OF NEW PAKS II. SUBSTATION

Several potential locations were determined for Paks II. substation by taking into account the installation criteria applied for MAVIR type stations, the special objectives and requirements applicable to the MAVIR transmission network station, and the individual considerations concerning the network connection of Paks II. Nuclear Power Plant.

The optimal site for Paks II. substation in terms of feasibility and safe electric power supply was a location situated ~1,0 km to the north from the proposed site of the nuclear power plant units of Paks II., along the Main Road No 6. Construction of transmission lines with a length of 2,5-3 km is necessary between units 5 and 6 and the Paks II. substation as shown in Figure 2.1-2.

2.1.3 POSITION OF THE PAKS II. UNITS WITHIN THE SITE

The size of the units' buildings increased, location of the units within the site is shifted to the north therefore the units are positioned farther from the operating units.



Legend

Area cross-hatched in red: operation area

Area cross-hatched in blue: staging area

Area cross-hatched in green: planned area for unit lines and back-up feeder lines

Area cross-hatched in orange: planned area for the hot water channel

Figure 2.1-2: General site-ayout including the Paks Nuclear Power Plant site

2.1.4 THE SEPARATE HOT WATER CANAL

Warmed up cooling water of the new units will be discharged through an open surface canal which is separated entirely from the existing hot water canal of the Paks Nuclear Power Plant.

There is no change in regard to the technical implementation of the object planned to be constructed at the junction of the separate hot water canal and the main Danube watercourse compared to that presented before. The conclusions drawn in the EIA report related to the heat load of the Danube and the hot water plum shall continue to apply.

2.1.5 CONSTRUCTION SCHEDULE OF PAKS II.

Expected dates of different project phases:

Activity	Paks II.	
	Unit 5	Unit 6
Initiate the environmental licensing procedure	2014	
Demolition works at the construction area	2018-2019	
Preparation of license applications and construction drawings	2015-2017	
Levelling of the ground	2018-2020	
Obtaining permits needed for the commencement of construction works	2015-2018	
Start of construction works	2018	2019
Foundation work	2018-2021	2019-2021
Building and fitting structures	2020-2023	2020-2024
Tests, commissioning	2020-2024	2020-2025
Test run start date	2024	2025
Start of commercial operation	2025	2026

Table 2.1-2: Different phases of Paks II.

2.1.6 OPERATION SCHEDULE OF PAKS II.

According to the schedule in place commercial operation of Paks II. Unit 5 starts in 2025, while Unit 6 starts commercial operation in 2026. The planned operational lifetime of the new nuclear power plant units is 60 years.

Activity	Paks II.	
	Unit 5	Unit 6
Start of commercial operation	2025	2026
End of 60-years operational lifetime	2085	2086

Table 2.1-3: Operation shedule of Paks II. units

Operating periods

Activity	Time interval
Parallel operation of Units 1-4 in Paks Nuclear Power Plant and Unit 5 of Paks II.	2025
Parallel operation of Units 1-4 in Paks Nuclear Power Plant and Unit 5 and Unit 6 of Paks II.	2026-2032
End of commercial operation of Units 1-4 in Paks Nuclear Power Plant after reaching the end of the extended lifetime thereof	2032-2037
Parallel operation of Paks II. Units 5 and 6 after the shut-down of Units 1-4 of the Paks Nuclear Power Plant	2037-2085
End of planned operational lifetime for Paks II. Unit 5	2085
End of planned operational lifetime for Paks II. Unit 6	2086

Table 2.1-4: Operating periods of Paks II. units, parallel operation with the existing units of Paks Nuclear Power Plant

3 ASSESSMENT AND EVALUATION OF THE ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE SPECIFIED TECHNICAL SOLUTIONS

In this document only the above presented, more precisely specified technical solutions are dealt with in details, the impact factors and impacts thereof already assessed in the EIA report and not affected by any specific solutions since then are not repeated herein.

3.1 REVIEW OF THE IMPACT FACTORS, PROCESSES AND ENVIRONMENTAL ELEMENTS CONCERNED BY THE SPECIFIED TECHNICAL SOLUTIONS

Impact processes triggered by the construction and operation of the new nuclear power plant units with a view to the specified technical solutions will be as follows:

- *with the increase of the size of the plant buildings, changing of the size of construction and staging areas and shifting the units to the north the construction area grows while staging area decreases,*
- *the length of the 400 kV power line and the 132 kV feeder line will be shortened by locating the Paks II. substation nearer, and as a result, the extent of land use and vegetation will also be reduced, the extent of the original vegetation cover is retained*
- *due to shifting of the deep foundation buildings to the north, the impacts on the flow of groundwater is also relocated to the north*
- *due to shifting of the plant buildings and hence, emission sources to the north the spread of air pollutants and noise changed*
- *the construction of the separate hot water canal has an impact on the habitat of the trees on the island,*
- *the construction of the separate hot water canal has an impact on the vegetation cover ratio of the surface*
- *due to the different schedule the construction phases of the two units get closer to each other.*

All potential impact factors derived from the specified parameters (nature and size of land use, dislocation of emission sources, specified schedule) were evaluated which may reasonably emerge with respect to the specified technical solutions. The evaluation also assessed whether or not the potential impact factors will have an actual impact on any of the environmental elements, in other words will it be an actual impact factor or not. (The “environmental elements” are the elements of the environment may be affected by the proposed activity, previously mentioned as “impact bearer”.)

The following environmental elements can be identified in the processes described above:

- *groundwater at the site,*
- *ambient air,*
- *settlement environment (noise and radioactive atmospheric discharges),*
- *population (conventional and radioactive atmospheric emissions),*
- *biosphere of the island and the route of the long distance transmission line.*

3.2 GEOLOGY AND GROUNDWATER AT THE SITE

3.2.1 IMPACTS AND IMPACT AREAS OF THE SPECIFIED TECHNICAL SOLUTIONS ON THE GROUNDWATER IN THE CONSTRUCTION PHASE OF PAKS II.

As a result of moving the units within the site – shifting to the north – their position in the hydrodynamic model was also shifted northwards. Thanks to the clarifications the impact area extending up to the isobar line of the 3 metres depression of the water table in the work pit expected to appear due to the dewatering efforts was shifted approximately 200 metres to the north. The impact area this way does not cross the northern edge of Unit No 4 of the existing nuclear power plant.

The impact of the water extracted during dewatering of the work pits and discharged into the Danube was mitigated. The ≈ 333 MBq/day value derived from the products of the maximum volume of water crossing the zone used earlier on to assess activity concentrations of tritium and of the maximum activity concentration specified for the zone profile was reduced to ≈ 196 MBq/day. In the case of the other method, the former estimate of ≈ 53 MBq/day calculated from the product of the activity concentration distribution assessed along the North-East profile, the average filtration velocity and the surface of the 9 m² web drawn on the profile has grown to ≈ 112 MBq/day. The results are within the interval provided in the EIA report

The static model runs for the application of extreme conditions defined for operational states and decommissioning (taking into account long term extremely high and low, as well as average Danube water levels) and the findings drawn from them are identical to the previously presented.

Due to the clarifications of the positioning of auxiliary buildings serving the units and the constructions storing hazardous substances the monitoring system was also redesigned.

3.2.2 DRINKING WATER RESOURCE ANALYSIS – OPERATING DEEP AQUIFER WATER WORKS AT CSÁMPA

The impacts of the 720 m³/day water demand incurred in relation to the new nuclear power plant units to be constructed at the current plant site of MVM Paksi Atomerőmű Zrt. exerted on the flow of groundwater were provided using numeric hydrodynamic modelling. On the 55 km² area investigated in the course of the model development the operating deep aquifer extracting production wells at Csámpa the deep aquifer extracting production wells of the Paks Water Works were also included in the survey.

The calculations confirmed that the four wells in Csámpa currently in operation will be capable to meet the increased drinking water demand during construction.

3.3 AMBIENT AIR

Due to shifting the units to the north within the site emission sources are also shifted and the installation of additional emergency diesel generators is also included in the concept. The time sequence and pattern of air polluting sources is also changed as a consequence of the construction and operations schedule provided.

Using the data, air pollution concentrations caused by the power plant were assessed. They were assessed in comparison to the exposure limits specified on the basis of the baseline studies and pursuant to Ministerial Decree No 4/2011. (I. 14.) VM on the limit values of air pollution levels and on the emission limits of stationary air pollution sources. Demarcation of the impact areas was made on the basis of the provisions laid down in 306/2010. (XII. 23.) Gov. Decree on the protection of the air. Conservative estimates were made for the purposes of determining the parameters, in other words the highest possible level of environmental exposure was taken into account.

3.3.1 IMPACTS AND IMPACT AREAS OF THE SPECIFIED TECHNICAL SOLUTIONS IN THE CONSTRUCTION PHASE OF PAKS II.

In the construction phase discharges causing pollution of the air are generated mainly in connection with the operation of power machinery and earth works.

Pollutant concentrations formed in all four stages of construction works (demolition, ground levelling, foundations, structural construction works) as a result of the emissions were assessed for the following air polluting parameters: carbon-monoxide (CO), nitrogen-dioxide (NO₂), hydrocarbons (C_xH_y), and for the period of ground levelling for total suspended particulate matter (TSPM and PM₁₀) as well.

Air pollution impact area of the construction phase is the zone demarked with a circular line of 1300 metres radius measured from the centre point of discharges.

It is expected that total exposure from the construction phases will be qualified as acceptable/neutral for residential areas.

3.3.2 IMPACTS AND IMPACT AREAS OF THE SPECIFIED TECHNICAL SOLUTIONS DURING NORMAL OPERATION AT PAKS II.

During the operation of Paks II. the trial run of diesel generators causes the emission of non-radioactive air pollutants.

Point source identifiers at Paks II. *	Identification of the equipment	Y coordinate	X coordinate
P3	diesel generator - EPSS	634992	137376
P4	diesel generator - EPSS	634991	137360
P5	diesel generator - EPSS	635077	137459
P6	diesel generator - EPSS	635094	137459
P7	diesel generator - NI	635050	137248
P8	diesel generator - NI	635062	137248
P9	diesel generator - TI	635251	137258
P10	diesel generator - EPSS	634992	137696
P11	diesel generator - EPSS	634991	137680
P12	diesel generator - EPSS	635077	137779
P13	diesel generator - EPSS	635094	137779
P14	diesel generator - NI	635050	137568
P15	diesel generator - NI	635062	137568
P16	diesel generator - TI	635251	137578
P17	diesel generator - DEC-2	635007**	137430**
P18	diesel generator - DEC-2	635002**	137629**

Note:

Point sources P1 and P2 are the identifiers of the ventilation smokestacks

* Point sources were indicated in this study with the identifiers included herein, the site might apply different identification codes.

** Coordinates specified as the emission points of the mobile diesel generators for the purposes of the calculations

Table 3.3-1: EOVI coordinates of Paks II. diesel generators

Point source identifiers at Paks II *	Identification of the equipment	Rated output [kWe]	Emissions [g/s]				Running hours [h/year]	Smokestack height [m]
			CO	NO _x	C _x H _y	solids (soot)		
P3	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P4	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P5	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P6	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P7	diesel generator - NI	6 300	3.395	5.880	0.385	0.193	96	31
P8	diesel generator - NI	6 300	3.395	5.880	0.385	0.193	96	31

P9	diesel generator - TI	2 000	1.078	1.867	0.122	0.061	96	20,5
P10	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P11	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P12	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P13	diesel generator - EPSS	6 300	3.395	5.880	0.385	0.193	96	20
P14	diesel generator - NI	6 300	3.395	5.880	0.385	0.193	96	31
P15	diesel generator - NI	6 300	3.395	5.880	0.385	0.193	96	31
P16	diesel generator - TI	2 000	1.078	1.867	0.122	0.061	96	20,5
P17	diesel generator - DEC-2	600	0.323	0.560	0.037	0.018	96	2
P18	diesel generator - DEC-2	600	0.323	0.560	0.037	0.018	96	2

Notes:

Point sources P1 and P2 are the identifiers of the ventilation smokestacks

* Point sources were indicated in this study with the identifiers included herein, the site might apply different identification codes.

Table 3.3-2: Typical properties of the diesel generators during operation

The evolved air pollutant concentrations were assessed for carbon-monoxide (CO), nitrogen-dioxide (NO₂), hydrocarbons (C_xH_y) and soot.

Impact area for normal operation will be limited to an area situated not more than 400 m from the property boundary.

The operation of Paks II. will have no significant impact on the air pollution and will not modify substantially the existing conditions of air pollution.

3.3.3 IMPACTS AND IMPACT AREAS OF THE SPECIFIED TECHNICAL SOLUTIONS DURING PARALLEL OPERATION OF PAKS II. AND PAKS NUCLEAR POWER PLANT

During the parallel operation of Paks II. and Paks Nuclear Power Plant the impact area of air pollution caused by the emissions of the diesel generators during the test runs will extend to not more than a distance of maximum 600 metres measured from the property boundary.

The impact of parallel operation of Paks II. and Paks Nuclear Power Plant will not modify the existing conditions of air pollution substantially and will be qualified as acceptable or neutral for residential areas.

3.4 NOISE CONTROL

3.4.1 NOISE IMPACT AREA DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS DURING THE CONSTRUCTION PHASE OF PAKS II.

Noise emission sources will be dislocated due to the shifting of the units to north within the GIP area and result in a altered noise emission sources. The temporal distribution of the noise emission sources will change as a consequence of the construction and commercial operation schedule provided. The following statements can be made with respect to noise exposure based on the assessment and evaluation of the ambient noise impacts of the specified technical solutions using the same calculation method presented in Chapter 15 of the EIA report:

The noise exposure limits applicable to protected areas and buildings can be met during the construction works carried out within the plant site.

The spatial extent of the ambient noise impact of the parallel structural construction works of the two units as the phase of the construction work associated with the most significant noise load is the dominant factor in the cumulated noise impact area for constructions. The size of the impact area for territories that belong to different noise control categories may change or changes with direction as a function of noise exposure limits and background loads.

The cumulated impact area for the phases of construction within the operation area is shown in the figure below:



Figure 3.4-1: Cumulative noise impact area for the phases of construction within the operation area

Within the phases of transmission line construction, landscaping and foundation works are identified to cause the highest level of noise exposure. The impact area is given for these two phases. The impact area of the transmission line construction extends to ~70 m from the lines at the industrial economic area (GIP) and to ~150 m in areas which are not considered as protected from noise. Noise exposure limits are to be met in all phases of the transmission line constructions. The impact area of transmission line establishment is illustrated in the following figure:



Figure 3.4-2: Noise impact area of transmission line construction

3.4.2 CUMULATIVE IMPACT AREA OF THE CONSTRUCTION OF PAKS II. DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS

The cumulative impact area of the construction is the cumulative area of the transmission line constructions and that of the construction works on the operation area, as illustrated on the figure below.

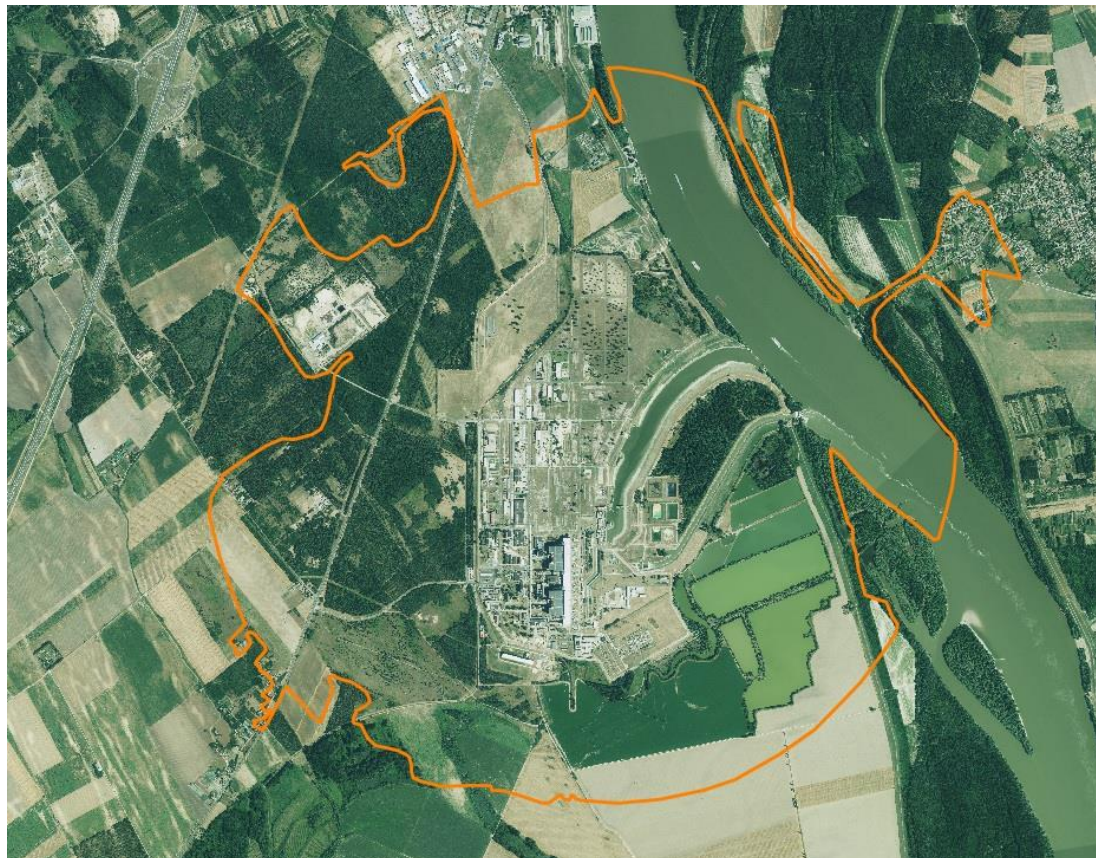


Figure 3.4-3: Cumulative impact area of the constructions

3.4.3 THE IMPACT AREA OF THE OPERATION PERIOD OF PAKS II. DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS

Noise load of the power plant concerning the residential area stays below the noise exposure limit applied for such area category. For areas that belong to different noise control categories the impact area of the operation of Paks II. operations may change or changes with direction as a function of noise exposure limits and background loads.

The noise exposure originating from the operation of the transmission lines is minimal at the facade to be protected. The impact area of the operation of the transmission lines is the area directly underneath the power lines in the industrial economic areas (GIP), and extends to approximately ~70 m from the lines in areas which are not considered as to be protected from noise.

The respective noise impact areas of the operation of Paks II. and the transmission lines are presented in the figures below:

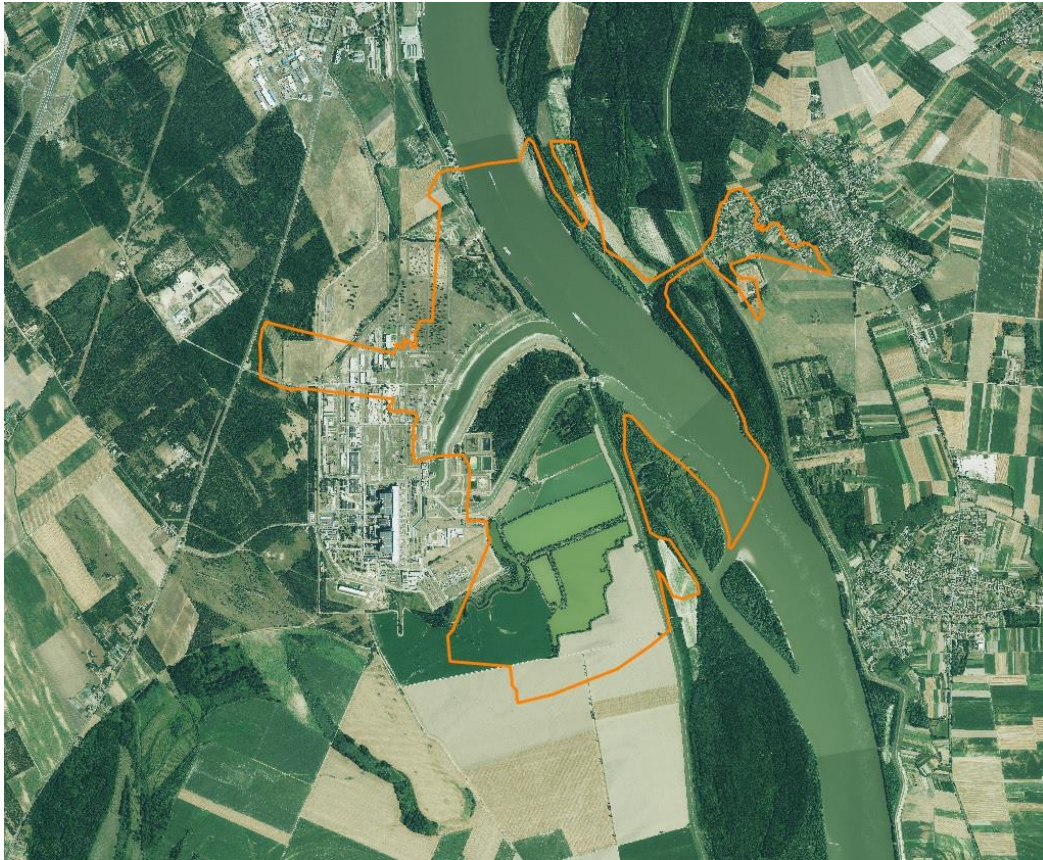


Figure 3.4-4: Noise exposure impact area of the operation of Paks II.



Figure 3.4-5: Noise exposure impact area of the operation of the transmission lines

3.4.4 THE CUMULATIVE IMPACT AREA OF THE OPERATION PERIOD OF PAKS II. DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS

The cumulative impact area of the operation of Paks II. and the transmission lines can be found in the figure below:

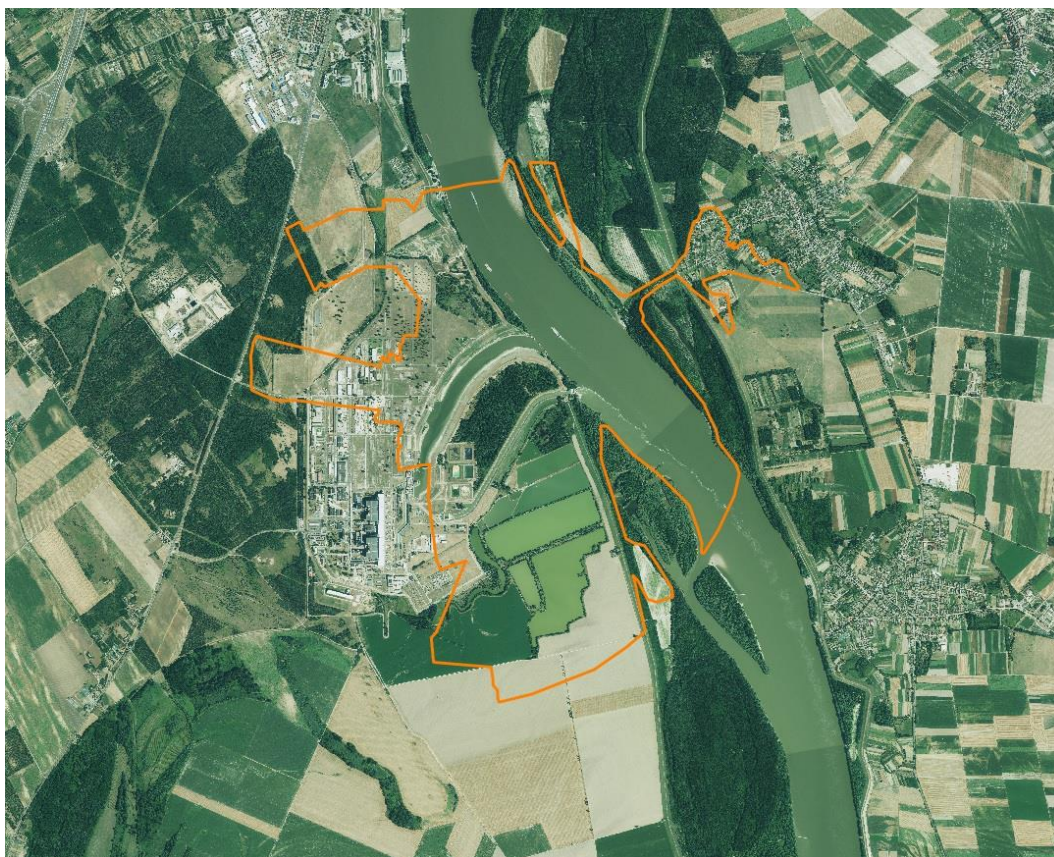


Figure 3.4-6: The cumulative impact area of the operation of Paks II. and the transmission lines

3.4.5 NOISE IMPACTS BEYOND NORMAL OPERATION DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS

Noise emission sources to be taken into account during noise impact assessment of events beyond normal operation are shifted to north. The results of reassessment of impacts show that the noise impact of the power plant will not exceed the daytime noise limit applied for residential areas. The noise load limit applied during the night is expected to be exceeded with a minimal extent at the facade to be protected in the settlement of Csámpa.

3.4.6 NOISE IMPACT AREA OF JOINT OPERATION OF PAKS II. AND PAKS NUCLEAR POWER PLANT DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS

The expected level of noise load originating from the joint operation of Paks II. and Paks Nuclear Power Plant at the facade to be protected will remain within the noise exposure limits applied for the area. The impact area of the joint operation of Paks Nuclear Power Plant and Paks II. may change or changes with direction as a function of noise exposure limits and background loads.

The impact area of the joint operation of Paks Nuclear Power Plant and Paks II. is illustrated in the figure below:



Figure 3.4-7: Noise exposure impact area of the joint operation of Paks II. and Paks Nuclear Power Plant

The impact area of the joint operation of Paks II. and Paks Nuclear Power Plant including the operation of transmission lines is shown in the figure below:



Figure 3.4-8: Noise exposure impact area of joint operation of Paks II. and Paks Nuclear Power Plant combined with the operation of transmission lines

Based on the results of the noise impact assessment, it can be stated that the impact areas do not affect new administrative area.

3.5 ENVIRONMENTAL RADIOACTIVITY - RADIATION EXPOSURE OF THE POPULATION LIVING NEAR THE SITE

Emission sources will be dislocated due to the shifting of the units to north within the GIP area. Temporal distribution of sources will change as a consequence of the construction and commercial operation schedule provided.

3.5.1 THE IMPACT OF THE SPECIFIED TECHNICAL SOLUTIONS ON THE ENVIRONMENTAL RADIOACTIVITY – RADIATION EXPOSURE OF THE SURROUNDING POPULATION

3.5.1.1 EMISSION POINTS

With the shifting of the new nuclear power plant units to north the EOY coordinates of the atmospheric emission points will also change (ventilation chimney, turbine building, ventilation for the reactor building), which are summarised in the table below.

	Description	EOY Y	EOY X
Unit 5	Ventilation chimney	635 085	137 322
	Turbine building	635 224	137 378
	Building fan (safety steam blow-off)	635 128	137 357
Unit 6	Ventilation chimney	635 085	137 642
	Turbine building	635 224	137 698
	Building fan (safety steam blow-off)	635 128	137 677

Table 3.5-1: EOY coordinates of Paks II. emission points

3.5.1.2 FINDINGS

The source terms, the meteorological parameters taken into account in the calculations and the effective height of the emission points did not change, remained as presented in the Environmental Impact Assessment Report, the specified technical solutions listed above have an impact only on the position of the emission points within the plant site. The radiological impact areas of emissions associated with normal operation and design basis conditions stay within the safety zone of the plant, they are only shifted in space with a slight extent in parallel with the shifting of the emission points. Beyond the safety zone the impact is neutral. Concerning the design extension conditions, there are no changes related to the statements presented in the International chapter of the EIA Report

3.6 BIOSPHERE, ECOSYSTEM

Due to the change in size and position of the operational and staging areas of the new units within the industrial economic area of the Paks NPP and the shift of the new units to north within the GIP area, the extent and nature of land take will be modified. The length of the 400 kV power line and the 132 kV feeder line will be shortened by locating the Paks II. substation nearer, and as a result, the land take will also decrease. The construction of the separate hot water canal increase the land take on the island situated between the cold and hot water canal and affect the habitat of the trees on the island.

In the EIA Report, the botanical and zoological characterisation of the power plant site and the surrounding areas, as well as the zoology of the island situated between the cold water canal and the hot water canal was presented.

3.6.1 THE IMPACT AND IMPACT AREA OF THE SPECIFIED TECHNICAL SOLUTIONS IN THE CONSTRUCTION PHASE OF PAKS II.

Based on the vegetation mapping supplemented with the assessment of zoological and ecological communities in 2012 and 2013, the following habitat types are found in the island between the two canals: willow-poplar gallery forests,

standing water, non-characteristic or pioneer forests with native soft wood tree species, honey locust plantations, non-characteristic dry and semidry grasslands, non-characteristic fresh grasslands.

The impact and impact areas of construction were already described in the EIA Report, however the extent of the impacts on the island between the two canals will be more significant by taking into account the current clarifications of the technical solutions, since practically the entire tree stand will be affected. The willow-poplar gallery forest stand situating between the cold and hot water canal in an extent of approximately ~27 ha will be felled. On the inner parts of the island approximately ~19 500 tree specimen can be found. The major part of them constitutes of black and white poplars, together with a considerable amount of white willow. The smaller proportion constitutes of European white elm, ash leaf maple, honey locust, green ash and walnut trees.

The estimate of the tree stock growing in the 0.78 ha of willow-poplar gallery forest at the Danube bank of the island within the Natura 2000 site was accomplished as part of the EIA Report. Due to the large space requirement of poplar and willow trees, a relatively small number, approximately ~220-300 trees of various sizes can be found there. The clarifications of the technical solutions do not affect the new area qualified as Natura 2000 site compared to those presented in the EIA Report.

Shifting nuclear power plant units to the north and the change in size and position of the operational and staging areas of the new units result in a higher level of exposure for the open and closed sandy grasslands.

The direct impact area of the constructions on botany is supplemented – in comparison to that presented in the EIA Report – with the parts of the island which were not directly affected earlier, the extent of land take will be higher within the Paks Nuclear Power Plant site.

As a result of the reduced length of the transmission lines, the land take of their construction will decrease, but since the impact factors do not change, the same width of impact area strips will be present in the surrounding of the new path of the power lines as estimated in the EIA Report.

The required nature conservation measures shall be made in accordance with the provisions already described in the EIA Report.

Due to the construction of the planned, separated hot water canal the tree stands on the island situated between the cold and hot water canal will be affected, animals needing protection will be relocated/resettled before the commencement of working operations on the area concerned and their habitat will be provided in the new area in the future. For the long-term management of the environmental impacts on the flora and fauna of the island occurring as consequences of the construction of the new units, MVM Paks II. Ltd. will elaborate a plan.

3.6.2 IMPACTS AND IMPACT AREA OF THE SPECIFIED TECHNICAL SOLUTIONS DURING THE OPERATION OF PAKS II.

Due to the clarification in size of the operational areas of the new units and their shift to north, the extent of the environmental impact of operation will be bigger than that presented in the EIA Report. During the operation of the plant, continuous artificial environment, persistence of degraded secondary grasslands and fragmented habitats will characterise the site.

The extent of land take will increase within the areas of the Paks Nuclear Power Plant site. The area occupied by the transmission lines will decrease due to their shorter length, and since the impact factors involved do not change, the same width of the estimated impact area strips will be present along and in the surrounding of their new path as it was specified in the EIA Report.

The direct impact area of the operation on botany – in comparison with the statements made in the EIA Report – will be different in the surroundings of the water based structures,, according to their specified position it will be in their closest vicinity.

The concerned area qualified as Natura 2000 site presented in the EIA report does not increase in the operation period of the new units.

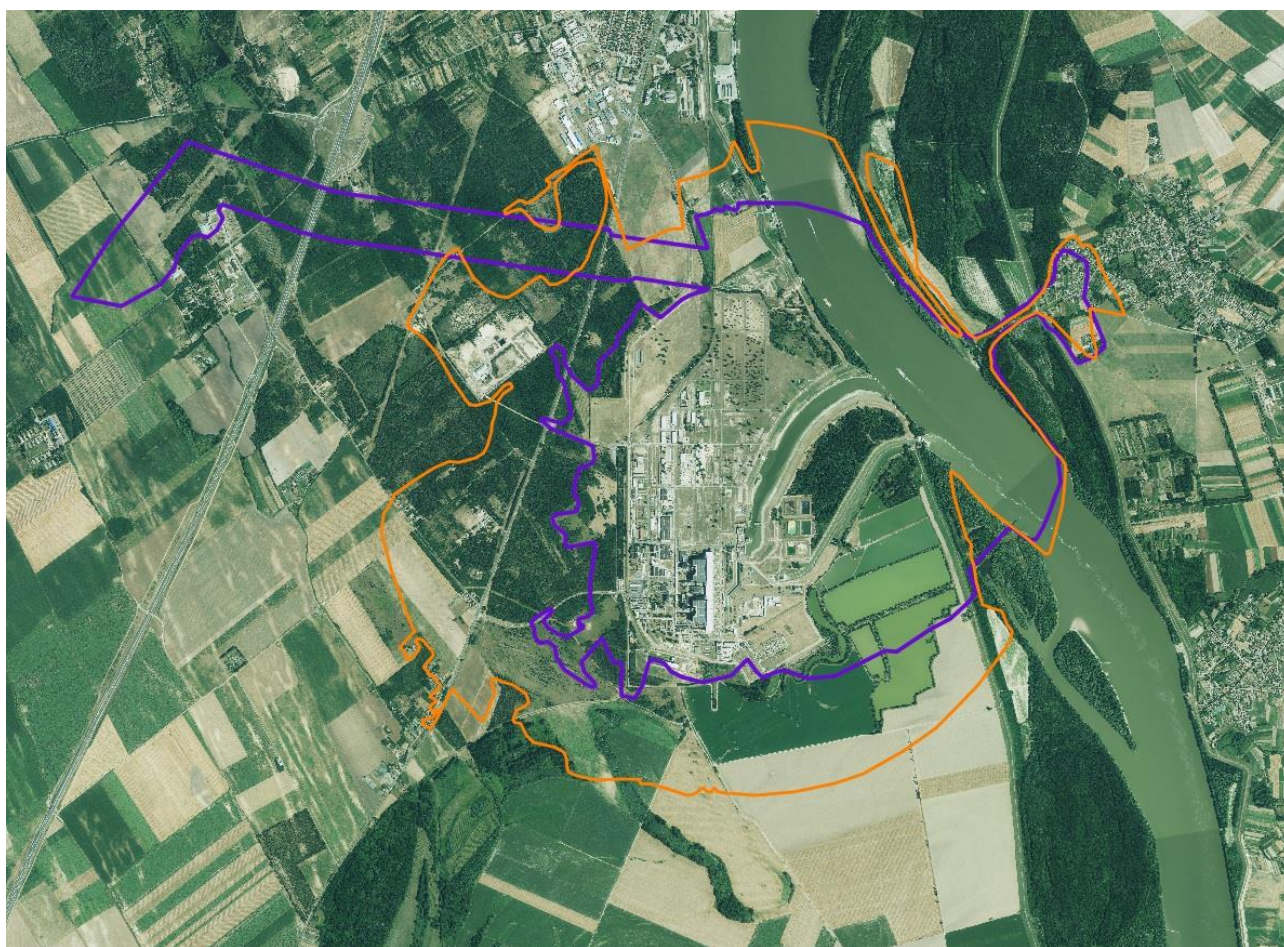
3.7 CUMULATIVE IMPACT AREAS DETERMINED ON THE BASIS OF THE SPECIFIED TECHNICAL SOLUTIONS

Cumulative impact areas of each of the impact factors were determined based on both the EIA Report prepared in 2014 and the assessment of the specified technical solutions in 2016, both for the constructions and operation periods of the proposed nuclear power plant.

The results are shown in the figures below.

3.7.1 PAKS II. – CONSTRUCTION

The cumulative impact areas of the phases of the constructions according to the EIA Report prepared in 2014 and based on the assessment of the specified technical solutions in 2016 are shown in the figure below.



Legend:

purple: the impact area of the constructions according to the EIA Report (2014.)

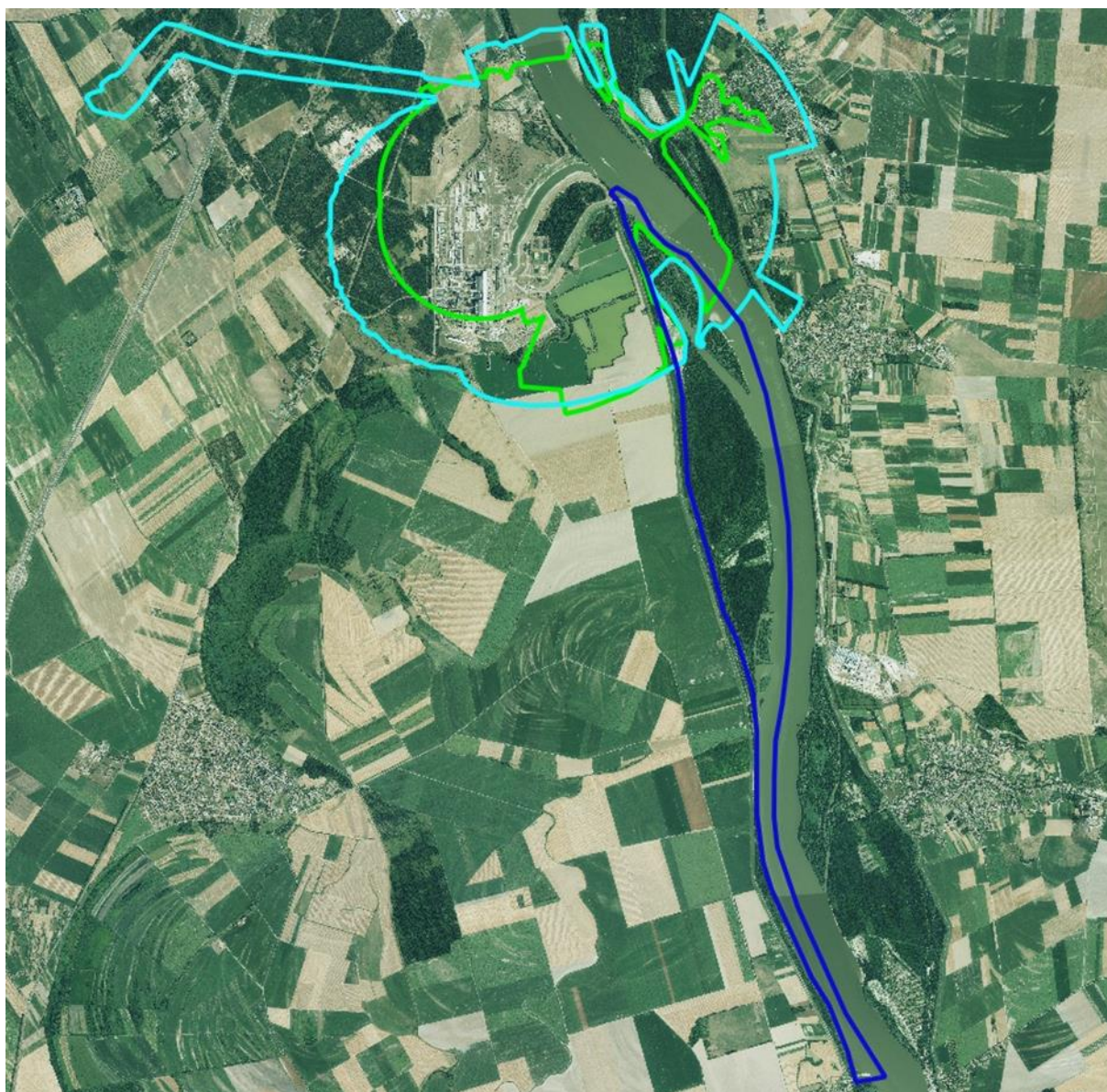
orange: the impact area of the constructions based on the assessment of the specified technical solutions (2016.)

Figure 3.7-1: Cumulative impact areas of the phases of constructions according to the EIA Report prepared in 2014 and based on the assessment of the specified technical solutions in 2016

Based on the results of the assessment, it can be seen that the spatial extent of the impact area of the constructions increased with respect to the plant site and decreased in the case of the transmission lines compared to the impact areas presented in the EIA Report.

3.7.2 PAKS II. - OPERATION

The cumulative impact areas of the operation based on the EIA Report prepared in 2014 and on the assessment of the specified technical solutions in 2016 are illustrated below.



Legend:

Light blue: impact area of the operation according to the EIA Report (2014.)

Light green: impact area of the operation according to the specified technical solutions (2016.)

Dark blue: the combined impact area of thermal load caused by emission of cooling water from Paks Nuclear Power Plant and Paks II

Figure 3.7-2: Cumulated impact areas of the operation according to the EIA Report prepared in 2014, and based on the assessment of the specified technical solutions in 2016, including the combined impact area of thermal load caused by emission of cooling water from Paks Nuclear Power Plant and Paks II,

Based on the results of the assessment, it can be seen that the spatial extent of the impact area of the operation is decreased with respect both to the site and the transmission lines compared to the impact areas presented in the EIA Report.

4 SUMMARY

In summary it can be stated that the results of the supplementary assessments after the clarification of certain technical solutions presented in course of the EIA procedure show that the nature and size of the environmental impacts presented earlier in the course of the EIA procedure do not change in any substantial manner, no new environmental elements can be identified and the exposure of environmental elements identified previously in the EIA report do not change to any significant extent. There is no change in respect to transboundary impacts either.