

## NON – SPECIALISTIC SUMMARY

This report on environmental influence applies to the construction of A1 motorway segment Nowe Marzy - Czerniewice in km 89+494,76 ÷ 151+900, which run is presented on the key plan in scale 1:100 000 – Appendix no. 1.

Analysed investment enterprise is located in kujawsko – pomorskie province, in 6 districts: Świecie, Grudziądz, Chełmno, Wąbrzeźno, Toruń and Golub-Dobrzyń, and 10 parishes: Dragacz, Grudziądz, Stolno, Lisewo, Płużnica, Chełmża, Łysomice, Lubicz, Wielka Nieszawka and Kowalewo Pomorskie, and 2 municipalities: Grudziądz and Toruń.

Investment task consists in construction of motorway with length of 62,4 km, divided into 4 segments, for which separate design documentations are prepared in order to obtain construction authorization.

- > **Segment I** Nowe Marzy - Grudziądz in km 89+494,76 ÷ 98+400 - length 8 935,24 m,
- > **Segment II** Grudziądz - Lisewo in km 98+400 ÷ 114+000 - length 15 600 m,
- > **Segment III** Lisewo - Lubicz in km 114+000 ÷ 141+040 - length 27 040 m,
- > **Segment IV** Lubicz - Czerniewice in km 141+040 ÷ 151+900 - length 10 860 m.

This segment run is consistent with provisions of two decisions, regarding location of paid motorway A1 Gdańsk - Toruń - Łódź (Tuszyn): decision no. 1/96 of Toruń Governor from 10.12.1996 (sign: GP.I.7331/1/96) and decision no. 1/97 of Bydgoszcz Governor from 21.02.1997 (sign: GPKG.I.7331-1/96 MW1).

Due to determination of motorway run with regard to the above decisions, this Environmental Influence Report includes variants analysis in the following range: non – investment variant (so called zero variant) and investment variant, including two different motorway cross sections and structure type and locations of engineering objects (bridges on Wisła, passages for animals).

Investment start is located in km 89+494,76, next to Nowe Marzy node, in contact point with already being constructed segment of A1 motorway Rusocin (Gdańsk) - Nowe Marzy. And the end is located in km 151+900, in the intersection point with national road no. 1 (node Czerniewice). In the nineties segment IV of the motorway (km 141+040 ÷ 151+900) has been partially realized. Ground works for two roadways have been performed, but the pavement has been made only on the left (eastern) one. The final location of the second roadway is already included in road overpasses spans dimensions over the motorway in that segment. Ecological flyover and agricultural passages have also been made for two motorway roadways.

The motorway is located in the contact area of 3 mesoregions: Grudziądzka Valley, Chełmińskie Lakeland, Toruńska Valley. They are characterized by diversified morphology with many elevations, made from boulder clays. In the descent from moraine heights the motorway goes through the terraces of main water courses: Wisła (water km –113,8 near Grudziądz and water km 216,8 south of Toruń) and Drwęca.

Terrains around the investment in the first segment are mostly agricultural, flat area. Only in the first fragment (approx. 1 km) the terrain is wavy and wooded. It includes Maława and Wisła rivers valley – crossed with numerous drainage ditches. Terrains around the second segment are mostly agricultural, flat to wavy area. Places with more diversified configuration are: km 101 – serpentine in the course of national road no. 55 Grudziądz – Chełmno, and km 105 – ravine in Młynówka river valley. Woody terrains exist only in small fragments in km 101 and 105. Terrain in segment III also has agricultural character and flat to wavy configuration. Compact wood cluster exists in km 117+500 and in section 128+000 ÷ 129+600. In this segment (III) the motorway goes in close vicinity of Dźwierzynskie lake (km 122+500) and approximately 0,5 km from Kamionkowskie lake (km 129). In segment IV the motorway goes through flat configuration terrains, covered mostly with woods. Agricultural land exists in 3 places with lengths correspondingly: 460 m, 1000 m and 1000 m. In river valleys, crossed in this segment, there are mostly meadows and pastures.

The motorway in its whole length bypasses bigger clusters of compact housing. In closer vicinity there are individual, sparse agricultural sites of smaller towns.

The run of analysed segment of A1 motorway collides with various elements of the technical infrastructure, which are presented below:

- high voltage lines 110 kV and 220 kV - 7 units,

- high pressure gas pipings (Dn 400, Dn 200 and Dn 100) - 5 units,
- water lines (with various nominal diameters) – 25 points,
- railway lines – 4 units.

Range of construction works in the analysed motorway segment is diversified due to the fact, that segment IV Lubicz – Czerniewice is already partly realised.

In segment I-III Nowe Marzy – Lubicz the following elements are planned:

- construction of motorway with length of 51,54 km;
- construction of 4 collision-free road nodes;
- construction of passages over transverse roads, crossing the motorway;
- construction of cumulative, access and agricultural roads;
- construction of engineering objects in and over the motorway (bridges, flyovers, overpasses, agricultural passages, passages for animals);
- construction of culverts;
- construction of rain sewage system;
- construction of 3 pairs of travellers service points (MOP) - Malankowo II and III, Drzonowo I, Nowy Dwór I, and 3 toll stations (SPO) – Grudziądz, Lisewo, Turzno;
- construction of bridges and nodes lighting;
- construction of environment protection devices (acoustic screens; greens, separators);
- construction of traffic safety system;
- construction of communication systems.

And in mentioned above segment IV the following construction works are planned:

- construction of second motorway roadway with length of 10,86 km;
- construction of 1 collision-free road node;
- construction of passages over transverse roads, crossing the motorway;
- construction of cumulative, access and agricultural roads;
- construction of engineering objects in and over the motorway (bridges, flyovers, overpasses, agricultural passages, passages for animals);
- construction of culverts;
- construction of rain sewage system;
- construction of 1 pair of travellers service points (MOP) – Nowa Wieś II and III, toll yard (PPO) – Nowa Wieś, 1 toll station (SPO) – Lubicz, and motorway maintenance station (OUA) – “Grabowiec”;
- construction of bridges and nodes lighting;
- construction of environment protection devices (acoustic screens; greens, separators);
- construction of traffic safety system;
- construction of communication systems.

In the end the motorway will have two roadways with 3 lanes each, 3,5 m wide. Currently the following construction stages are planned:

- o **Stage I** – construction of 2nd roadway with 2 lanes – 3,75 m wide with variants of 3rd lane location: **variant I** – third lane outside of existing roadways (dividing zone 5,0 m wide) and **variant II** – third lane between existing roadways (dividing zone 11,0 m wide)
- o **Stage II** – adding of 3rd lane according to the chosen variant. Realization depends on quantitative increase of traffic intensity.

Currently designed basic technical parameters of analysed motorway segment are the following:

technical class	- A (motorway)
design speed	- Vp - 120 km/h

traffic category	-	KR6 (very heavy)
load	-	115kN/axis
pavement	-	bituminous
vertical gauge	-	4,70 m
road crown width	-	<u>variant I</u> - 28,88 m
		<u>variant II</u> - 34,50 m
roadways	-	2 roadways, 2 lanes each
roadway width	-	7,50 m
lane	-	3,75 m
emergency lane	-	3,00 m
ground shoulder	-	1,39 m
roadway transverse inclination	-	2,5%
dividing zone	-	<u>variant I</u> - 5,00 m
		<u>variant II</u> - 11,00 m

Total area of terrain occupied by the motorway is 724 ha, including 128 ha for bituminous pavement.

According to the initial forecast, prepared by Transprojekt Warszawa, on the designed motorway segment traffic intensity will be 12.400 vehicles/day (year 2010) and 23.720 vehicles/day (year 2030).

Terrain for motorway construction (in the dividing lines) has been completely prepared for its realization. Due to this fact, in year 2006, according to order of General Directorate for National Roads and Motorways in Warsaw, trees in transverse roads, crossing the motorway, and other individual tree clusters, colliding with planned motorway have been cut.

## VARIANTS

Design works, connected with determination of A1 motorway location have been preceded with the series of study and planning works in the eighties and nineties. During that period also social consultations have been carried out and opinions of local government and road administration as well as agreements and opinions of appropriate institutions obtained.

Run of currently assessed segment of motorway A1 Nowe Marzy – Czerniewice is determined by location between currently realized segment Gdańsk – Nowe Marzy and existing motorway segment near Toruń. As it was mentioned before, for segment Nowe Marzy – Czerniewice 2 decisions of location determinations are valid: decision no. 1/97 of Bydgoszcz Governor from 21.02.1997, and decision no. 1/96 of Toruń Governor from 10.12.1996.

Between 1997-2005 the motorway run, determined with legally binding locating decision, resulted in performing of works, connected with grounds purchase, implementing changes in local development plans, performing archaeological research and other necessary preparation activities, connected with construction of this segment of A1 motorway.

Meridional univariant route survey of A1 motorway, consistent with national policy and program of motorways and express roads construction plan precludes bypassing of Nature 2000 terrains, connected with Wisła river valley protection, which are approved as legally functioning terrains, subjected to environment protection in range of Polish and European law.

In range of currently performed design works, connected with verification of the Initial Design, variants of A1 motorway have been prepared in range:

- **optimization of technical solutions of designed bridge objects in Wisła and Drwęca rivers valley**

### **New bridge passage through Wisła near Grudziądz – crossing Nature 2000 terrain “Lower Wisła Valley PLB 040003” in km 94+655 ÷ 95+760**

In the Initial Design there was bridge construction planned through Wisła near Grudziądz in km 95+162. Bridge in form of flyover included the whole inter-embankment area (approx. 1150 m). Width of Wisła river in that place is 400 ÷ 410 m. Bridge heads have been located on anti-flood embankments. For the river navigation 10 m of object vertical gauge above high navigational water has been planned. Bridge width included final stage of motorway cross section – three lanes in each direction.

In that stage two bridge variants have been prepared:

- bridge with steel load-carrying structure, combined with roadway reinforced concrete slab (length – 1142 m, total width – 37,10 m, single roadway width – 17,45 m, gap between roadways – 2,2 m, max. midstream span dimension – 150 m);
- bridge with shroud structure, hanged on two high pylons in form of A letter with total length of 1173 m. Bridge load carrying structure has been divided into two independent structures: shroud over the river bed, three-span with total length of 645 m, middle span in the river midstream 400 m, pylon height – 90 m. Under both roadways one common load-carrying structure 37,1 m wide, with constant box cross section, 3,20 m high. Over the backwater: bridge with post-tensioned prestressed concrete structure, 7 spans with total length of 528 m.

Currently, due to the character and length of crossed terrains (Wisła river, inter- and beyond-embankment terrains), enabling of wide works front and environmental conditions, the bridge passage of this object, designed by Transprojekt Gdański, has been divided into the following sections:

1. left-bank flyover – with length of 222 m (4 spans), with box, prestressed concrete cross section,
2. left-bank backwater bridge – with length of 507,3 m and width of 33,70 m (2 x 16,85 m), seven spans, with continuous structure – steel combined with concrete mating slab, over the left-bank backwater,
3. midstream bridge – for which 2 structural variants have been analysed:  
**steel bridge, combined with reinforced concrete slab** – for which it is necessary to make, among others, supports in the midstream every 150 m; length 713,4 m, width 33,7 m, load-carrying structure height 4,5+7,5 m.  
**suspended bridge with continuous structure** – for which the supports are located outside of midstream; length 713,4 m, width 33,8 m, load-carrying structure height 2,7 m, midstream span length 410 m.
4. right-bank flyover – with length of 162 m (3 spans), with box, prestressed concrete cross section.

According to the recommendations of expert opinion of Dr. B. Twaróg “Range of flood wave, caused by Wisła river embankments breach near Grudziądz” (Kraków, January 2007), due to the possibility of 300-year old water flood banks breach, on the bridge access roads (backwater terrains) the motorway grade line was lifted to appropriate height, and fill slopes were protected from washout. For free water flow and preventing the results of flood wave impact, the above flyovers have been designed beyond inter-embankment on both sides of the bridge.

**Modernization and reconstruction of the existing bridge through Wisła near Toruń – crossing Nature 2000 terrain “Lower Wisła Valley PLB 040003” in km 149+555 ÷ 151+390**

The Initial Design provided the necessity of constructing the second roadway of A1 motorway in segment Lubicz – Czerniewice, i.e. also on the existing bridge through Wisła near Toruń.

The existing bridge object is located approximately 7 km south of Toruń, in 216,6 water km of Wisła river. River width between banks – 360 m. Parameters of existing bridge object near Toruń: load-carrying structure length – 957,40 m, width – 14,81 m, number of spans – 13 (total), number of midstream spans – 3, span length: maximum 130 m (in the midstream), minimum 55 m (on the backwater terrain), vertical gauge – 10 m. The load-carrying structure is multi-span, continuous box structure, independent for each roadway, made from prestressed concrete. The midstream part with total length of 520 m is made in overhang placing of concrete in form of the box, prestressed with cables. The box height is variable from 4 to 8 m. The backwater part is the box prestressed concrete structure with constant height of 4 m. The object supports have been made for the final section.

In currently prepared design the existing left roadway will be unchanged (10,5 m wide), Finally it will have to be widened by 74 cm for 3 lanes. The right roadway load-carrying structure is supported on existing supports, constructed in 1998. It will be adapted for three lanes – roadway width 11,25 m. The total designed object width will be 15,55 m. It has been assumed, that the designed load-carrying structure is the same as for the existing bridge, and constitutes 13-span, continuous prestressed beam structure.

**Modernization and reconstruction of the existing bridge through Drwęca river - crossing Nature 2000 terrain "Drwęca Valley" in km 145+800 ÷ 145+880**

In 1996 in range of construction of the first roadway of A1 motorway segment Lubicz – Czerniewice all supports for both roadways for bridge through Drwęca as well as spans structure for the left roadway have been constructed. Total width of existing object is 14,7 m, and its length (in the motorway axis, measured along the arc) is 108,49 m. The same parameters were planned for the second roadway, which was supposed to be constructed later.

Currently, due to important modification of road standards (necessity of emergency stop lane), it is necessary to rebuild the existing bridge structure and to construct new roadway with changed parameters. The existing roadway will be widened by 3,35 m through adding the steel girder (on the external side, in the distance of 2,8 m) and widening the roadway slab. Roadway widening requires widening of pillars through making the additional pillar, pole, and widening the girt in each pillar. Widening of bridge heads requires constructing of 2 poles, widening of bodies and making new wings.

The new roadway is designed for standard parameters and is going to be 18,05 m wide. The load-carrying structure will be the same as the existing one, i.e. continuous beam. The existing supports will be rebuilt in the same way as for existing roadway. First, the new roadway will be constructed, then, after traffic change, the existing one will be rebuilt.

➤ **final verification and determination of location and geometrical parameters of passages for animals in determined migration routes of big, medium and small animals**

In places of increased animals migration the appropriate passages, location of which during the Initial Designing has been consulted with forest service and hunters organizations, will be constructed.

Within the framework of the currently prepared Environmental Influence Report there have been two consultations with Prof. W. Jędrzejewski from the Mammal Research Institute of the Polish Academy of Sciences in Białowieża, which allowed for obtaining the detailed data for better locations and parameters of animal passages. The final decisions for passages locations are presented in further paragraphs of this document.

➤ **determination of final geometrical parameters of motorway form**

The Initial Design (1996 – 1997), which was the basis for location recommendations, and later for location decision for A1 motorway, included in the first stage the construction of motorway with the following section: 2 roadways with two lanes (3,75 wide each), separated with 5 m dividing zone. The final stage included adding the third lane outside of roadways designed in stage I.

In 21.11.2006 the General Directorate for National Roads and Motorways decided to change the location of the third lane and to realize the final parameters of motorway form as early as in the first stage. Due to this fact, currently there is motorway form designed for 2 roadways with 2 lanes each (3,75 m wide each lane), separated with 10m dividing zone. In the final stage the third lane will be added inside of existing roadways. The decision on adding the third lane depends on quantitative increase of traffic intensity.

Assessment of A1 motorway influence, performed in the Report on environmental influence, allowed for determining for which environmental elements, under its influence, the appropriate protective devices will be used.

The brief characteristics of those elements is presented below, along with anticipated influence and proposed environment protection means.

## **Geological conditions and soil and water environment**

The designed motorway in four designed segments is located in Wisła and Drwęca rivers basin. Its route is cut by many drainage ditches, waterways and rivers, which in the end will be the final receivers. The most important of them, along with kilometres of motorway crossing, are presented below:

- km 91+650 - Maława
- km 95+490, km 150+500 - Wisła
- km 96+630 - Kanał Główny
- km 98+250, km 104+800 - Młynówka,
- km 122+380 - dopływ z Zelgna
- km 126+870 - Struga Toruńska (Bacha)
- km 142+620 - Struga Lubicka,
- km 145+800 - Drwęca
- km 147+250 - Rudnik,
- km 147+750 - Jordan,
- km 149+750 - Struga Młyńska,
- km 151+266 - Brzoza.

On the assessed terrain there are three recognized water-bearing levels: Quaternary, Tertiary and Cretaceous. The motorway causes no direct collision with deep underground water environment of Principal Underground Water Reservoirs (GZWP) and intakes. Two Principal Underground Water Reservoirs have been found, which range is presented in Appendix no. 4:

- **in the range of segment I** there is **deep underground water reservoir (GZWP) no. 129 Lower Osa River Valley**. The designed motorway crosses and adjoins with the Highest Protection Zone (ONO) of this reservoir in km ~89+000÷93+000, and is located in the High Protection Zone (OWO) from the beginning of designed segment to km~96+800. Underground waters of this reservoir are the main underground water source for Grudziądz. In range of identified reservoir no. 129 there is “**Grudziądz**” **intake located**. The motorway route is located outside of resource area of this intake (2,5 km from its boundaries). This intake is supplied mostly by rain water, soaking in the ground, and inflow from eastern elevation, therefore from outside of designed motorway route. The assessment of hydro-geological conditions on this terrain allowed to determine that the motorway construction will have no influence on water quality from this intake.

The motorway may potentially be dangerous for the water-bearing layer in range of this reservoir in case of serious failure. This layer has no natural protection in the form of insulating layers, protecting it from surface influences. Therefore in range of protecting this level it is recommended to construct ecological (sedimentary and retention) reservoirs, which main task will be the protection from the serious failure. These reservoirs will have cleaning and emergency functions. The most appropriate location for them has been indicated under the flyover, beyond flood banks (on both sides of Wisła river). In the outflows from those reservoirs there will be gates, cutting off outflow of possible impurities to the receivers. In order to protect shallow ground waters in the area of deep underground water reservoir crossing it has been recommended to locate geo-cloth with 20 cm of filtrating layer in ditches bottoms on both sides of designed motorway in km: [89+850÷90+070], [90+300÷90+550], [91+500÷94+300].

- **in range of segment IV** there is **deep underground water reservoir (GZWP) no. 141 - Lower Wisła**. The designed motorway crosses the Highest Protection Zone (ONO) of this reservoir in km ~148+750÷150+850, and is located in the High Protection Zone (OWO) from km ~142+000 to the end of the designed segment. This is a reservoir of porous character (sands and gravels), where mean intakes depths are 40 m. The recognized waters of Quaternary water-bearing level exist in sand terraces of Wisła. In this area, due to lack of continuous series of compact separating deposits, it comes up to connecting of water-bearing levels. There is one common valley water-bearing level. Locally there are low thickness of low-permeable deposits, i.e. clays (8 m), silts (1 m), which protect this level from possible impurities from the surface. Rain water from this segment will be carried away by means of properly selected devices, removing suspensions and petroleum hydrocarbons.

In the vicinity of the identified deep underground water reservoir no. 141 (in km ~141) there are intakes "Drwęca" and "Jedwabno", approximately 1 km from the intermediate protection area of those intakes. The general direction of underground waters flow in examined area (in the range of both intakes) is from northern East to southern West, towards Wisła valley.

In km ~151 of motorway there is underground water intake "**Czerniewice**". The lowest distance from the designed A1 motorway to the intermediate protection zone of this intake is 350 – 400 m. The underground waters flow is towards the designed segment of A1 motorway and partially parallel to it.

The above mentioned intakes are located in safe distance from the designed A1 motorway. It is estimated, that there will be no negative influence on surface and underground waters environment, used in mentioned areas.

The identified deposits of natural aggregates do not collide with the designed motorway run.

Rain water removing, floating from motorway sealed areas, will be performed directly (gravitationally) to adjacent ditches, or indirectly through segments of rain sewage system, which are designed for removing water from roadway arcs and engineering objects. Removing water from motorway auxiliary objects will be also performed through rain sewage system.

Cleaning of water from the motorway will be performed in adjacent ditches, locally equipped with transverse partitions in form of palisade, covered with stones. The motorway adjacent ditches will have deposit and retention function, assuring 40 to 60% of suspensions removing from these waters. In two segments, due to lack of reservoirs, outflow from the motorway drainage area will be performed to the ecological (deposit and retention) reservoirs, in km 129+165 (right side) and 139+750 (left side).

The devices, used for water environment protection, will also include settling tanks (or horizontal sand traps) and petroleum compounds separators (with automatic outflow closing), located before rain water inflow to the reservoirs (Wisła and Drwęca rivers, and next to auxiliary service objects).

To protect soil and water environment, in places, where underground water level in sand formations is lower than 5 m, it is recommended to use the geo-cloth. Geo-cloth locations have been determined according to archive research in 6 segments of motorway adjacent ditches, in km: [89+850÷90+070], [90+300÷90+550], [91+500÷94+300], [96+800÷100+500], [124+500÷128+000], [129+100÷129+900].

Used devices will allow to obtain the required level of impurities removing, according to valid regulations, and will protect environment in case of serious failure.

Flood safety – designed engineering objects (flyovers, bridges, passes) will not change hydrographical conditions in river valleys and in range of smaller water courses. It results from designed throughput of objects, adapted for high water levels.

A1 motorway, running through Wisła valley near Grudziądz and Toruń is located in similar area in respect of flood conditions. Taking into consideration existing terrain conditions and Water Law requirements, the following recommendations have been proposed:

- construction works, connected with flyover building in range of existing flood banks should be performed in the way, which does not break their tightness and stability;
- vehicles traffic during construction works, in case of bank crossing needs, should be performed in appropriate places, agreed by kujawsko – pomorskie province marshal;
- all activities in terrain between water and flood bank (inter-embankment) and in potential flood hazard region (beyond the bank on the leeward side) should be agreed with Director of Regional Water Management in Gdańsk;
- do not allow for growing self-seeding trees and bushes under the flyover. In that purpose control the area at least once a year and cut the possible self-seedings. Those activities will prevent blocking and creation of jams for flowing high water, often carrying broken ice;
- in the inter-embankment segment in Wisła valley near Grudziądz (Nature 2000 area) there is agricultural cultivation, which due to environmental reasons should be transformed into meadow, where appropriate treatment (mowing) will also not problematic for flood water outflow. At the same time such activity will contribute to enlargement of the area of habitat that is friendly for protected species in that area;



- in the old river beds, created in the past, and local hollows there are terrains especially valuable for plants and animals. In places assigned by naturalists, especially in Wisła valley near Grudziądz, where bordering lines of designed investment are in direct vicinity, it is recommended to maintain these terrains (unchanged, if possible) and leave them for natural recovery of plant habitats.

## **Soil**

Along the analysed segment of A1 motorway there are mostly agricultural terrains with very high soil usability. The biggest areas belong to class III and IV. The biggest part is good wheat complex and very good rye complex. Appendix no. 5 contains soil and agricultural maps in scale 1:25 000.

In segment I Nowe Marzy – Grudziądz and in segment IV Lubicz – Czerniewice, in range of Wisła river, there is majority of fen soils on common dusts and sand clays. Very good (1) and good (2) wheat complex dominates here. This segment is characterized by high productive values of soil, with high dependence on underground water level stability.

Segment II Grudziądz – Lisewo is characterized by mosaic of soils and agricultural complexes. The majority here are brown soils and weak green croplands (3z) on sand clays and strong clay sands. Among the agricultural terrains in elevated area south of Młynówka valley good wheat complex (2) is a majority.

Segment III Lisewo – Lubicz is characterized by dominating good wheat complex (2) with fragments of very good rye complex (4). Green croplands are weak and very weak, located on ooze – peat soils. Locally there is also strong cereal and fodder complex (8) on black specific soils.

During the construction the strong transformation of soils in technical works area and in direct vicinity will take place. The biggest, often non-recoverable changes in soil cover will take place in areas in the direct vicinity (soil zone, included in lines bordering the motorways). Those terrains will be excluded from the agricultural production. Whereas terrain strips with temporary occupation, e.g. for infrastructure rebuilding after reclamation will be restored to the previous use.

Motorway influence during use phase will depend on local conditions, physical and chemical properties of soils and impurities inflow amounts. Range of forecasted soil contamination in the motorway surrounding is estimated for max. 5 m from its edge. As the primary communication pollutants, influencing on soils the heavy metals are recognized – lead and cadmium. The source of communication pollutions are also agents for removing ice and snow, i.e. NaCl and CaCl<sub>2</sub>.

For the purpose of soil protection it is recommended to protect it during heavy equipment operation and against pollution with building materials, protecting surface and underground waters and removing humus layer for reuse after the motorway construction. Also it will be necessary to protect the soils (botanical classes I – III), adjacent to the road, through planting of covering and insulating greens (detailed locations for planting are given in table in chapter IX.2). Selection of green zones width will depend on purchased terrain area, located in bordering lines, according to valid decisions.

## **Environment**

In the run and in the direct vicinity of analysed segments of A1 motorway there are terrains, being environment protection forms according to art. 6, section 1 of environment protection law (Journal of Laws No. 92/2004, pos. 880). Planned route will cross twice the area of special birds protection (OSOP) Nature 2000 PLB040003 “Lower Wisła valley”, Nature 2000 “Drwęca Valley” PLH280001 and “Nieszawska Wisła Valley” PLH040012. Moreover, the motorway crosses other protected terrains, i.e. reservation, protected landscape areas and group of landscape parks.

In the table below there are identified in the motorway vicinity or in its run forms of environment protection, together with definitions of collision type and investment influence, according to its designed kilometres. Locations of those forms are shown in the map in scale 1:25 000 – Appendix no. 2.

Motorway kilometres	Environment protection form	Collision type	Investment influence
89÷494	Environment reservation "Grabowiec"	motorway in the distance of approx. 5 km	no influence
89÷494	Environment reservation "Jezioro Fletnowskie"	motorway in the distance of approx. 5,5 km	no influence
89+494÷90+320	Eastern Region of Tucholski Forest Protected Landscape	motorway crosses on the length of ~830 m	ecosystems fragmentation
89÷494	Ecological cropland – Forest Inspectorate Dąbrowa, district Laskowce 212n	motorway in the distance of approx. 290 m	no influence
89÷500	Ecological cropland – Forest Inspectorate Dąbrowa, district Laskowce 212b	motorway in the distance of approx. 270 m	no influence
90+320÷95+420	Chełmiński and Nadwiślański Landscape Parks Group	motorway crosses on the length of ~5,1 km	crossing of mammals and birds migration routes
94+655÷95+760	OSOP "Dolina Dolnej Wisły" PLB040003	motorway crosses on the length of ~1,1 km	influence requiring repair and minimization actions
99+880÷102+255 104+310÷106+125	Protected Landscape Area Osa and Gardęga Valley	motorway crosses on the length of ~4,2 km	migration routes crossing and ecosystems fragmentation
121÷000	Protected Landscape Area "Zgniłka-Wieczno-Wronie"	motorway in the distance of approx. 1,6 km	no influence
128÷460	Ecological cropland – Forest Inspectorate Kowalewo Pom., district Leśno 133f	motorway in the distance of approx. 440 m	no influence
129÷000	Ecological cropland – Forest Inspectorate Kowalewo Pom., district Leśno 139h	motorway in the distance of approx. 150 m	no influence
128+660÷129+130 143+255÷146+600	Protected Landscape Area "Dolina Drwęcy"	motorway crosses on the length of ~3,82 km	ecosystems fragmentation
141÷000	Protected Landscape Area of Edge Wisła Valley	motorway in the distance of approx. 4,4 km	no influence
145+830÷145+870	Environment reservation "Rzeka Drwęca "	motorway crosses on the length of ~40 m	influence requiring repair and minimization actions
145+800÷145+880	Special Habitat Protection Area "Dolina Drwęcy" PLH280001	motorway crosses on the length of ~80 m	influence requiring repair and minimization actions

149+555÷151+390	OSOP "Dolina Dolnej Wisły" PLB040003	motorway crosses on the length of ~1,83 km	influence requiring repair and minimization actions
149+555÷151+390	Special Habitat Protection Area "Nieszawska Dolina Wisły" PLH040012	motorway crosses on the length of ~1,83 km	influence requiring repair and minimization actions
151÷900	Special Habitat Protection Area "Forty w Toruniu" PLH040001	motorway in the distance of approx. 8,3 km	no influence
151÷900	Environment reservation "Kępa Bazarowa"	motorway in the distance of approx. 5,3 km	no influence
151÷900	Protected Landscape Area Ciechocińska Lowland	motorway in the distance of approx. 4,8 km	no influence
151÷900	Protected Landscape Area Wydmowy, south of Toruń	motorway in the distance of approx. 470 m	no influence

A1 motorway crosses and adjoins with the series of plants and animals migration routes, among others passages of large mammals, so called Northern and North-Central from country East to West, national and international migration route of water and mud birds along the Wisła valley, and national ecological passage along the Drwęca valley:

Motorway kilometres	Main animals migration passages	Collision length
89+000÷92+000	Northern and North-Central passage of big migratory mammals	Crossing on length approximately 3,0 km
89+000÷92+000, 100+500÷101+500, 104+800÷105+000, 126+000÷128+000	North-Central passage of big migratory mammals	Crossing on length approximately 6,2 km
94+000÷96+000 150+000÷152+000	National and international birds route	Crossing on length of 4,0 km

In places of increased animal migration the appropriate passages will be constructed, which locations during the initial designing has been consulted with forest service and hunters organizations. In this report, due to better recognition of migration passages of big mammals problem, previous decisions have been revised. Detailed data, regarding locations of passages have been created according to opinions and consultations with Dr. W. Jędrzejewski from the Mammals Research Institute of Polish Science Academy in Białowieża. Proposals and recommendations for animal passages, presented by Mammals Research Institute of Polish Science Academy during Environmental Influence Report preparation were analysed au courant by road designers for the technical possibilities of realization. Taking into consideration the opinion of Director of Environment, Agriculture and Country Development Department in the District Office, as well all previous agreements for the individual motorway segments, the following amount of passages for animals:

• **segment I - in km 89÷494,76÷98+400 - 13 objects, including 5 for big animals**

<b>kilometres</b>	<b>Passage type and its parameters</b>
91÷426	Box passage 2x3,0 m with shelf
91÷655	Bridge [MA-89] through Maława river, 3 spans, 71,32 m long. Spans spacing 21,5+27,0+21,5 m. Additional side span has been added as passage for big animals.
91÷908	Box passage 2x3,0 m with shelf
92÷400	Box passage 2x3,0 m with shelf
92÷690	Box passage 2x3,0 m with shelf
92÷938	Passage Ø100 on the drainage ditch
93÷455	Box passage 2x3,0 m with shelf
94+390÷94+610 94+610÷95+831 95+831÷95+993	Bridge crossing through Wisła near Grudziądz – passages for big animals: Flyover 220 m long; spans spacing 45-60 m; Midstream bridge through Wisła 1603 m long; Flyover 161 m long; spans spacing 50-60 m
96÷660	Bridge [MA-93], 128 m long, 5 spans, through Main Channel and Młynówka river. Side and central spans – passages for big, medium and small animals
97÷752	Box passage 2x3,0 m with shelf
98÷301	Box passage 2x4,5 m with shelf

• **segment II - in km 98+400÷114+000 - 14 objects, including 2 for big animals**

<b>kilometres</b>	<b>Passage type and its parameters</b>
99÷000	No technical possibilities of building the passage for <u>big animals</u>
99÷270	Passage 2x3,0 m with shelf
99÷700	Passage 2x3,0 m with shelf
100÷015	Passage 2x3,0 m with shelf
101÷333,5	3-span overpass, 75 m long, over the national road no. 55 (serpentine). 25 m long side spans as passages for <u>big animals</u>
103÷375 104÷625	2 passages Ø100 ("dry" passages) for small animals
104+761÷105+019	Flyover [WA-102], 255 m long, 6 spans, also as the passage for big animals
105÷274	Passage 4,89x3,92 m (elliptical)
107÷725	Passage 2x3,0 m with shelf
108÷425	Separate passage only for animals, dimensions 5,2x9,7 m
108÷650; 111÷250; 112÷025	3 passages Ø100 ("dry" passages) for small animals
113÷547	Passage 2x3,0 m with shelf

• **segment III - in km 114+000÷141+040 - 50 objects, including 7 for big animals**

<b>kilometres</b>	<b>Passage type and its parameters</b>
114÷740	Passage 1,5 m x 3 m
115÷385	Lower passage 3 m x 15 m; passage location has been chosen with taking into consideration the possibility of routing the water course under it, which has been accepted by the Mammals Research Institute of Polish Science Academy (location change by 10 m) – passage for big animals
115+075; 115+175; 115+275; 115+450; 115+600; 115+735; 115+810; 115+885; 116+200; 117+070	Increasing passages number for small mammals and amphibians, dimensions 1,5 x 1,5 m
117÷465	Lower passage 3 m x 15 m; location change by 15 m; 3 m vertical gauge of passage, according to the initial opinion of Mammals Research Institute of Polish Science Academy – passage for big animals
117÷680	Passage 1,5 m x 3 m
117+570; 119+360; 119+700	Increasing passages number for small mammals and amphibians. Dimensions: 1,5x1,5m
119+900	Passage 1,5 m x 3 m, location change by 20 m
120+150	Passage 1,5 m x 3 m
120+350	Passage 1,5 m x 3 m
120+800	Passage 1,5 m x 3 m
120+870	Lower passage 3,7 m x 15 m of Polish Science Academy – passage for <u>big animals</u>
121+350	Passage 1,5 m x 3 m
122+285	Passage 1,5 m x 3 m
122+445	Passage 1,5 m x 3 m
124+525; 124+600; 125+300; 125+940; 126+850	Increasing passages number for small mammals and amphibians, dimensions 1,5 x 1,5 m
126+931	Bridge [MA-117] through Struga Toruńska river – raised motorway grade line, which created passage 5,0 m high under the bridge on both river sides, on dry terrain strip with total width min. 10,0 m – passage for <u>big animals</u>
127+170	Passage 1,5 m x 3 m, location change by 180 m
128+280	Lower passage for all animals 5 m x 40 m – passage for big animals
127+850; 127+070; 128+001,5; 129+160; 130+735; 130+835	Increasing passages number for small mammals and amphibians, dimensions 1,5 x 1,5 m
130+030	Passage 3 m x 1,5 m
130+935	Passage 1,5 m x 3 m
132+702,5	Passage 1,5 m x 3 m
132+820	Lower passage 3.5 m x 15 m of Polish Science Academy – passage for big animals
134+675	Passage 1,5 x 3 m – location change caused by local conditions, moves passage away from the busy district road, and allows for passage width 3,0 m
137+035	Lower passage 3.5 m x 15 m of Polish Science Academy – passage for <u>big animals</u>
136+950; 137+120; 137+200; 138+254 139+750	Increasing passages number for small mammals and amphibians, dimensions 1,5 x 1,5 m