

**REGIONAL DIRECTOR FOR  
ENVIRONMENTAL  
PROTECTION IN RZESZÓW**

**DECISION**

Acting on the basis of :

- Article 104 of the Act of 14 June 1960 - Code of Administrative Procedure (Journal of Laws of 2013, item 267);
- article 71, passage 2, item 2, article 73, passage 1, article. 75, passage 1, item 1 letter i, article 80, article 82, article 85, passage 2, item 1 of the Act of 3 October 2008 on making available information on the environment and its protection, participation of the society in environmental protection (Journal of Laws No. 199, item 1227 with later amendments);

after examining the application of 26 October 2011 of the Podkarpacie Administration of Land Melioration and Water Installations, ul. Hetmańska 9, 35-959 Rzeszów, concerning issuance of the decision on environmental conditions for implementation of the project entitled: "Vistula - Stage 1 - Expansion of the right embankment of the Vistula river in km 5 + 950 -15 + 819 on the section from Tarnobrzeg (Skalna Góra) to Koćmierzów (the border of Podkarpackie and Świętokrzyskie voivodeship)" and documentation mentioned below:

1. Report on environmental impact of the project - by Design Group DERING 81-572 Gdynia, ul. Świerkowa 36/3, January 2012,
2. Supplementation of the report of environmental impact of the investment project, covering the documents from: May 2012, July 2012, September 2012, January 2013, May 2013.
3. Acoustic analysis, entitled: "Influence of truck traffic on the communal road in the area of expansion of the right Vistula embankment at 5 + 950 -15 + 819 km from Tarnobrzeg (Skalna Góra) to Koćmierzów on the acoustic conditions in the environment", preparation: Stempus Witold Ziółkowski, May 2013,
4. The copy of site and elevation map including the area on which the project shall have impact,
5. The copy of registry maps certified by a competent body,
6. Simplified extract from the land register.

**I hereby decide**

I shall determine environmental conditions for the project under the name: "Wisła - Stage 1 - Expansion of the right embankment of the Vistula river in km 5 + 950 - 15 + 819 on the section from Tarnobrzeg (Skalna Góra) to Koćmierzów (the border of Podkarpackie and Świętokrzyskie voivodeship)".

Investor of the project: Board of Melioration and Hydraulic structures in Rzeszów, ul. Hetmańska 9, 35-959 Rzeszów

## **I. Type of the project and place of its completion:**

The project shall consist of the expansion of the right Vistula embankment at 5 + 950 -15 + 819 km in the section from Tarnobrzeg (Skalna Góra) to Koćmierzów (border of Podkarpackie and Świętokrzyskie Voivodeships). The designed expansion aims to increase flooding security of the city of Tarnobrzeg within the districts: Dzików, Zakrzów, Sielec i Wielowieś.

Planned project includes the completion of e.g.:

1. Increase and enlargement of the embankment's crown along with compaction of the body, ca. 1.5 +1.8 m.
2. Sealing of body and base of the embankment based on horizontal anti-filtration screen of ca. 10 m deep (at 5 + 950 -15 + 700 km) using DSM method and sealing of the upstream bank using foil covered with a layer which builds the embankment's body.
3. Repair of existing embankment's roads on the landside.
4. Construction of the operational road on lacking sections.
5. Construction of the operational strip on the side of the upstream bank.
6. Reconstruction of embankment's passages adjusting them to changed embankment sizes as a result of its increase.
7. Protection of embankment's lock, outlets of rain water pumping station and sewage treatment plant adjusting them to changed embankment's sizes as a result of its increase.

Assumed parameters of flood embankment upon reconstruction:

Crown ordinate:	from 150.45 m above sea level (at km 5+950) to 152.80 m above sea level (at km 15+819), ie. 1 m above max. water table in May 2010.
Embankment crown width:	3.00 m
Water-side slope inclination:	1:2.5
Land-side slope inclination:	1:2.0
Width of the embankment's footing:	3.50 m
Width of the operational strip:	4.00 m

## **II. Conditions of use of the area in the phase of implementation and operation or use of the investment project, with particular focus on the need to protect important natural values, natural resources and monuments, as well as reduce nuisances for the neighboring area:**

1. Soil mass collection from the inter-embankment area is prohibited.
2. Upon the execution of works it is required to remove fertile soil layer, thickness: ca. 20 - 30 cm which shall be then piled on the embankment and used for future reclamation of the concerned area.
3. Works associated with removal of fertile soil layer in waterlogged areas shall be conducted in the period from 1 September to 31 October while on the remaining areas excluding the period from 1 March to 31 July. If, due to technical reasons, the works would have to be conducted (partially or fully) at a different time, they shall have to be conducted under environmental supervision.
4. Works involving interference in natural reproduction places of amphibians (e.g. melioration ditches, outflows of embankment's locks, places for periodical water stagnation) shall be executed beyond the period from 1 March to 30 June while works involving interference in wintering of amphibians shall be carried out excluding the period from 1 November to the end of February.
5. The works conducted in the vicinity of the confirmed by natural supervision places of reproduction of amphibians will be made excluding terms from 1 March to 31 May i.e. after the end of the main amphibian breeding migration period. It is also acceptable to use, in accordance with the environmental supervision recommendations, temporary fencings of the aforementioned migration corridors (to enable amphibians to reach the breeding grounds and limit the trampling of specimens by mechanical equipment).

6. Felling shall be limited to trees and shrubs growing at the foot, on the scarp and the crest of the embankment intended for expansion, i.e. to ca a dozen or so trees and a dozen or so shrubs. Felling shall be conducted outside the main bird breeding period, i.e. excluding the period between 1 March and 15 October.
7. Damaging trees and shrubs not subject to felling, in the vicinity of conducted earthworks related to the realization of the project is prohibited. For this purpose, it is recommended to utilize tree trunk covers (e.g. straw mats, wire braided plank formwork). If the application of the aforementioned protections should prove technically unfeasible, fencing is recommended (for the period of work realization) of groups of trees/shrubs, by means of coloured tape. For this reasons, it is prohibited to store near tree trunks (i.e. inside the outline range of the tree crowns and at the minimum, 2 m outside that outline) and shrubs, of any construction materials and waste.
8. It is forbidden to interfere in patches of natural habitat of willow, poplar, alder and ash marsh meadows *Salicetum albo-fragilis*, *Populetum albae*, *Alnenion* (91E0) confirmed in the vicinity of the planned works due to the aforementioned reason patches of habitats, and others indicated by the environmental supervision as valuable, in the vicinity of which concerned works shall be carried out, shall be duly protected during works realization, e.g.: by tape fencings to be removed after completion of the works.
9. The storage of waste, soil masses, as well as the localization of material bases the inter-embankment area of the Vistula river and at the locations of marginal lakes, water stagnation, and other habitats indicated by the environmental supervision is prohibited.
10. Excavations and structures, which may constitute a trap for small animals, mainly amphibians, should be adequately secured (e.g. tightly covered at the end of each workday). In addition, the aforementioned locations shall be inspected daily, and in the case of possible trapping of animals, they shall be captured and transferred to habitats proper for a given species, outside the works' area.
11. Using the area during the works should be economical and its transformation is acceptable only with regard to the performed project the reason of which the works related to implementation of the concerned task should be limited to the area directly occupied under the project implementation, i.e. the rebuilt embankment section with a technological strip of a width of a dozen or so meters (both on the landside and the inter-embankment area) and land for the technological facilities.
12. Whenever possible, the planned works should be conducted gradually, i.e. after completing works in a given section and its reclamation, works should begin at the next embankment section intended for expansion.
13. Compliance with the aforementioned conditions shall be overseen by experienced natural supervisors. Reporting from supervisors' activities shall be transferred to the local Authority within 6 months from work completion.
14. Household sewage should be collected in a tight, contained tank (TOI TOI type facilities), the contents of which shall be transported to the nearest sewage treatment plant equipped with a wastewater collection point.
15. At the construction works stage, water for grout production pumped into the embankment body (anti-filtration screen), shall be delivered from the water supply network, by means of a water-wagon.
16. During construction works related to any earthworks, surface waters must be secured against excessive silting due to increased erosion.
17. During construction works, the soil-water environment should be safeguarded against contamination with substances used, sewage, or waste generated in connection with realizing works.
18. Earthworks shall be carried out so that no damage is caused to regulatory structures.
19. Construction works should be conducted outside the flood hazard season.
20. For the time of conducting construction works, a plan should be prepared against flood

protection, specifying the relation between the time of commencement of the evacuation or equipment safeguarding, and the occurrence of a certain hydro-meteorological situation.

21. During the course of construction works, equipment maintenance and repairs at the construction site is prohibited.

22. After completion of earthworks, the construction site should be immediately restored. Damaged land should be sown, and the rebuilt embankment section should be turfed and sown with native plants.

23. After completing the construction works, the entirety of the earth works area shall be covered with humus and sown with grass.

24. After completing all construction works, areas temporarily occupied for access roads and storage yards should be restored to their prior condition.

25. Transport of materials shall be conducted on existing roads or designated temporary roads, established in such a way so as to reduce interfering with the natural habitats designated by the environmental supervision.

26. Trucks transporting aggregate to the earth embankment construction site shall travel along the road sections:

- road 723 - access road (road 723 - earth embankment),
- road along the earth embankment on the side of the Vistula River (road along the embankment's footing shall be shielded by the embankment with the height from 3 m to 4 m).

27. Construction works and operations connected with aggregate transportation by trucks at the stage of project realization shall be conducted only during the day i.e. from 6am to 10pm.

28. Hardened surfaces which shall be used cars transporting aggregate should be maintained in an appropriate condition (i.a. access roads).

### **III. Requirements concerning environmental protection to be included in the building design:**

1. Include recommendations resulting from item II of the decision.
2. On the section of the embankment at 5 + 950 -15 + 700 km it is important to perform horizontal anti-filtration screen max. depth of 10.00 m. The screen should be made by means of a non-vibrating DSM (Deep Soil Mixing) technology by means of vertical or horizontal stirrers.
3. Additionally, for the purpose of sealing of the embankment's upstream bank on the section at 5 + 950 -15 + 700 km it is necessary to place foil covered with a layer of material used for reconstruction of the embankment.
4. To protect the area located beyond the embankment on the section of the embankment at 15 + 700 -15 + 819 km(place of ferry crossing) it is necessary to apply mobile sandur protections which shall be assembled in the case of meteorological messages concerning flood waves.
5. Along the whole length of the examined embankment's section from the side of the upstream bank it is important to make a green operating strip of ca. 4.0 m.

### **IV. I shall not impose the obligation to conduct environmental impact assessment under the proceedings concerning issuing decision which permits the execution of the investment project.**

## **SUBSTANTIATION**

Regional Director for Environmental Protection in Rzeszów received an application from the Board of Melioration and Hydraulic Structures, ul. Hetmańska 9, 35-959 Rzeszów of 26 October 2011, concerning issuance of the decision on environmental conditions for the execution of the investment project entitled: "Vistula - stage 1 - expansion of the right embankment of the Vistula River, in km 5 + 950 - 15 + 819 on the section from Tarnobrzeg (Skalna Góra) to Koćmierzowa (Podkarpackie and Świętokrzyskie Voivodeship border)".

The application has been properly completed, according to Article 74, passage 1 of the Act of 3 October 2008 on making available information on the environment and its protection, participation of the society in environmental protection, as well as on environmental impact assessments.

Embankment's section of ca. 9,869 km planned for reconstruction (at 5 + 950 -15 + 819 km) has a regular line which was constructed from the land side by means of the embankment's footing on which operational road is constructed. Upon the completion of expansion, parameters of the embankment shall be in accordance with requirements specified in the Regulation of the Minister of Environment of 20 April 2007 on technical conditions concerning hydrotechnic buildings and their location (Journal of Laws no. 86, item 579). The project is a part of technical solution system protecting Vistula River valley against flood on the section from Wisłoka to San. Owing to development of the Vistula Valley in this area, there is a need to provide a high degree flood protection which shall allow the expansion of the existing Vistula embankment, including expansion of the embankment on the analyzed section.

The concerned project shall be executed by way of the Act of 8 July 2010 on specific principles for preparation to implement investment with regard to anti-flooding structures (Journal of Laws No. 143, 963) and Regional Director of Environmental Protection in Rzeszów is the competent authority for issuance of the decision on environmental conditions concerning consent for its execution on the basis of Article 75, passage 1, item 1, letter i and Act on making available information on the environment and its protection, participation of the society in environmental protection, as well as on environmental impact assessments.

Designed project belongs to the group of projects which may require execution of the environmental impact assessment procedures on the basis of Article 59(1) item 2 of the Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments of § 3(1) item 65 (flooding structures, excluding the reconstruction of flood embankments consisting in tightening of the embankment's body and its base in order to limit the possibility of their washout and interruption of flood waters passing as well as regulation of waters or sewage system understood as development of waters which allow use for navigation purposes) of the Regulation of the Council of Ministers of 9 November 2010 on kinds of investment projects which may significantly affect the environment (Journal of Laws no. 213, item 1397 with later amendments).

According to the valid regulations, information on submitted application was attached in the publicly available list of data on documents containing information on environment and its protection in form A under no. : 826/2011 kept by the Regional Director for Environmental Protection in Rzeszów. Additionally by way of announcement of 17 November 2011., ref. no. : WOOŚ.4233.39.201 I.KR-7 the local Authority notified the Parties on initiating the proceedings in a given case.

Upon the analysis of submitted application and considering the provisions of Article 63(1) of Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments, mainly with regard to the location of the planned project in immediate vicinity of the area which have importance for Tarnobrzeg Vistula Valley Community PLH180043, which is characterized by: great biodiversity of plants and animal species as well as the existence of unique natural habitats, the examples of which are - old beds and natural floating vegetation, marshy meadows and meadows, numerous fish species and amphibians and plenty of interesting species that it is important to assess its impact on the environment and at the same time there is a need to prepare report on environmental impact of the project containing environmental impact assessment required by Article 6.3 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora (hereinafter referred to as "Habitat Directive"). It should be added that the area of the aforementioned Natura 2000 site is at the same time an important environmental corridor.

By means of the order of 26 January 2012, ref. no. : WOOŚ.4233.33.2012.KR-16, the

Regional Director for Environmental Protection in Rzeszów ascertained the obligation to conduct an assessment of the environmental impact of the planned project, and defined the scope of the environmental impact report of the investment project. At the same time proceedings by way of provision of 26 January 2012 ref. no. : WOOŚ.4233.33.2012.KR-17 was suspended until submission of the required report by the Applicant.

Board of Melioration and Hydraulic Structures in Rzeszów submitted report on environmental impact with the letter of 24 February 2011 ref. no. : IM 403.7.2.2012. In this letter the Investor additionally asked, under environmental impact assessment, for consideration of works consisting in excavation of ground masses from the land of Vistula embankment for the purpose of their future embedding into the embankment's body on the examined section. The prepared report discusses aspects related to impact of the reconstruction of the embankment and collection of the ground masses collection the inter-embankment.

In connection with submission of the report to the local Authority on 24 February 2012, it determines circumstances concerning suspension of the proceedings, therefore, it has been initiated. Due to the lack of required site and elevation map by way of the letter of 29 February 2012 ref. no. : WOOŚ.4233.33.2012.KR-25 the notification was issued to supplement the application. In response on 12 March 2012 the Investor made necessary supplements.

Information on the report on the environmental impact of the investment project was placed in a publicly available list of data on documents containing information on environment and its protection kept by the Regional Director for Environmental Protection in Rzeszów under number 139/2012.

Having read the submitted report it was ascertained that it does not present in a sufficient manner all significant issues with regard to environmental protection resulting from provisions of the Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments. Therefore, letters: of 23 March 2012 ref. no. : WOOŚ.4233.33.2012.KR-35 of 20 June 2012 ref. no. : WOOŚ.4233.33.2012.KR-44 of 21 August 2012 ref. no. : WOOŚ.4233.33.2012.KR-49 the Investor was called to supplement the report. The Applicant submitted appropriate supplements to the report along with letters of 17 May 2012 ref. no. : IM.402.4.1.2012 of 24 July 2012 ref. no. : IM 403.7.7.2012 and of 19 September 2012 ref. no. : IM 403.7.9.2012. As a result of the analysis of collected evidence materials in connection with further doubts with regard to environmental impact of the investment project, the local Authority by way of the letter of 17 October 2012 ref. no. : WOOŚ.4233.33.2012.KR-57 once again called to supplement the report. Along with the letter of 31 January 2013 ref. no. : IM 403.43.1.2013 the Investor submitted supplements to the report. Having read the submitted document the local Authority by way of the letter of 1 March 2013 ref. no. : WOOŚ.4233.19.2013.KR-67 once again called to explain issues concerning impacts on natural environment. The Investor submitted supplements along with the letter of 31 May 2013 ref. no. : IM 403.43.3.2013.

Additionally by way of the letter of 6 June 2013 ref. no. : IM 403.43.5.2013 the Investor notified on resignation from the planned collection of ground masses from natural habitat 91EO (willow-poplar gallery forests, elm-ash forests noting at the same time that the earth material for expansion of the embankment shall come from the external and licensed source.

Owing to the new source of earth material necessary to reconstruct the embankment, throughout the procedure the Investor was called electronically to analyze the impact of transport of earth material from external sources on the acoustic conditions. This analysis was submitted along with the letter of 20 June 2013 ref. no. : IM 403.43.5a.2013.

Upon the analysis of documents and explanations submitted by the Applicant it was recognized that their content complies with requirements of Article 66 of Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments.

Under the procedure concerning issuance of the decision on environmental conditions

concerning the permit for the execution of the investment project, Regional Director of Environmental Protection in Rzeszów applied to National Poviát Sanitary Inspector in Tarnobrzeg by way of the letter of 26 June 2013 ref. no. : WOÓŚ.4233.19.2013.GJ-80 for an opinion by way of Article 77(1) item 2 of Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments. The aforementioned letter contained documents, i.e. the copy of the Investor's application on issuance of the decision on environmental conditions for the above project, report on environmental impact of the project along with supplements.

National, Poviát Sanitary Inspector in Tarnobrzeg upon the analysis of the above documents by way of the letter of 12 July 2013 ref. no.: PSNZ.4600-5/2013 expressed a positive opinion on the execution of the aforementioned of the project. Regional Director of Environmental Protection in Rzeszów specifying required conditions concerning execution and operation of the investment project to be applied by the Investor included and provided detailed position of the aforementioned Authority.

The subject of analyses presented in the report includes three technological variants as well as description of expected effects for the environment in the event of failure to execute the project.

#### Option I

It includes the reconstruction of the embankment by earth works and sealing of its body and base owing to diversity of hydro-geological conditions and structure of the previous embankment. With regard to sealing technology of the embankment the division into the following sections was adopted:

##### *1. Section I - km 5+950 -15+700*

Execution of anti-filtration screen at the foot of the upstream scarp on the maximum depth of 10.00 m (at 5 + 950 -15 + 700km) and sealing of the upstream bank by means of foil. Anti-filtration screen shall be made by means of non-vibrating DSM technology - Deep Soil Mixing - ground mixing using vertical stirrers (cutting devices) or horizontal stirrers (cutting-bucket devices). In addition it is planned to make a green operational strip of ca. 4.0 m width on the side of the upstream bank.

##### *2. Section II- km 75+ 700 - 15+819*

This section shall include only earth works related to the embankment's superstructure under which it is planned to make green operational strip of ca. 4.0 m width on the side of the upstream bank. Owing to the planned increase of the embankment by 1.0 m within the ferry crossing it is necessary to secure the area located beyond the embankment by applying mobile sandur protections. Sandur protections shall be assembled in the case of meteorological messages concerning flood wave.

This option was executed by the Investor as a complex solution protecting the effectiveness of the existing embankment against the effects of filtration threatening its destruction. This option is at the same time the most beneficial owing to the environment impact.

#### Option II

This option assumes sealing of the whole embankment by the execution of anti-filtration screen from the crown (in the embankment's axis). Construction of the screen with the length of ca. 10.0 m to ca. 20.0 m included WIPS technology (vibrating cavity screen). This solution provides the required stability of the embankment and protects against excessive filtration and causes additional thickening of the embankment's body. However due to the depth of the made screen, its execution requires special equipment (heavy pile-drivers with vibration hammers). This technology hinders works stage both in organizational and spatial terms because it requires appropriate preparation of additional mounds for pile-driver (operating platform). For the above reasons the Investor excluded the execution of the project under the above option.

### Option III

It includes the application of vertical anti-filtration screen near the upstream bank and sealing of the upstream bank by means of artificial material (bentomat, foil) with covering by means of ground layer of ca. 1.5 m. The concerned barrier increases the stability coefficient above the acceptable level ( $F > 1.30$ ), eliminates helocren springs on downstream bank and crosses privileged filtration road in a sands layer lying directly under the embankment's body. Application of described option requires substantial expenses and wide scope of earth works. For its application it shall be necessary to reduce the upstream bank inclination. Interference in the embankment structure as a result is connected with growth of flood hazard during the execution of earth works (excavations from the upstream side). For this reason this option was rejected by the Investor.

### Failure to execute the project

Technical condition of the existing embankment of 9,869 km (at 5 + 950 15 + 819 km), i.e. on the section from Tarnobrzeg (Skalna Góra) to Koćmierzów requires actions which are necessary to provide appropriate tightness and stability. Within the embankment strip on the land side and the scarp on the land side there may occur numerous leakages caused by increased filtration during the presence of high water levels of Vistula. The current condition creates danger of loss of stability and increases possibility of interruption of the embankment. Flood problem and increased water levels occur over years with smaller or greater intensification. Failure to execute the investment project with all confidence shall have negative impact on the health and life of people, strongly damage infrastructure of Tarnobrzeg and have an influence on condition and preservation of the environment.

Throughout the project realization inconveniences with regard to noise are to be expected, generated during the construction works. The source of noise emissions to the environment in the expansion phase of the right Vistula embankment at 5 + 950 -15 + 819 km from Tarnobrzeg (Skalna Góra) to Koćmierzów shall be mainly road noise created by trucks with aggregate from the mine to the place of reconstruction of the embankment. As it results from the presented acoustic analysis (noise map) road noise emission originating from trucks traffic of the discussed project, determined by the course of isolines with regard to: As it results from the presented acoustic analysis (noise map) road noise emission originating from trucks traffic of the discussed project, determined by the course of isolines with regard to: 61 dB (A) is the value determining acceptable level of noise for areas of housing in the day time. Considering calculated value of equivalent noise level in percentage points (at the nearest housing located along the access road to the reconstructed embankment), i.e.: item 7 at the height of the first floor - 46.4 dB (A), at the height of the second floor - 47.8 dB (A), item 6 at the height of the first floor - 39.4 dB (A), at the height of the second floor - 39.7 dB (A), item 4 at the height of the first floor - 38.6 dB (A), at the height of the second floor - 39.0 dB (A), item 1 at the height of the first floor - 38.8 dB (A), at the height of the second floor - 41.4 dB (A) and additionally considering summary of accumulated impact (i.e. all vehicles moving on the provincial road no. 723) where the value of equivalent noise level in percentage points amounted to: item 7 at the height of the first floor - 47.3 dB (A), at the height of the second floor - 48.9 dB (A), item 6 at the height of the first floor - 46.7 dB (A), at the height of the second floor - 47.0 dB (A), item 4 at the height of the first floor - 44.8 dB (A), at the height of the second floor - 45.4 dB (A), item 1 at the height of the first floor - 38.9 dB (A), at the height of the second floor -41.4 dB (A) it may be concluded that the project shall not exceed acceptable noise for daytime (61 dB) in the areas located along the aggregate removal route, meeting requirements of the regulation of the Minister of Environment of 14 June 2007 on acceptable noise levels in environment (Journal of Laws no. 120, item 826 with later amendments).

Execution of this project shall be related to the introduction of pollutants into the air. Locally, in the area of construction of the embankment may occur growth in dust concentration in the air mainly as a result of displacement of the ground masses. Pollutants shall be also emitted by construction machines and transport. Emission shall be periodical and local and cease along with



the completion of the project.

Actions related to the execution of the project shall result in waste generation. In the case of waste management general principles resulting from Act of 14 December 2012 on waste shall be met (Journal of Laws of 2013 item 21) and in particular: works shall be organized in a manner minimizing quantity of generated waste, manufactured waste shall be stored in the designated and marked place in back-up facilities and shall be transferred for recovery or utilization. Storage of waste shall be conducted in such a way (for instance in containers, under roof or in storage bunkers) so as not to cause their spread in the environment.

Vistula within Tarnobrzeg flows in the bed with quite considerable width reaching from 200 to 500 m. In the river valley between embankments there are many old beds. Underground waters in the analyzed area occur in two water-bearing levels which are Tertiary and Quaternary. Quaternary waters constitute main level of utility waters. The level of water of this level in the analyzed area is deposited at the depth of ca. 1.5 up to 3.5 m b.g.l. Locally with greater overburden of impermeable formations or on poorly permeable there is tightened level of waters which stabilizes at the depth of ca. 2-2.8 m b.g.l. Eastern edge of Tarnobrzeg is located in the main reservoir of underground waters no. 425 "Dębica - Stalowa Wola - Rzeszów".

Homogenous part of surface waters (JCWP) which is included in planned project is Vistula from Wisłoka to San with code: PLRW 20002121999, abiotic type: great lowland river. It constitutes a strongly altered water body. Plan of water management within the basin of Vistula (M.P. of 2011 no. 49, item 549) condition of the homogenous surface waters is defined as bad and it is indicated of failure to reach environmental goals owing to salinity and post-mines waters impact which without derogation. The environmental objective of given homogenous surface is to achieve good ecological and chemical potential. In case of the planned project the influence applies to protected areas as defined by Article 4(1) (c) of Water Framework Directive (2000/60/EC) listed also in Article 113(4) of Act of 18 July 2001 Water Law (Journal of Laws of 2012, item 145, with later amendments) i.e. areas intended for protection of habitats or species for which maintenance or improvement of waters condition is an important factor in their protection.

In addition planned project shall be located in homogenous part of surface waters (JCWPd) with code: PLGW2200135 characterized by good condition of waters without the risk of failure to reach established environmental objectives. Environmental objective for this part of waters is to prevent its deterioration. In order to meet the requirement concerning non-deterioration of part of waters, for part of waters being in at least good chemical and quantitative condition it is important to maintain this condition.

On the basis of data from National Environment Monitoring obtained from Voivodeship Environmental Protection Inspectorate in Rzeszów (measurement point in Sandomierz), currently examined (examination from 2010) chemical condition of JCWP with code PLRW 20002121999 was assessed as below good condition. Ecological potential was assessed as good. The realization of the planned investment project does not include interfering with the Vistula river bed. Impacts during the construction stage may result from penetration of oil derivative substances into surface waters as a result of failure i.e. spillages of fuel and other substance used during construction. Technically operational construction equipment, and proper handling of machines will eliminate any and all such hazards. Proper organization of construction works shall also shorten the work time of heavy equipment. During the execution of the project it is not planned to create parking places. Local roads shall be limited concerning delivery of ground masses. Upon the completion of works the area shall be ordered and restored to the primary function. Concerned project (expansion of the embankment) shall be executed within plots through which runs the discussed section of the embankment and plots neighbouring with the existing embankment.

Earthworks shall be carried out so that no damage is caused to regulatory structures. Upon the completion of works the area shall be reclaimed (sowed with grass). At the stage of construction works the water for production of the cement grout forced in the embankment's body (anti-filtration screen) shall be delivered from the water supply network by means of water carts. Back up facilities

of the construction site shall be equipped with sanitary devices with tight containers to collect liquid wastes which shall be regularly disposed to the sewage treatment plant. During construction and operation of the planned investment project industrial sewage shall not be created. In the course of execution and operation of the investment project it will not be necessary to discharge rainfall waters in an organised manner.

During the assessment of the impact of the concerned project on the status of the homogenous surface waters it should be stated that the project has no effect on the morphological continuity of Vistula. It shall not result in impact on hydromorphological elements (morphological conditions) - no interference in bed of the Vistula river. Potential impact of the project shall be manifested in affecting on physical and chemical parameters (short-term, but throughout the term of execution). Increased indicators as general suspension or indicators describing oxygen conditions (including dissolved oxygen). It shall be however short-term impact related to the stage of execution of works and it should not affect physical and chemical parameters of the whole homogenous surface waters. The project shall not have an impact on biological elements, i.e. on macrophytes and phytobenthos. In the case of macrozoobenthos possible adverse effect may be demonstrated by suspension. Potential impact on this element shall be limited in time and space. However such effect shall not affect the assessment of the element within the whole uniform part of waters. Similarly due to the scope and special character of the investment project it shall not have adverse impact on fish. The Project poses no risk for realizing the goals of water protection within the uniform waterbody, and will not pose risks for water protection in other water bodies. As a result, the Project realization shall not cause risks of incompleteness of environmental goals JCWP Vistula from Wisłoka to San, code: PLRW 20002121999. The project shall not result in the risk for the purposes of protection of waters in other parts of waters.

In the light of the embankment's sealing by means of anti-filtration screen proposed within planned investment no negative impact on water relations on the land side was indicated. Drainage of water from the aforementioned areas after flood wave is provided by melioration devices. Considering the scope of the Project and its potential impacts, it should be stated that the Project shall not constitute a risk for the environmental objectives set forth for JCWPd code: PLGW2200135.

Concerned project is planned to be executed partially within the borders of the area which have importance for Tarnobrzeg Vistula Valley Community PLH180049 i.e. the border of the concerned area reaches upstream bank of the aforementioned embankment.

In the initial stages of the project it was assumed that ground masses necessary for expansion of the embankment shall be collected from ground masses located partially in the border of the embankment (the area of 24 ha which was reduced to the area of 13 ha), partially covering natural habitat listed in Appendix no. 1 of the Habitat Directive, i.e. willow-poplar gallery forests, elm-ash forests (*Salicetum albo-fragilis*), (*Populetum albae*), (*Alnenion*) (91E0), namely habitats indicated in the Regulation of the Minister of Environment of 13 April 2010 of natural habitats and species being the object of interest of the Community as well as criteria of selection of areas qualified to be acknowledged or determined as Natura 2000 sites (Journal of Laws no. 77, item 510) as priority habitat. For this reason the local Authority called to complete the concerned documentation by means of thorough analysis of the impact of the investment on the goals and the object of protection of the aforementioned Natura 2000 site as well as questioned the option consisting in resignation from collecting ground masses from inter-embankment. It should be emphasized that works executed with regard to Natura 2000 sites which relate to permanent transformation of natural habitats may be related with the significantly negative effect even if they relate to the small area. It is also reflected in the case law of Court of Justice of the European Communities. For instance in the sentence C-258/11 (*Sweetman's case, beltway Galway*) of 11 April 2013 it has been indicated that the project violates integrity of the area if it prevents permanent maintenance of the significant features a given area is related to the presence of certain type of

natural habitat the protection of which justified the placement of this area in the list of areas which have importance for the Community. If implementation of the plan or project leads to permanent and irreversible loss of the whole or part of type of natural habitat the protection of which was justified by marking such area as OZW (permanent destruction of 0.5% of the area of priority habitat of *limestone pavements* \*) it is necessary to consider that this plan or project shall have unfavourable effect on the integrity of this area.

Owing to the above in the letter of 6 June 2013 ref. no. : IM.403.43.5.2013 the Board of Melioration and Hydraulic Structures in Rzeszów declared that collection of ground masses from inter-embankment area shall be refrained - ground masses shall be collected only from outside of the inter-embankment area. For the purposes of the implementation of the project the characteristics of the concerned area, i.e. inter-embankment and section of the embankment intended for expansion as well as strip of several meters on the embankment have been presented. Geological mapping of habitats presented in the report was conducted in the period from September 2011, while fauna inventory-taking was conducted during three field inspections in the period of 21 June 2011, 31 July 2011 and 9 September 2011 during was performed the passage of designated areas in the morning (6<sup>00</sup>-1000) and in the night (1700-2200). The natural description of the land contained literature data and information contained in the standard data form characterizing the area which have the importance for Tarnobrzeg Vistula Valley Community PLH180049. Assessment of the effect on species under legal protection and natural habitats was conducted for species confirmed during a wildlife inventory taking and species mentioned in the aforementioned SDF.

Natural characteristics contained in the report indicate that embankment's scarps on the water and upstream side are covered by grass anthropogenic communities with features and structure of lowland fresh meadows (*Arrhenatherion elatioris*). On this territory we may encounter echium and ribbed melilot communities. The crown of the embankment contains field road where we can encounter vegetation complex comprised of *Plantago maior* and *Poa annua* as well as ruderal communities. Embankment's banks contain also plants of foreign origin such as *Bunias orientalis* or *Erigeron ramosus*. In the place where the waterside bank neighbors with parcels on the land side we can encounter *Cosmos bipinnatus* - decorative plant.

For the purposes of the implementation of the project, taking into account collection of ground masses from the inter-embankment the documentation contains natural characteristics of this area (area with total size of ca. 85 ha). The report indicates that the largest surface of this part of the inter-embankment comprises willow-poplar gallery forests and elm-ash forests (*Salicetum albo-fragilis*), (*Populetum albae*), (*Alnenion*) (91E0). By the banks of watercourses around old riverbeds or water reservoirs there are *Phragmitetea*. Additionally inter-embankment contains numerous eutrophic reservoirs with *Nymphaeion* and *Potamion*. They are represented by floating plants *Lemna sp.* and species: *Spirodela polyrhiza* and *Hydrocharis morsus-ranae* and banks and coastal parts are settled by

*Phragmites australisi*, *Typha sp.*, *Acorus calamus* and *Carex acutiformis*. The second group without marshy meadows covering the largest surface of the analyzed inter-embankment are meadows. Within the concerned area it is possible to encounter damp meadows with *Sanguisorba officinalis* typical for lowland meadows, however, as the most important meadow communities should be considered meadows with garlic angular *Allium angulosum* typical of extensively managed and damp meadows. We can also encounter *Angelica sylvestris* typical of communities of damp meadows *Molinietalia caerulea*, the bushes of which were recorded in places which are partially shaded, marshy tree plantings with weak structure as well as scrubs and waterlogged meadows. The discussed area include also herb communities along watercourses as well as fringes, communities of herbs including seed of *Cuscuta*, *Calystegia sepium*, *Rudbeckia*, community of *Urtica* and *Calystegia sepium*. We may also encounter invasive plants *Solidago Sp.* and *Reynoutria Sp* and species: *Impatiens glandulifera* and *Rudbeckia laciniata* as well as *Heracleum sosnowskyi* and *Heracleum mantegazzianum*.

On the other hand the area on the land side is indicated by arable fields, orchards, wastelands and urbanized areas. In accordance with submitted report the land side does not cover naturally valuable habitats.

Referring to the impact of the project on the above habitats it should be stated that concerned project upon waiver of the Investor from collection of ground masses from the area of inter-embankment shall not in any way interfere in inter-embankment marshy habitats 91E0, neighboring (in accordance with the graphic Appendix) with the embankment within the total section of 1.4 km (i.e. short sections, of a length accordingly: 230 m, 525 m, 331 m and 380 m). On sections where planned works shall be conducted in the vicinity of marshy meadows in the aforementioned conditions there are indicated protections of the aforementioned habitats by means of tape fencings. Additionally, within the area of the aforementioned habitats in accordance with the aforementioned conditions shall not be collected wastws and shall not be located work facilities (which shall be situated on the land side). It should be also emphasized that the concerned works shall not in any way interfere with the old riverbeds habitats and other reservoirs located in the inter-embankment area. The analysis of graphic Appendix presenting results of natural inventory-taking shows that implementation of planned tasks shall not be connected with interference in habitat meadows. On the other hand, variable-humidity meadows which are extensively used reach in accordance with the above Appendix the embankment's footing on the total length of ca. 5.3 km (i.e. on shorter sections of 1.4 km, 670 m, 875 m and 2.4 km). This habitat shall be seized only in its marginal, bank part. Humus shall be removed within the embankment which is intended for expansion, protected and then used for reclamation of the concerned area and after execution of works damaged ground surfaces shall be sowed with native plants. Therefore, the realization of the concerned Project shall not result in significant adverse impacts on the aforementioned natural habitats.

Natural inventory-taking made it possible to indicate protected plants under Regulation of the Minister of Environment of 5 January 2012. (Journal of Laws, item 81) i.e. *Sahinia natans* (sp. covered by strict protection in two old riverbeds in the inter-embankment) and *Nuphar lutea* (sp. covered by partial protection in water reservoirs within inter-embankment). For this reason water reservoirs are located beyond the scope of conducted works, and there is no impact of the planned works on the aforementioned species. There was also indicated the type of moss covered by partial protection under the aforementioned Regulation i.e. *Rhytidiadelphus squarrosus* which is present within damp habitats in which there is no interference in relation to the execution of the project. In addition inventory taking covered *Yiburnum opulus* - covered by partial protection. However due to logging of several trees and shrubs of different species there is no adverse impact on these species. In addition, the report states that if at the stage of execution of works, a collision of planned works with plants covered by protection occurs, then upon obtaining a respective permit a given example shall be replaced to the proper habitat, except for concerned works if possible in a close vicinity of the area of their origin.

Ornitological inventory-taking made it possible to indicate 44 bird species, including in the vicinity of the concerned embankment there were indicated such bird species as: *Sylvia communis*, *Parus major*, *Emberiza citrinella*, *Alauda amensis*, *Turdus merula* and *Phylloscopus collybita*. The aforementioned birds species are medium numerous (blackbird also locally numerous), numerous (*Phalaenopsis*, *Phylloscopus collybita*, *Emberiza citrinella*), and very numerous (Great tit, Skylark) in Poland (on the basis of: "Awifauna Polski - rozmieszczenie, liczebność i zmiany"; L. Tomiałojć, T. Stawarczyk, Wrocław 2003). Referring to the effect on birds the report indicates that the results of conducted works in the vicinity of machines may cause disturbance - this shall be however short-term impact limited to the period of conducted works. Another element which affects fauna is logging of trees and shrubs - but owing to its limited nature it shall not be significant impact. In addition according to the aforementioned conditions, removal of trees and shrubs shall be executed beyond the main breeding period of birds which according to the letter of the General Director of Environmental Protection of 10 August 2012. ref. no. : DOP-OR.075.03.5.2012.ep.3 for most

species is included in the period from 1 March to 15 October. The adverse impact of the project on birds applies to task related to removal of humus in the case of breeding on the ground. For this reason fertile layer of soil shall be modelled beyond the period from 1 March to 31 July (when it is necessary to conduct this type of activities in different time they shall be consulted with supervisor of environmental works). Therefore, bearing in mind the scope of conducted works and minimizing actions proposed in the aforementioned conditions it is not planned to observe significantly adverse impact on fauna.

In old riverbeds and ponds found in the inter-embankment there are six places of amphibians reproduction i.e. *Bufo bufo* and *Rana temporaria* as well as *Bombina Bombina*, *Rana esculenta* and *Rana lessonae* - all species are covered by close protection under Regulation of the Minister of Environment of 12 October 2011. (Journal of Laws No. 237, item 1419). Nonetheless the scope of the project excludes interference in water reservoirs, therefore the concerned project shall not have significant negative impact on the aforementioned species. Additionally the conditions indicate that humus removal in waterlogged areas which may constitute potential habitat of amphibians was executed in autumn (on the basis of: "Poradnik ochrony płazów" R. T. Kurek, M. Rybacki, M. Sołtysiak: Bystra 2011). Additionally in accordance with the aforementioned conditions in the case of observing, by natural supervision, routes passing through the place of amphibian migration in the aforementioned migration corridor works shall be withheld for the period from 1 March to 30 June so as to prevent any possible spread of these animals by mechanical equipment. It is also acceptable to make temporary fencing to protect migration corridors of these animals (it is necessary to perform inspection and consultation with natural supervisors which on the basis of valid literature shall define the selection of fences to perform fencing and indicate the length and width of the separated land strip).

During inventory-taking which is included in the report two butterfly species are not listed which are presented in Appendix no. II of the Habitat Directive, i.e. *Lycaena dispar* and *Phengaris nausithous* constituting the object of protection in the area which have importance for Tarnobrzeg Vistula Valley Community PLH180049. Nonetheless the report presents that works which are executed on the embankment including deprivation of their vegetation may adversely affect the aforementioned butterfly species. However, it should be emphasized that owing to the expected character land reclamation (shielding, grassing, continuation of mowing vegetation on the embankment) this shall be short-term impact.

Among mammals there are two species covered by partial protection and listed in Appendix no. II of the Habitat Directive constituting the object of protection in the aforementioned Natura 2000 site, namely otter *Lutra lutra* and beaver *Castor fiber*. The presence of otter is associated with water courses observed in the inter-embankment and bed of the Vistula river, therefore due to the lack of interference in riverside areas and limitation of works to the area intended for planned expansion of the embankment there is no adverse impact of the project on the above species by limitation of migration or depletion of nutrition. Referring to the impact of works on beaver, the report indicates that adverse impact of the concerned works on this species is possible due to depletion of nutrition. However, it should be emphasized that this assumption is connected with the option which consisted in logging of trees and shrubs in the area intended for establishment of ground masses reservoir in the inter-embankment. In connection with the limitation of the scope of the concerned project for expansion of the embankment (resignation from collecting ground masses from inter-embankment) and owing to small scope of logging of trees and shrubs limitation of the interference in water courses along which migrate the aforementioned animals to works within the embankment's locks as well as gradual works it should be stated that planned works shall not be significantly negative to the aforementioned species.

The report indicates also that the project shall have negative impact on the landscape - by presence of heaps and deprivation of vegetation from banks and embankment's crown. Nonetheless due to the nature of the project it shall be associated with the construction phase.

Analyzing the effect on the nature it should be stated that damage will cover herbaceous

vegetation and logging cover trees and shrubs at the place of refurbishment of the embankment's crown as well as in the area occupied for temporary technological roads and manoeuvre yards. Logging shall cover several trees and shrubs which directly collide with the project. In order to restore natural values upon the completion of works humus filling and sowing with native plants shall cover crowns and damaged embankment's banks (after completion of the operational road). In addition after removal of fertile soil layer the transport of ground masses shall proceed mainly along the route of the existing embankment. At the stage of operation the concerned embankment shall be subjected to mowing which shall prevent the expansion of external invasive plants. In connection with the above and using indicated technological, construction and organizational solutions the planned project shall not have significant adverse impact on resources, formations and components of nature referred to in Article 2(1) of Act of the Environmental Protection of Act of 16 April of 2004 on nature protection (Journal of Laws of 2013, item 627, with later amendments). In addition it was recognized that the concerned project shall not substantially affect goals and object of protection of the aforementioned Natura 2000 site, integrity of this area and consistency of Natura 2000 networks. Under impact assessment there were no suitable impact assessment required by way of Article 6.3 of the Habitat Directive. It is necessary to explain that the authors of the report referred to, on the basis of Article 66 of the Act, required analysis of the project's impact on Natura 2000, nonetheless due to resignation from collecting ground masses from borders of area which have importance for Tarnobrzeg Vistula Valley Community PLH180049 the decision was made to resign from the justified enforcement of detailed assessment required by way of Article 6.3 of the Habitat Directive.

The areas stipulated directly for the project there are no historical facilities subject to archeological and conservation protection.

The project shall not cause transboundary impact on the environment due to the considerable distance from the border of the state and local range of the project. In connection with the above prior to commencement of the project the procedure was withheld in mode of Article 104 of Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments.

The proceeding conducted from 9 July 2013 to 29 July 2013 included participation of the society - according to Article 79 of Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments. Announcement of the Regional Director for Environmental Protection in Rzeszów of 26 June 2013 ref.: WOOŚ.4233.19.2013.GJ-82 on the submitted application and environmental impact report, along with information about conducting assessment of the impact of the project on the environment, initiating proceeding, the object of the decision which is to be issued, an authority competent to issuing decisions and authority competent to issue opinions, possibilities of familiarizing with any necessary documentation case and place of providing it for inspection, possibilities and deadline for submission of comments, with observance of 21-day term of their submission and authority competent for their examination, were made public. It was placed on the bulletin board and on the website of the Regional Environmental Protection Management in Rzeszów, on the bulletin board and on the website of the Municipal Office in Tarnobrzeg as well as in the bulletin board and on the website of the Municipal Office in Sandomierz.

During the conducted public participation, the local authority did not receive any comments or conclusions associated with the concerned project.

Before publication of this decision, the parties have been ensured on possibility of expressing opinions on the gathered evidence, in accordance with Article 10 of the Code of Administrative Proceedings by means of publishing Announcement of the local authority dated 6 August 2013 sign: WOOŚ.4233.19.2013.GJ-88 in the area of implementation of the investment project, in the seat of Office of the City of Tarnobrzeg and Sandomierz, as well as in the seat of the local authority.

Neither party to the proceedings used the possibility to issue an opinion, whit regard to the

collected evidence and materials on the basis of which will be issued the decision on environmental conditions of implementation for the above of the project.

Conducted procedure, including the analysis of the entire collected evidence in the case, among others, report on environmental impact along with its supplements indicates that the execution and operation of the project preserving conditions listed in the conclusion of this decision shall meet the binding environmental quality standards including people's health.

Bearing in mind the above circumstances it has been adjudged as in the control network, on the basis of the regulations referred to in the legal base.

## INFORMATION

1. The integral part of this decision constitutes characteristics of the project being detailed description of the project.
2. Decision on environmental condition excludes the execution of forbidden activities in relation to protected species - these decisions are issued in separate proceedings and have different character and thus in the case when implementation of the project shall involve violation of prohibition which is binding in relation to plants, animals and fungi covered by strict protection it shall be necessary to obtain respective permits referred to in Article 56 of the Act on environment protection.
3. The parties shall be entitled to refer to the General Director of Environmental Protection via the Regional "Director of Environmental Protection in Rzeszów within 14 days from receiving thereof.

Appendix to the decision: - Characteristics of the project

### Received by:

1. Board of Melioration and Hydraulic structures in Rzeszów, ul. Hetmańska 9, 35-959 Rzeszów
2. Parties to the proceedings pursuant to Article 49 of the Code of Administrative Proceedings in connection with Article 74(3) of Act on making available information on the environment and its protection, participation of the society in environmental protection as well as environmental impact assessments via Municipal Office in Tarnobrzeg and Municipal Office in Sandomierz

### To the attention of:

1. State County Sanitary Inspector in Tarnobrzeg, 39-400 Tarnobrzeg, ul. 1-go Maja 1
2. WOOŚ; a/a.



**REGIONAL DIRECTOR FOR  
ENVIRONMENTAL  
PROTECTION IN RZESZÓW  
WOOŚ.4233.19.2013.GJ-96**

Characteristics of the investment project

"Vistula - Stage 1 - expansion of the right Vistula embankment at 5 + 950 -15 + 819 km on the section from Tarnobrzeg (Skalna Góra) to Koćmierzów (border of Podkarpackie and Świętokrzyskie Voivodeships)".

The goal of the concerned project is to improve the existing embankment on the right Vistula bank at 5 + 950 -15 + 819 km in Tarnobrzeg. Concerned section of the embankment protects the region of Dzików, Zakrzów, Wielowieś and Sielec.

In the existing condition, the concerned section of the embankment of ca. 9,869 km has regular line with footing constructed on the land side which partially supports the operational road. Native base below the embankment base is built of layers of river deposits and marshy, i.e. sands, clays, dusts, organic peat and aggragate mud. These grounds are characterised by high permeability. Additionally embankments show substantial permeability and weak compaction.

Stage of construction works shall be preceded by preparatory activities under which the following is provided: cutting of the embankment's crown and banks of the embankment's body and inter-embankment footing, measurement works and removal of top fertile soil of ca. 20 cm thick and its storage on the edges of the embankment's crown for the purpose of future embedding in the top of the embankment upon the completion of works.

As part of the reconstruction of previous structure of the embankment on this section it is planned to execute the following elements, among others:

Planned project includes the completion of e.g.:

- 1) Increase and enlargement of the embankment's crown along with compaction of the body, ca. 1.5 +1.8 m.
- 2) Sealing of body and base of the embankment based on anti-filtration screen of approx. 10 m deep (at 5 + 950 -15 + 700 km) made by DSM method and sealing of upstream scarp using foil covered with a layer which builds the embankment's body.
- 3) Repair of existing embankment's roads on the landside.
- 4) Construction of the operational road on lacking sections.
- 5) Construction of the operational strip on the side of the upstream bank.
- 6) Reconstruction of embankment's passages adjusting them to changed embankment sizes as a result of its increase.
- 7) Protection of embankment's lock, outlets of rain water pumping station and sewage treatment plant adjusting them to changed embankment's sizes as a result of its increase.

Technical parameters of the embankment upon the completion of expansion shall be in accordance with requirements specified in the Regulation of the Minister of Environment of 20 April 2007 on technical conditions concerning hydrotechnic buildings and their location (Journal of Laws no. 86, item 579). Assumed parameters of flood embankment upon reconstruction:

Assumed parameters of flood embankment upon reconstruction:

Crown ordinate: from 150.45 m above sea level (at km 5+950) to 152.80 m above sea level (at km 15+819), ie. 1 m above max. water table in May 2010.

Embankment crown width: 3.00 m

Water-side slope inclination: 1:2.5  
Land-side slope inclination: 1:2.0  
Width of the embankment's footing: 3.50 m  
Width of the operational strip: 4.00 m

Increase of the embankment's crown (on the whole length of the concerned section of the embankment), lightening of the upstream scarp and land-side as well as construction of the operational road on the embankment footing shall require earth works. The basic material to be used in phase of earth works shall be clayey sand delivered from the nearby gravel pit located outside the area for execution of the investment project. The balance of demand for materials indicates that it shall be necessary to deliver ca. 350 000 m<sup>3</sup> of the main building compound which is sand. It is not planned to store delivered material. It shall be delivered directly to the place of embedding in the embankment's body and at the same time it shall be compacted. Connection of the construction site shall provide access road and technological road from the upstream side.

Due to the complex scope of works construction works shall be carried out using typical machines for ground works and means of transport as well as specialized equipment used in geotechnics, i.e. single-bucket loader, track chain bulldozer, track chain excavator, vibratory roller, static roller, grits spreader, sprinkler for bitumen and transport vehicles.

For effective protection of the embankment's body against filtration it is planned to seal the base on the entire length by means of DSM technology (Deep Soil Mixing) with breakdown into sections:

*1. Section I - km 5+950 -15+700*

Execution of anti-filtration screen at the foot of the upstream scarp on the maximum depth of 10.00 m (at 5 + 950 -15 + 700km) and sealing of the upstream bank by means of foil. Anti-filtration screen shall be made by means of non-vibrating DSM technology - Deep Soil Mixing - ground mixing using vertical stirrers (cutting devices) or horizontal stirrers (cutting-bucket devices). In addition it is planned to make a green operational strip of ca. 4.0 m width on the side of the upstream bank.

*1. Section II - km 15+700-15+819*

This section shall include only earth works related to the embankment's superstructure under which it is planned to make green operational strip of ca. 4.0 m width on the side of the upstream bank. Owing to the planned increase of the embankment by 1.0 m within the ferry crossing it is necessary to secure the area located beyond the embankment by applying mobile sandur protections. Sandur protections shall be assembled in the case of meteorological messages concerning flood wave.

DSM technology is intended to the ground mixing using vertical or horizontal stirrers along with delivered cement-bentonite mixture. The minimum thickness of shield was adopted at the level of ca. 15 cm. Planned additional foil screen shall be covered with ground layer of ca. 1 m. Selected screen is characterized by favourable filtration coefficient at the level of ca.  $1 \times 10^{-8}$  m/s for the structure, namely flood embankment.

Application of vertical anti-filtration screen as a result shall increase the coefficient of stability of the embankment structure above the acceptable level ( $F > 1.30$ ) and decreases the level of the ground water mirror during flood wave).

Increase of the embankment's crown results in the fact that it shall be necessary to reconstruct the existing embankment's passages which shall be incorporated in the operational road strip located on landside footing and crown. Pavement and base passages and operational road shall be made of draining layer with medium sand with the thickness of ca. 20 cm and crushed stone with granulation of 2-68 mm. On the section of operational road with asphalt pavement in the existing condition, on crushed stone passages pavement shall be made executed asphalt layer. The project implementation shall also require protection of existing embankment's locks.

Upon the completion of the construction works finishing works shall be conducted which are divided into different stages:

- 1) alignment of the embankment's crown by leveling of delivered ground masses which linger on crown,
- 2) humus filling and sowing with grass mixes of crowns and damaged embankment's scarps (upon completion of operational road),
- 3) disassembly of temporary technological roads and manoeuvre yards (upon the completion of construction of the operational road on footing and at the foot of the embankment).

During the execution of the project there shall occur unfavorable impact on quality and acoustic conditions which involves work of machines, equipment and transport. In order to reduce inconveniences using heavy equipment in the vicinity of sites protected acoustically, works shall be conducted in day time (6<sup>00</sup> - 22<sup>00</sup>). These difficulties shall have short-term character and cease along with the completion of construction works. In order to limit inconveniences related to transportation of necessary materials in the planning phase the access to of the examined embankment shall proceed by means of access route - district road leading from voivodeship road 723 to reconstructed embankment in the area of Sielec and Wielowieś. Then communication of transportation vehicles and construction machines along embankment shall proceed on the upstream side. For this purpose in the vicinity of planned embankment's body there shall be built technological route and maneouvre yards of reinforced concrete slabs.

Wastes manufactured and generated in the course of execution and operation shall be collected selectively and transferred for recovery or utilization.

Numerous solutions protecting environment shall be applied, e.g.: good work organization, efficient equipment and materials meeting standards. Upon the completion of works, areas of construction back-up facilities shall be restored to the condition allowing use in accordance with the intended use.