

**REGIONAL DIRECTOR FOR  
ENVIRONMENTAL PROTECTION  
IN CRACOW**

OO.4233.4.2016.BM

Cracow, 27 January 2017

**DECISION  
ON ENVIRONMENTAL CONDITIONS**

Based upon Article 104 and 107 (1) of the Act of 14 June 1960 Administrative Proceeding Code (OJ of 2016, item 23, consolidated text), Article 63, Article 71 (2) item 2, Article 75 (1) item 1 letter i), Article 75 (1) item 1a, and Article 80 (2), Article 84 and Article 85 (2) item 2 of the Law of 3 October 2008 on access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (OJ of 2016, item 353, as amended), and based upon Article 17 of the Act of 8 July 2010 on the special preparation rules for flood protection investments (OJ of 2015, item 966, as amended), as well as Article 3 (1) items 65 and 33 of the regulation of the Council of Ministers of 9 November 2010 on the investments which may significantly affect the environment (OJ of 2016, item 71, consolidated text),

**after considering**

the application dated 07/22/2016, ref. no.: HTK/JM/15008/2770/16 (HK-2402/59/2770/16), supplemented with formal parts with a note dated 08/23/2016, ref. no.: HTK/JM/15008/3077/16 (HK-2402/66/30778/16) and corrected and updated with formal parts with a note dated 09/27/2016, ref. no.: HTK/JM/15008/3037/16 (HK-2402/74/3537/16), as provided by Mr. Jarosław Maciaś of Sweco Engineering Sp. z o.o., with its registered office in Cracow at 30. Wielicka Street, acting upon the power of attorney provided by the Investor, i.e.: Lesser Poland Voivodship – Lesser Poland Board of Amelioration and Water Structures in Cracow, with its registered office in Cracow at 73. Szlak Street, 31-153 Cracow; and the investment data sheet supplemented with the note dated 11/21/2016, ref. no.: HTK/JM/15008/4708/16 (HK-2402/92/4708/16) along with related clarifications given in the note dated 01/20/2017, ref. no.: HTK/JM/15008/0219/17 (HK-2402/107/0219/17) for the issuance of a decision on environmental conditions for the investment titled: **“Completion of redevelopment of flood embankments for the Vistula River in Cracow: Section 1 – the left embankment of the Vistula River from the Wandy bridge to the Przewóz barrage with backwater embankments of Dłubnia River; Section 2 – the left embankment of the Vistula River from the Przewóz barrage to Suchy Jar”**,

**I hereby decide as follows:**

- 1. I state that it is not necessary to perform an environmental impact assessment for the investment.**
- 2. Specificity of the investment is determined in appendix no. 1 forming an integral part of this decision.**

## Justification

Mr. Jarosław Maciaś of Sweco Engineering Sp. z o.o., with its registered office in Cracow at 30. Wielicka Street, acting upon the power of attorney provided by the Investor, i.e.: Lesser Poland Voivodship – Lesser Poland Board of Amelioration and Water Structures in Cracow, with its registered office in Cracow at 73. Szlak Street, 31-153 Cracow, provided an application dated 07/22/2016, ref. no.: HTK/JM/15008/2770/16 (HK-2402/59/2770/16), supplemented with formal parts with a note dated 08/23/2016, ref. no.: HTK/JM/15008/3077/16 (HK-2402/66/30778/16) and corrected and updated with formal parts with a note dated 09/27/2016, ref. no.: HTK/JM/15008/3037/16 (HK-2402/74/3537/16), along with related clarifications given in the note dated 01/20/2017, ref. no.: HTK/JM/15008/0219/17 (HK-2402/107/0219/17), for the issuance of a decision on environmental conditions for the investment titled: **“Completion of redevelopment of flood embankments for the Vistula River in Cracow: Section 1 – the left embankment of the Vistula River from the Wandy bridge to the Przewóz barrage with backwater embankments of Dłubnia River; Section 2 – the left embankment of the Vistula River from the Przewóz barrage to Suchy Jar”**.

In the note dated 09/08/2016, ref. no.: HTK/JM/15008/3295/16 (HK-2402/70/3295/16), the Proxy informed the local Authorities that in the final section of the left backwater embankment at the River Dłubnia at chainage from about km 1+030 to km 1+263 (end of the embankment) it is expected to modify the designed target land management. In accordance with initial establishments made with the Investor – Lesser Poland Board of Amelioration and Water Structures – it shall include resigning of raising of the embankment in that reach and demolition of that section of the embankment or land grading in that reach. Protection of the adjacent land shall be assured by new embankments designed at a new route, which would cover the entire adjacent residential housing and it shall reach the high bank.

That situation resulted from the lack of possibility to extend and close the existing embankments after raising them to the designed crest elevation. In the area of Bardosa Street there is dense development and land lowering, which disables that. Furthermore, part of the development would be left within the embanked area in a reach of direct flood threat. As a consequence, the Investor undertook actions to order designing of a new section of embankments protecting all buildings and meeting requirements under the regulations. The design shall be done based upon a separate agreement, but simultaneously with the redevelopment of embankments, which is currently being designed. As a result, the Proxy corrected the filed application and supplemented relevant formal issues in the note dated 09/27/2016, ref. no.: HTK/JM/15008/3077/16 (HK-2402/66/30778/16).

The formally complete documentation allowed for commencing the proceedings by the Regional Director for Environmental Protection on the issuance of a decision on environmental conditions. The parties of proceedings have been informed about the commencement of proceeding in a note dated 10/21/2016, ref. no.: OO.4233.4.2016.BM. Due to substantial shortcomings in the investment data sheet, the Investor's Proxy was called to supplement it in the note dated 11/10/2016, ref. no.: OO.4233.4.2016.BM. Relevant update was provided to the Directorate in the note dated 11/21/2016, ref. no.: HTK/JM/15008/4708/16 (HK-2402/92/4708/16). Additionally, in the note dated 01/20/2017, ref. no.: HTK/JM/15008/0219/17 (HK-2402/107/0219/17) the Proxy detailed information on accompanying infrastructure presented in the IDS.

During the proceedings the following were attached to the application:

- 2 copies of investment data sheet, including a digital version;
- Designed management on maps for designing purposes, with register division – 10 sheets + location map;
- Topographic map including the implementation site and the impact area for the planned investment – 10 sheets in two copies, including a digital version;
- Map in a scale assuring legibility of provided data, with marked area, where the investment shall be implemented, and with the area, where the investment shall exert impact, including a digital version;
- Original extract for 21 register plots no. GD-10-6642.5245.2016 for selected plots (i.e. for plots no.: 2, 1/9, 38, 39, 40, 41, 42, 48, 51, 54/4, 60, 63, 76, 80, 81, 83, 87, 112/2, 132/1, 137, 140 – area no. 46 Nowa Huta), according to the status valid on 08/23/2015, as issued by the Mayor of Cracow;
- Original power of attorney for Mr. Jarosław Maciaś to apply in the name of the Investor, i.e.: Lesser Poland Board of Amelioration and Water Structures in Cracow, to public administration units and to represent it in administrative proceedings before those units, in relation to the issuance of decisions and establishments necessary to develop the studies;
- Copy of resolution no. 380/14 of the Lesser Poland Management Board dated 8 April 2014 on adjustment of resolution no. 1515/10 dated 14 December 2010 on provision of the power of attorney for the Director of Lesser Poland Board of Amelioration and Water Structures in Cracow;
- Environmental inventory and valorization for the aforementioned investment task developed by: Michał Węgrzyn PhD, Mateusz Kolecki MSc, Paulina Wietrzyk MSc, and Donata Suder PhD (Sławkowice, 30 May 2016).

The subject investment task is qualified to group II of investments, mainly in accordance with **Article 3 (1) item 65** – *“flood defenses, except for redevelopment of flood embankments including sealing of the embankment body and its subbase, to limit the possibility of washing-out and failure during accommodation of flood water, as well as regulation of water or its channeling understood as water management allowing for its use for navigation purposes”* – regulation of the Council of Ministers of 9 November 2010 on the investments which may significantly affect the environment (consolidated text: OJ of 2016, item 71). Due to the redevelopment of existing embankments it shall also be necessary to relocate the existing gas piping with pressure of > 0.5 MPa, which collides with the route of redeveloped embankments, which – in accordance with **Article 3 (1) item 33** – *“installations for transfer of gas other than listed under Article 2 (1) item 21, and accompanying compressor stations and reduction stations with pressure higher than or equal to 0.5 MPa”* – of the aforementioned regulation, also qualified to group II of investments.

Furthermore, within the investment area there are crossings (collisions) with the existing infrastructure, which is listed in a catalogue of investments, which may potentially and adversely affect the environment, but they are not going to be redeveloped, but only protected, as a result of redevelopment for the existing embankments.

In case of such investments, in conformity with provisions under Article 63 (1) of the Law of 3 October 2008 on access to information on the environment and its protection, public participation in environmental protection and environmental impact assessments, it is required to identify the necessity of performing the environmental impact assessment by a relevant regional director for environmental protection.

In accordance with the investor's application the decision on environmental conditions shall be necessary to obtain a decision on investment project implementation permit, as discussed under provisions of the Act of 8 July 2010 on the special preparation rules for flood protection investments; thus – in compliance with Article 75 (1) item 1 letter i) of the *EIA Act* – the unit relevant for the issuance of decisions on environmental conditions is the Regional Director for Environmental Protection in Cracow.

Furthermore, in accordance with Article 75 (1) item 1a of the *EIA Act* the, in case the application on the issuance of environmental decision covers at least two assignments implemented under one investment, the unit relevant for the issuance of decision on environmental conditions is the regional director for environmental protection in Cracow.

The subject investment is proceeded based upon the application filed by the Proxy in July 2016, and therefore in case of the analyzed investment – implemented based upon the Act of 8 July 2010 on the special preparation rules for flood protection investments – there is no obligation to obtain an opinion of the relevant unit of Sanitary Inspectorate, in conformity with Article 64 (1) item 2 of the *EIA Act*.

In accordance with Article 80 (2) of the Law of 3 October 2008 on access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (OJ of 2016, item 353, as amended), identification of compliance between the investment location and establishments under the local spatial development plan is not related to flood defenses implemented based upon the Act of 8 July 2010 on the special preparation rules for flood protection investments (OJ of 2015, item 966, as amended).

Based upon Article 61 (4) of the Administrative Proceeding Code the Regional Director for Environmental Protection in Cracow (hereinafter referred to as the *Regional Director*) notified the parties of proceedings in the note dated 10/21/2016, ref. no.: OO.4233.4.2016.BM, on the commencement of proceedings to issue this decision. Due to the fact that the number of proceeding parties exceeded 20, in accordance with Article 74 (3) of the Law of 3 October 2008 on access to information on the environment and its protection, public participation in environmental protection and environmental impact assessments (hereinafter referred to as the *EIA Act*), Article 49 of the Administrative Proceeding Code (hereinafter referred to as the *APC*) – stating notification of the parties through an announcement – was applied. Placement of the announcement for 14 days took place on a noticeboard of the Regional Directorate for Environmental Protection in Cracow (hereinafter referred to as the *RDOŚ in Cracow*) and in the City Office of Cracow.

The announcement was placed on the noticeboard of the RDOŚ in Cracow from 10/21/2016 to 11/02/2016, whereas on the noticeboard of the City Office of Cracow – from 10/24/2016 to 11/08/2017. Information on the commencement of proceedings was also included in the Public Information Bulletin at the website of the Regional Directorate for Environmental Protection in Cracow, and also in the publicly accessible data register at the website of the Center on Information on the Environment.

Due to Article 63 (1) of the Law of 3 October 2008 on access to information on the environment and its protection, public participation in environmental protection and environmental impact assessments, while taking into account specificity of performance and of use of redeveloped Vistula flood protection embankments the following criteria were taken into consideration:

**1. Type and character of the investment including the following:**

**a) Scale of the investment and size of acquired land, and their mutual proportions, as well as significant solutions specific for the investment.**

The planned investment comprises the redevelopment and extension of about 10 km long section of embankments for the River Vistula, including backwater embankments at the River Dłubnia, except for the short section of the final reach of the embankment.

Except for the redevelopment and extension of embankments for the River Vistula, including backwater embankments at the River Dłubnia, the scope of application also covers redevelopment, protection or liquidation of the related accompanying infrastructure (embankment locks, descend roads and embankment crossings), and construction, redevelopment, protection or liquidation of the existing road infrastructure (roads, culverts, ramps – descend roads and embankment crossings), power network, gas network, IT network, water supply network and sewerage network.

The planned investment shall be implemented in accordance with the requirements of the regulation of the Minister of Environment of 04/20/2007 *on the technical conditions for hydraulic structures and their location*, with required safe freeboard for hydraulic structures as in Class I, with deviation related to determination of design flow and control flow in reference to Q1% and Q0.2%, respectively, without estimation mistake. The deviation from technical and engineering regulations for that section of embankments is a result of continuation of gradeline for the embankments, based upon the same rules for the entire length within Cracow. A section between the Dębnicki Bridge and Wawel was a deciding factor for deviation from technical and engineering regulations and for lowering of the gradeline, due to the following reasons:

- Practically unrealistic implementation of extensive redevelopment of control network for bridges and access roads within the historic city center,
- Technical difficulties associated with extension of the existing embankments in the area of dense urban development, and especially extension of the existing stone walls located in a small distance from windows of buildings located e.g. along Kościuszki Street,
- Architectural and landscape reasons – necessary rising of the stone wall on the crest of the left embankment between the Dębnicki Bridge and Wawel, a height of which would need to reach not about 1.0 m, as it is now, but about 2.3 or even about 4.0 .

The same level of flood protection is continued within the current section.

The table given below provides chainage of the embankments covered by the investment, including corresponding 1 working chainage.

Planned investment	Register chainage km		Working km
	Embankment km	Respective river km	Embankment km
Section 1. Left embankment of the Vistula River (from the Wandy bridge to the estuary of Dłubnia River)	87+600	87+900	0+000
	88+800	89+040	1+142
Section 1. Left embankment of the Vistula River (downstream of the estuary of Dłubnia River)	89+640	89+640	1+142
	90+560	90+550	2+097
Section 1. Left embankment of the Vistula River (downstream of the estuary of port channel)	90+638	90+640	2+097
	91+797	91+540	0+097
Section 1. Right embankment of the Dłubnia River	0+000	0+000	0+000
	1+832	2+373	1+830

Section 1. Left embankment of the Dłubnia River	0+000	0+000	0+000
	1+220	1+609	1+263
Section 2. Left embankment of the Vistula River (from the Przewóz Barrage to Suchy Jar)	91+997	91+990	0+000
	95+162	96+680	2+875

As it is not possible to raise and close the final section of the left embankment for the River Dłubnia at the existing route, the Investor decided about correcting the application in question through:

- Redevelopment and extension of that embankment at chainage from km 1+136 (river chainage km 1+577) to km 1+263 (river chainage km 1+609), i.e. up to the registered end of the embankment, including grading or total demolition of that reach of the embankment;
- Development of a new embankment reaching the high bank, covering all of the buildings, including those, which are currently located within the embanked area in a direct flood hazard area. A design for development of the new embankment shall be done based upon a separate investment task. The investor declares that both investments shall be implemented simultaneously, so the same level of flood protection would be provided.

The planned scale of rising for the embankments under the investment in question within particular sections:

- **Section 1** covers:
  - Left embankment of Vistula from the Wandy Bridge to the estuary of the River Dłubnia – max. by about 0.5 m, about 0.3 m on average (embankment raising is not expected in a reach of embankments from km 0+000 to 0+985, but only development of a membrane at the embankment crest, reaching the depth of up to 6 m);
  - Right embankment of Dłubnia from the estuary to the area of Ptaszyckiego Street - max. by about 1.2 m, about 0.75 m on average;
  - Left embankment of Dłubnia from the estuary to the area of Bardosa Street - max. by about 1.2 m, about 0.65 m on average;
  - Left embankment of Vistula from the estuary of Dłubnia to the Przewóz Barrage – max. by about 1.0 m, about 0.3 m on average.
- **Section 2** covers:
  - Left embankment of Vistula from the Przewóz Barrage to Suchy Jar - max. by about 1.2 m, about 0.75 m on average.

The subject investment is located within the Municipality of Cracow, on the left bank of the River Vistula.

**Section 1** begins at the Wandy Bridge, and then it overlaps Podbięty Street (Mogilski Forest joins it within that reach). Behind the lock, in the area of Zakarnie Street, Podbięty Street runs north on its own embankment. An independent flood embankment starts in that place. About 160 m further there is a registered beginning of the right backwater embankment of Dłubnia. It runs north and – running parallel to the River Dłubnia – reaches the area of Ptaszyckiego Street. Length of the right backwater embankment is about 1814 m.

The left backwater embankment on the River Dłubnia reaches the area of Bardosa Street. It is significantly shorter than the right one and has a length of about 1220 m, and is divided into two parts (length of about 758 m and about 462 m) before the estuary channel of the Smelter. Similarly as in case of the right one, it runs parallel to the River Dłubnia. In a distance of about 500 m from its estuary it runs south-east and turns – in registry meaning – into the River Vistula embankment. Na

Niwach Street runs along the embankment in that section. The embankment crosses the newly constructed embankment of S7 road, passes the Thermal Treatment Waste Plant, and runs parallel to the Vistula River and joins the embankments of the Przewóz port channel. That section is about 1116 m long. Register course of the further sections – running between the Vistula channel and embankments of sediment tanks of the Kujawy waste treatment plant, and ending in the area of the inlet to the upstream channel of the lock at the Przewóz Barrage – starts on the other bank of the channel. This section is about 1212 m long.

**Section 2** starts in the area of the downstream abutment of the lock, runs as a curve on the high bank of the Vistula flooding terrace, and then parallel to the Vistula course, and ends – according to the register – at embankments of the Suchy Jar Stream. That section is about 2875 m long.

Currently the height of the flood embankment existing in **Section 1** is from about 2.6 m to about 4.8 m. Width of the crest in sections beyond the crossings is from about 2.0 to about 2.8 m. Grade of the riverside slope is from 1:2.15 to 1:2.32. Grade of the landside slope is from 1:1.8 to 1:1.9. The height of the flood embankment existing in **Section 2** is from about 2.8 m to about 4.0 m. Width of the crest in sections beyond the crossings is from about 2.3 to about 3.6 m. Grade of the riverside slope is from 1:1.8 to 1:2.7. Grade of the landside slope is from 1:1.8 to 1:2.35.

In case of the designed embankment the minimum parameters were adopted as follows: crest width of about 4.0 m (except for Podbipięty Street, where the width is greater and results from dimensions of the road course), grade of the riverside slope of 1:2.5 and of the landside slope of 1:2.0. The maximum height of the embankment shall rise to about 5.4 m for **Section 1** and to 4.6 m for **Section 2**.

The embankment performs its main function of a flood embankment within the entire section. The slopes and the embankment crest are covered with grass. Sectionally, there are some roads of various courses on the crest. The embankments are and will be regularly mown. The embankments cross such technical infrastructure as roads, water supply system, sewerage, heating and gas networks, and power and teletechnical lines.

Currently, the width of the River Vistula embanked area and of the Dłubnia river embanked area are as follows:

- a. Between the Dąbie Barrage and the Wandy Bridge (from km 80+900 to 87+900) – from 311 m (at the Dąbie Barrage – transient section between the boulevard facilities and the embankments) to 511 m in the area of Białuchna estuary (about km 82+000). The embanked area's width in that section is about 420 m, on average.
- b. Between the Wandy Bridge and the Przewóz Barrage (from km 87+900 to km 92+000) – from 404 m to 500 m, 460 m on average. An exception is the area of the Przewóz Barrage, where the embankments also protected the Vistula's oxbow lake with the estuary of Drwina, where the embanked area's width reaches 1100 m.
- c. Between the Przewóz Barrage and the estuary of Suchy Jar (from km 92+000 to 96+500) – from 445 m to 482 m, 460 m on average.
- d. Section of the Dłubnia River estuary between the estuary to the River Vistula and Ptaszyckiego Street – from 161 m to 270 m.

Due to rising the crest of existing embankments and due to their extension toward the embanked areas, the area and the embankment basis shall be narrowed, in reference to the maximum relocation of the crest towards the Vistula River – by 2 m, as follows:

- a. For Vistula embankments, section no. 1, up to 4 m,
- b. For Vistula embankments, section no. 2, up to 7 m,

- c. For Vistula embankments, section no. 3, up to 4 m,
- d. For the right embankment at Dłubnia, up to 6 m,
- e. For the left embankment at Dłubnia – 4 m.

At inclusion of the modernization scope for embankments in sections 1, 2, and 3, the minimum narrowing of the embanked area is as follows:

- a. Between the Dąbie Barrage and the Wandy Bridge (from km 80+900 to 87+900) – embanked area narrowed by 3 m, i.e. 0.7% of average width.
- b. Between the Wandy Bridge and the Przewóz Barrage (from km 87+900 to km 92+000) – embanked area narrowed by 6 m, i.e. 1.3% of average width.
- c. Between the Przewóz Barrage and the estuary of Suchy Jar (from km 92+000 to 96+500) – embanked area narrowed by 4.5 m, i.e. 1.0% of average width.
- d. Section of the Dłubnia River estuary between the estuary to the River Vistula and Ptaszyckiego Street – embanked area narrowed by 7 m, i.e. 4.3% of average width.

The impact of narrowing value for the embanked area on additional flood water damming has been estimated in conditions of gradually varied steady flow. At estimations for design water Q1%, which decided on the target height of embankments, the calculations – done with efficiency of 0.01 m – did not prove a necessity of additional height correction due to that reason. In case of the River Dłubnia in its estuary section a deciding factor is a flood on Vistula, backwater of which does not reach Ptaszyckiego Street at very low velocities of water flowing through the Dłubnia riverbed. Therefore, the width of embankments at the Dłubnia River and the volume of water flowing in it do not decide on the height of backwater embankments from the estuary to Vistula to Ptaszyckiego Street, despite the small spacing between them. To sum up, one shall state that potential additional damming associated with narrowing of the embanked area due to modernization works does not exceed 0.01 m, which is a negligible value for the adopted safety margin of 1.0 m above the elevation of design water.

For the purpose of redeveloping and extending the embankments it is mostly planned to apply the basic section – so-called type I. It is specified by extension of the embankment body on the embanked area's (river) side, reinforcement of the crest with gravel mix on geo-textile and voussoir, and service road at the buttress or at the landside embankment's foot (locally the road may move away from the embankment basis to e.g. bypass and protect objects of habitats located within the embankment route), hardened with sand ballast on geo-textile, breakstone and voussoir for the purpose of service vehicles' traffic.

Where it was not possible to develop the service road at the buttress or at the slope basis (e.g. due to the lack of space for the buttress or fenced premises directly neighboring the embankment, which collide with the route), so-called typical section was applied – type II, which – in comparison to type I – includes a service road on the embankment crest and it does not have a buttress.

Furthermore, in accordance with information provided in supplementation to the IDS, in locations where due to environmental and maintenance reasons or due to the lack of space it would not be possible to provide redevelopment according to type I and type II sections, type III was introduced, which comprises development of a membrane starting from the embankment crest, using the same technology as in case of the membrane applied in the subbase for type I and type II section.

Type of sections applied within analyzed sections of the redeveloped embankment are given in the table below.



<b>Section 1:</b>		
Left embankment of Vistula from the Wandy Bridge to the estuary of Dłubnia		
0+000	0+983	Type III
0+983	1+142	Type II
Left embankment of Vistula from the estuary of Dłubnia to the Przewóz Barrage		
1+142	2+097	Type I
2+097	3+038	Type II
3+038	3+273	Type I
3+273	3+317	Type II
Right embankment of Dłubnia from the estuary to the area of Ptaszyckiego Street		
0+000	0+429	Type II
0+429	0+439	Existing road embankment at Podbipięty Street
0+439	1+829	Type II
Left embankment of Dłubnia from the estuary to the area of Bardosa Street		
0+000	0+363	Type I
0+363	0+394	Existing road embankment at Podbipięty Street
0+394	0+835	Type II
0+835	1+136	Type II
<b>Section 2:</b>		
0+000	0+308	Type II
0+308	1+274	Type I
1+274	1+482	Type II
1+482	1+611	Type I
1+611	1+746	Type II
1+746	1+941	Type I
1+941	2+143	Type II
2+143	2+740	Type I
2+740	2+875	Type II

In a reach from 1+700 to 1+829 (registered end of embankments) the works shall practically include development of crest reinforcement only, according to section type II, without developing a visible rising of the embankments (sufficient land elevation), within a registered route of the embankments (the embankments is present in a registry kept by MZMiUW – the Investor). An exception for that section is a break provided to bypass a sewerage chamber at chainage from km 1+778 to 1+802, developed in a form of descend roads from the crest.

In a reach from km 0+000 to km 0+950 it is not planned to raise the existing embankments. That section is included in the investment implementation scope and impact range, due to possible occurrence of necessary sealing for the embankment and / or the subbase. Currently, it is planned to develop a membrane in that section – driven from the crest into the subbase onto a depth of 6 m.

The rising designed for any of the sections does not run beyond the existing embankment. The rising reaches the embanked area mainly. It is most often caused by neighboring development or facilities on the landside (area beyond the embankment). The correction of the embankment section is visible along the stand of hermit beetle and results from the necessary maintenance of that valuable environmental habitat. The table given below provides location of the correction for the embankment course.

Location	Description
Section 1. Left backwater embankment of Dłubnia, km 0+190 to 0+000 River Vistula embankment 1+142 to 1+180	Relocation of the designed axis towards the area beyond the embankment by about 2.5-3 m, resulting from the necessary protection of a valuable environmental stand – lane with willows inhabited by hermit beetle

Within the entire reach of modernized embankments (except for the section at sediment ponds on the left bank at chainage of the River Vistula from 90+600 to 91+200) membranes shall be developed in the subbase underneath the embankment body. Depth of the membrane results from specific geological formation of the rivers' subbase in Carpathian dales, which has been confirmed with geological tests.

Within the framework of the planned investment a membrane was designed for the following sections:

- **Section 1** left embankment of the River Vistula from km 0+008 to km 0+993, with a membrane developed from the crest towards the subbase to a depth of 6 m. Embankment body sealed using the same technology as in case of the subbase.
- **Section 1** left embankment of the River Vistula from km 0+993 to km 1+142, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 6 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.
- **Section no. 1** right embankment of the River Dłubnia from km 0+000 to km 1+180, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 6 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.
- **Section no. 1** left embankment of the River Dłubnia from km 0+845 to km 1+136, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 3 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.
- **Section no. 1** left embankment of the River Dłubnia from km 0+190 to km 0+835, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 6 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.
- **Section 1** left embankment of the River Dłubnia from km 0+000 to km 0+190, with a membrane developed from the crest towards the subbase to a depth of 6 m. Embankment body sealed using the same technology as in case of the subbase.
- **Section 1** left embankment of the River Vistula from km 1+142 to km 1+200, with a membrane developed from the crest towards the subbase to a depth of 6 m. Embankment body sealed using the same technology as in case of the subbase.
- **Section 1** left embankment of the River Vistula from km 1+200 to km 2+097, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 6 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.
- **Section 1** left embankment of the River Vistula from km 3+000 to km 3+315, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 6 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.
- **Section 2** left embankment of the River Vistula from km 0+080 to km 2+870, with a membrane developed at the riverside basis of the embankment towards the subbase to a depth of 6 m. Embankment body sealed on the riverside using bentonite mat or water-tight HDPE film.

Within the framework of the investment it is planned to redevelop, construct, remove embankment crossings and descend roads, and embankment culverts (locks). The planned new descend roads most often join the embankment crest with a shelf on the embankment or they remain a bypass of objects in the embankment course (e.g. existing sewerage chambers) or a link with bicycle path. The descend roads joining public roads shall be developed as asphalt ones within sections of several meters.

Type II structure with modified course, i.e. open-work reinforced-concrete road slabs, was applied for embankment crossings and descend roads. Their application is necessary to protect the embankment crest against excessive passing over. The application of open-work slabs shall allow for simultaneous maintenance of the surface as partially permeable. In order to limit the area acquired by embankments of embankment crossings and descend roads – as those often are arable fields – the grade of slopes beyond the embankment was increase to 1:1.5 and within the embanked area to 1:2. New descend roads most often link the embankment crest with a shelf on the embankment or remain a bypass for objects within the embankment course (e.g. existing sewerage chambers).

The table given below presents location of the existing and of new descend roads and crossings.

No.	Embankment section	Embankment km	Existing/new descend road	Remarks
1	Vistula section 1	0+983	Existing, redeveloped	Descend from the crest to the road
2	Vistula section 1	0+992	Existing, redeveloped	Descend from the crest to a private plot
3	Vistula section 1	1+080	Existing, redeveloped	Embankment crossing
4	Dłubnia right embankment	0+374	Existing, redeveloped	Embankment crossing
5	Dłubnia right embankment	0+421	Existing, redeveloped	Descend from the crest to the road
6	Dłubnia right embankment	0+428	Existing, redeveloped	Descend from the crest to the road
7	Dłubnia right embankment	0+439	Existing, redeveloped	Descend from the crest to the road
8	Dłubnia right embankment	0+487	Existing, redeveloped	Embankment crossing
9	Dłubnia right embankment	0+697	new	Descend from the crest to the sewerage chamber
10	Dłubnia right embankment	1+045	Existing, redeveloped	Embankment crossing
11	Dłubnia right embankment	1+188	Existing, redeveloped	Descend from the crest to the road
12	Dłubnia right embankment	1+441	Existing, redeveloped	Descend from the crest to a private plot
13	Dłubnia right embankment	1+712	Existing, redeveloped	Descend from the crest to a private plot
14	Dłubnia right embankment	1+772 to 1+806	new	Descend from the crest – bypass of

				the sewerage chamber
15	Dłubnia right embankment	1+829	new	Descend from the crest to a bicycle path
16	Dłubnia left embankment	0+951	Existing, redeveloped	Embankment crossing
17	Dłubnia left embankment	0+823	Existing, redeveloped	Embankment crossing
18	Dłubnia left embankment	0+470	Existing, redeveloped	Embankment crossing
19	Dłubnia left embankment	0+369	Existing, redeveloped	Descend from the embankment shelf to the road
20	Dłubnia left embankment	0+357	Existing, redeveloped	Embankment crossing
21	Vistula section 1	1+346	Existing, redeveloped	Descend from the embankment shelf to the State Treasury's plot
22	Vistula section 1	1+433	Existing, redeveloped	Embankment crossing
23	Vistula section 1	2+086	Existing, redeveloped	Descend from the crest to the State Treasury's plot
24	Vistula section 1	2+097	Existing, redeveloped	Descend from the crest to the State Treasury's plot
25	Vistula section 1	2+153	Existing, redeveloped	Descend from the crest to the State Treasury's plot
26	Vistula section 1	2+403	Existing, redeveloped	Embankment crossing
27	Vistula section 1	2+975	Existing, removed	Removal of the crossing
28	Vistula section 1	3+028	Existing, redeveloped	Embankment crossing
29	Vistula section 1	3+139	Existing, redeveloped	Embankment crossing
30	Vistula section 1	3+204	Existing, redeveloped	Descend to the State Treasury's plot
31	Vistula section 1	3+314	Existing, redeveloped	Descend to the plot of the Municipality of Cracow
32	Vistula section 2	0+259	Existing, redeveloped	Embankment crossing
33	Vistula section 2	0+308	Existing, redeveloped	Descend from the embankment shelf to the road

34	Vistula section 2	0+433	Existing, redeveloped	Descend from the shelf to a public plot
35	Vistula section 2	0+511	New	Descend from the embankment shelf to a public plot
36	Vistula section 2	0+551	Existing, redeveloped	Embankment crossing
37	Vistula section 2	1+030	Existing, redeveloped	Embankment crossing
38	Vistula section 2	1+211	Existing, redeveloped	Embankment crossing
39	Vistula section 2	1+327	Existing, redeveloped	Descend from the crest to a private plot
40	Vistula section 2	1+327	New	Descend from the crest to the embankment shelf
41	Vistula section 2	1+429	Existing, redeveloped	Embankment crossing
42	Vistula section 2	1+429	New	Descend from the crest to the embankment shelf
43	Vistula section 2	1+655	New	Descend from the crest to the embankment shelf
44	Vistula section 2	1+655	Existing, redeveloped	Embankment crossing
45	Vistula section 2	1+684	Existing, redeveloped	Embankment crossing
46	Vistula section 2	1+702	New	Descend from the crest to the embankment shelf
47	Vistula section 2	1+979	Existing, redeveloped	Embankment crossing
48	Vistula section 2	1+979	New	Descend from the crest to the embankment shelf
49	Vistula section 2	2+040	New	Descend from the crest to the road
50	Vistula section 2	2+094	Existing, redeveloped	Embankment crossing
51	Vistula section 2	2+099	new	Descend from the crest to the embankment

				shelf
52	Vistula section 2	2+780	New	Descend from the crest to the embankment shelf
53	Vistula section 2	2+784	Existing, redeveloped	Embankment crossing

Tabulated summary of culverts (embankment locks) planned for redevelopment.

Culvert no.	Embankment km	River km	Diameter [cm]	Remarks	A [ha]	Q1% [m <sup>3</sup> /s]	Designed diameter [cm]	Remarks
<b>Section 1</b>								
P.1.1	0+875	88+784	Ø115	Object underneath Longinusa Podbipięty Street. Reinforced-concrete, not to be redeveloped.	137	0.980	-	No changes to the culvert
<b>Dłubnia embankments</b>								
P.1.5	0+842	1+188	Ø60	Left embankment. Outlet from the pumping station, reinforced-concrete.	0.16	0.045	Ø60	Redevelopment of the inlet, with a valve.
<b>Section 2</b>								
P.2.1	1+059	94+524	2 x (230x205)	Reinforced-concrete object, outlet from the pumping station.	205	1.92	-	Redevelopment of the abutment
P.2.3	2+813	96+481	80x120 bell-shaped	Reinforced-concrete object.	183	1.76	Ø100	Redevelopment to gain greater diameter.

As a result of increasing the embankment section it shall be necessary to locally redevelop or protect such infrastructure as: power and IT lines, and gas, water-supply, sewerage and heating networks.

A tabulated summary on information concerning collisions between technical infrastructure with the planned investment, which not necessarily requires redevelopment, was given below.

No.	Embankment section	Embankment km	Description
1	Vistula section 1	0+016	Overhead IT line
2	Vistula section 1	0+089	Ground power cable network
3	Vistula section 1	0+111	Ground power cable network
4	Vistula section 1	0+808	Ground power cable network
5	Vistula section 1	0+809	Ground power cable network
6	Vistula section 1	0+910	Overhead IT line
7	Vistula section 1	0+973	Overhead IT line
8	Vistula section 1	1+001	Overhead IT line
9	Vistula section 1	1+105	Overhead power line
10	Dłubnia right	0+421	Overhead IT line
11	Dłubnia right	0+427	Ground power cable network
12	Dłubnia right	0+709	Sewerage network 2xk1800

13	Dłubnia right	0+844	Gas network g150 L/P
14	Dłubnia right	0+905	Overhead power line
15	Dłubnia right	1+068	Overhead power line
16	Dłubnia right	1+201	Gas network g250 H/P
17	Dłubnia right	1+218	Gas network g100 L/P
18	Dłubnia right	1+255 – 1+678	Gas network g300 M/P
19	Dłubnia right	1+429	Overhead power line
20	Dłubnia right	Redevelopment along the embankment in section 1+441 – 1+828, with crossing of the embankment at km 1+452	Gas network g200 PS/C
21	Dłubnia right	1+617	Sewerage network k550
22	Dłubnia right	1+646	Ground power cable network
23	Dłubnia right	1+678	Gas network g300 M/P
24	Dłubnia right	1+784	Sewerage network k1000
25	Dłubnia right	1+789	
26	Dłubnia right	1+825	Water-supply system w400
27	Dłubnia right	1+827	Sewerage network k300
28	Dłubnia right	1+828	Overhead power line
29	Dłubnia left	0+305	Water-supply pipe w230, w160
30	Dłubnia left	0+353	Overhead IT line
31	Dłubnia left	0+000 – 0+353	Ground IT line
32	Dłubnia left	0+368	Ground power cable network
33	Dłubnia left	0+635	Sewerage network 2xk1200, 2xk500
34	Dłubnia left	0+638	Gas pipe g150 L/P
35	Dłubnia left	0+672	Gas pipe g500 H/P
36	Dłubnia left	0+681	Gas pipe g250 H/P
37	Dłubnia left	0+720	Gas pipe L/P
38	Dłubnia left	0+927	Overhead power line
39	Dłubnia left	0+845	Overhead power line
40	Vistula section 1	1+142 – 1+560	Ground IT network
41	Vistula section 1	1+256	Gas pipe g300 H/P
42	Vistula section 1	1+304	Gas pipe g300 H/P
43	Vistula section 1	1+351	Gas pipe g500 H/P
44	Vistula section 1	1+407	Gas pipe g500 H/P
45	Vistula section 1	1+505	Water-supply system
46	Vistula section 1	1+605	Overhead power line
47	Vistula section 2	0+063	Sewerage k300
48	Vistula section 2	1+541	Overhead power line
49	Vistula section 2	1+726	Overhead power line

The planned area determined in the application is about 78 ha – section 1, and about 31 ha – section 2. The basic scope of works contains the works associated with redevelopment and extension of the embankments. Those shall mainly be the earthworks including e.g.:

- Removal of top top-soil layer from the slopes and from the embankment crest, and from the land strip adjacent to the embankment in order to prepare the site for extension (development of embankment);
- Profiling of uncovered slopes for the earth-fill embankment (so-called stair-shaping) and ploughing of the strip of land for the purpose of extension;
- Development of a membrane in the subbase;
- Development of an earth-fill embankment – extension;
- Placement of bentomat;
- Completion of the embankment – extension;
- Placement of a transition layer made of mineral soil;
- Placement of a top-soil layer with sowing using mix of grass.

Works associated with redevelopment of embankment locks – which shall be extended (what is related to the development of new reinforced-concrete abutments and to the redevelopment of descend roads, crossings through the embankment in the course of service roads, field roads or private roads, as well as asphalt public roads) – shall be directly associated with those works.

The basic membrane shall be developed using a bucket-ladder excavator under cover of a thixotropic suspension. Locally, the membranes shall be developed using different excavators, drills for deep soil mixing with injection of cement leaven, or they shall be driven using a pile-driver (vibro-hammer).

The investment shall be implemented with the application of general engineering technologies basing upon earthworks, concrete works, reinforced-concrete works, piling works, and installation works mainly. During the works one shall apply such machines as excavators, loaders, trucks, cranes, rollers, concrete mixers, concrete pumps, vibrators and compactors.

Implementation of the investment shall not affect landscape values adversely, as the course would not change and new elements would not be introduced to the landscape.

***b) Connection with other investments, and especially accumulation of impacts of investments in progress and completed ones, for which a decision on environmental conditions was issued, located on sites, where implementation of the investment is planned and in areas of investment impact or impact of which is included in the planned investment impact area in the scope, in which the impact may lead to accumulation of impacts with the planned investment.***

Simultaneously with the analyzed investment tasks considering modernization of the embankments – section 1: Left embankment of the Vistula River from km 87+900 to km 91+540 (from the Wandy Bridge – Klasztorna Street to the Przewóz Barrage), and section 2: Left embankment of the Vistula River from km 91+990 to km 96+680 (from the Przewóz Barrage to the Suchy Jar Stream) – section 3 shall be done – Right embankment from km 81+256 to km 92+800 (from the Dąbie Barrage to the Przewóz Barrage), which is a subject of another proceeding. The analysis of collected materials proves that no accumulated impact shall occur for the implemented rising of the embankments.

***c) Biological diversity, use of natural resources, including soil, water and earth surface.***

It was originally planned to take the soil for construction of the embankments from deposits present in the following locations:

- a) Deposit no. 1 – chainage of the Vistula River about km 91+500, right bank, embanked area – area of 3.94 ha;
- b) Deposit no. 2 – chainage of the Vistula River about km 84+500, left bank, embanked area – area of 5.59 ha;



- c) Deposit no. 3 – chainage of the Vistula River about km 88+200, right bank, embanked area – area of 2.53 ha;
- d) Deposit no. 4 – chainage of the Vistula River about km 85+100, left bank, embanked area – area of 1.33 ha;
- e) Deposit no. 5 – chainage of the Vistula River about km 82+900, right bank, embanked area – area of 1.24 ha;
- f) Deposit no. 6 – chainage of the Vistula River about km 81+500, left bank, embanked area – area of 0.71 ha;
- g) Deposit no. 7 – chainage of the Vistula River about km 88+500, right bank, embanked area – area of 1.68 ha;
- h) Deposit no. 7 – Brzegi – purchase of materials from the existing gravel pit.

However, after performing geological tests of deposits' utility for the intake of soil and after establishments made with land owners, the following deposits were left only:

- a) Deposit no. 1 – chainage of the Vistula River about km 91+500, right bank, embanked area. Due to the significant amount of waste materials deposited in the past that deposit may be used in a small part only for the intake of non-cohesive soil above the table of ground water. Deposit may be used for embankment section no. 3.
- b) Deposit no. 4 – chainage of the Vistula River about km 85+100, left bank, embanked area. The deposit is made of up to 3.0 m layer of cohesive soil (loam and loamy sand) placed on non-cohesive soil (medium sand, dusty sand). The level of ground water is about 3.3 m below the ground level. The expected use of up to 3.0 m contains cohesive soil and non-cohesive soil. Deposit may be used for embankment section no. 2.
- c) Deposit no. 6 – chainage of the Vistula River about km 81+500, left bank, embanked area. The deposit is made of up to 1.6 m layer of cohesive soil (sandy dust) placed on non-cohesive soil (fine sand). The level of ground water is about 5.7 m below the ground level. The expected use of up to 3.0 m below the ground level. Deposit may be used for embankment section no. 1.
- d) Deposit no. 7 – Brzegi. The area of aggregate extraction by the Krakowskie Zakłady Eksploatacji Kruszyw. In case of layers located at surface layers soil placed in that deposit is waste (KZEK extracts non-cohesive soil and sorts it) for the extraction plant, but it would be a valuable material for the construction of a static body of the embankments. That soil shall be bought from KZEK and delivered to the embedding location. Due to the need for soil in the amount of about  $300 \text{ K m}^3$ , the most of materials to be embedded shall be taken from the deposit in Brzegi. The deposit shall be used in case of all of the sections.

Sites indicated for the intake of soil from deposits are located within land where plant production is not done, and location of the pits shall not effect in a risk of damaging the flood embankments during the accommodation of flood waves. The adopted extraction levels above the table of ground water – depending on the water level in Vistula dammed at the Przewóz Barrage – allow for the intake of soil in condition allowing for embedding into the embankment body without drying. Simultaneously the scope of extraction would not result in the occurrence of water pits after rainfall or flood, because the pit bottom would be left at the level of highly permeable ground, above the table of ground water. Some kind of inconsistency during floods is the occurrence of water table in the pit with elevation compliant with the water level in the Vistula River (not related to the Brzegi deposit). To sum up, leaving of the pits would not affect the ground water levels and the water

environment as the adopted extraction level would not allow for the occurrence of any water environment. In accordance with the extraction project for deposits no. 1, 4, and 6, the contractor shall be obliged to shape the slopes at edges of pits, with grade of 1:2.5, including top-soiling and sowing, after completion of the works.

The materials purchase from the Brzegi deposit are natural soil, without pollution, and they shall be embedded above the ground water level; thus, no impact on the water environment and on the water-ground environment is expected in that case.

Furthermore, it is expected to use the following on the investment implementation stage:

- Water: volume of about 1.2 m<sup>3</sup>/day on average, up to about 3.6 m<sup>3</sup>/day at the peak of the works;
- Power: depending on the quantity and quality of the equipment used for the work, e.g. concrete mixer. Estimated demand for power on the construction site is about 25 kW.

***d) Emission and occurrence of other nuisance.***

Neither emission of pollution to air nor noise emission shall occur during the use. It was assumed that during the use noise would be omitted and vehicle traffic would be its only source (commuters), eventually maintenance works and repairs associated with the use of embankments and noise of lawnmowers at mowing of the embankments. Minor nuisance caused by the investment shall occur on the implementation stage only, and those shall be short and transitory impacts, associated with the construction stage.

Small exceedance of acceptable noise emission values may occur in residential areas neighboring the site (often directly adjacent to the embankment basis). The route of embankment sections to be redeveloped runs through urbanized areas. In order to minimize the adverse impact on the environment, the construction works shall be done during the day, i.e.: from 6.00 am to 10.00 pm.

Temporary pollution of atmosphere shall also occur during the construction and assembly works, and it would be mainly associated with operations of the equipment and of the means of transport with diesel engines. The level of pollution shall depend on the time of construction works, applied construction machines, selection of utilities with low combustion gas emission. However, considering the short time for performance, modernization of the existing section of embankments shall not be a threat to the condition of atmosphere.

The works shall be performed in a way preventing production of waste or limiting their volume. The waste produced due to implementation of the investment shall be collected selectively in designated locations, and subsequently handed over to companies having relevant permits.

Approximate locations of equipment and material backyards were assumed during implementation of the planned assignment. Due to the huge area of the investment five locations were accepted, i.e.:

- Section 1 – Vistula embankments at km 0+950 to 1+000;
- Section 1 – right embankment of the Dłubnia River at km 0+350 to 0+450;
- Section 1 – left embankment of the Dłubnia River at km 0+600 to 0+700;
- Section 2 – Vistula embankments at km 0+000 to 0+250 and at km 2+600 to 2+780.

All of the listed locations are placed beyond valuable habitats and beyond habitats with increased environmental values, and also beyond the areas of medium and high ornithological values, and beyond habitats of amphibians and beavers. The construction backyard and material intake sites shall be located beyond the most valuable environmental habitats and beyond the areas listed under ornithological valorization as of high and average value.

***e) Risk of serious failures or natural disasters and construction disasters assessed based upon scientific knowledge, including substance used and technologies applied, including a risk associated with climate change.***

Effects of changing climate, and especially the increase of temperature and of frequency and severity of extreme phenomena occurring within last few decades, are getting worse. In accordance with forecasts of weathermen, the climate in the 21<sup>st</sup> century will undergo significant changes. The temperature will rise by 1.0 to 5.5 degrees Celsius. Wind speed and volume of precipitation will increase in our country. It is therefore necessary to undertake actions to adapt (adaptation) to the forecasted effects of climate changes, and they shall be implemented simultaneously with the actions limiting greenhouse gas emission. The subject investment – considering modernization of the existing embankment sections – shall be implemented using general engineering technologies basing upon earthworks, concrete works, reinforced-concrete works, piling works, and installation works mainly. The technological processes applied during the development of membrane in the subbase shall base upon natural minerals, i.e. e.g. thixotropic suspension (bentonite derivatives) or cement and soil mixes. In the opinion of *the Regional Director* the planned investment shall be adapted to the changing character of atmospheric phenomena. Rising of the embankments is to protect the city of Cracow against the water of 1 in 100 years.

Natural disasters occurring in the area of embankments are rainfalls generating hydrological discharge from the catchment, with occurrence probability of less than once per one hundred years. In that situation Vistula River's water would spill over the embankment crest and flood major part of the City of Cracow.

Construction disaster contains failure of the embankments at the flow of Q1%, which is the flow for which the embankments have been designed for. Such situations are analyzed by relevant services responsible for flood protection for the City of Cracow.

The planned investment is not an assignment generating a possibility of serious failure, as neither technologies nor substances, which may pose risk to the environment, will be applied.

***f) Expected quantities and type of waste produced and their impact on the environment, if their production is planned.***

During implementation of the investment it is expected to produce numerous waste directly associated with the work performed, and its producer shall be the contractor, which is obliged to have a relevant permit for waste management. Expected quantities of waste produced is given in the table below:

Code	Waste type	Expected waste quantity Mg/year
17 01 06	Mixed packaging waste	0.35
17 01 07	Mixed concrete waste, ceramic waste and waste elements of equipment other than those listed under 17 01 06	2000
17 01 82	Other waste not listed (bentomat trimmings)	20
15 02 03	Absorbent, filtration material, rubbing textile (e.g. rags, cloths) and protective clothes, other than those listed under 15 02 02	0.01
17 02 01	Wood	30
17 04 11	Cables other than those listed under 17 04 10	0.5
17 06 04	Insulating materials other than those listed under 17 06 01	0.5
17 02 03	Plastics	0.5
17 04 05	Iron and steel	100
17 03 80	Waste roofing felt	05

Soil collected during the demolition shall be re-used for embedding or for reinstatement of pits from which the materials were taken for development. It is not expected to have soil as waste due to its management within the investment area.

During the construction phase municipal waste shall also be produced. Construction sites shall be provided with portable toilets, e.g. TOI TOI type. Furthermore, during performance of the construction works municipal waste will be produced (waste shall be stored in a place designated by the Contractor and handed over to the receiver having a permit for handing over).

Embankments to be redeveloped are essentially objects not requiring servicing. During their use waste shall be produced due to their maintenance. The analysis of design solutions proves that during the use of objects no hazardous waste would be produced; only waste other than hazardous one will be produced. Types and quantities of waste produced during the use of objects – the following waste codes shall be produced:

- 17 04 05 – iron and steel in the amount of about 0.02 Mg/year (waste produced as a result of repairs to return valves at locks, reconstruction of elements reinforced with steel);
- 17 01 01 – concrete waste and concrete debris from demolitions and repairs in the amount of about 0.1 Mg/year (waste produced as a result of repairs to culverts, locks).

All waste produced within the investment area shall be taken over by specialized companies.

***g) Hazard to health of people, including the one resulting from the emission.***

Emission of pollution to the air and emission of noise shall not occur during the use of the investment. It has been assumed that during the use of investment noise shall be omitted, and its main source would be the traffic (commuters), and potential maintenance works and repairs associated with the use of embankments, and noise generated by lawnmowers mowing the embankments. Minor nuisance of the investment shall only occur on its implementation stage, and those shall however be short and transient impacts associated with the construction time.

Small exceedance of acceptable noise emission values may occur in residential areas neighboring the site (often directly adjacent to the embankment basis). The route of embankment sections to be redeveloped runs through urbanized areas.

Temporary pollution of atmosphere shall also occur during the construction and assembly works, and it would be mainly associated with operations of the equipment and of the means of transport with diesel engines. The level of pollution shall depend on the time of construction works, applied construction machines, selection of utilities with low combustion gas emission. However, considering the short time for performance, modernization of the existing section of embankments shall not be a threat to the condition of atmosphere.

In order to minimize adverse impact on the environment it is planned to apply the following minimizing measures, e.g.:

- Construction works shall be performed during the day, i.e. from 6.00 am to 10.00 pm;
- Delivery of construction materials shall be done using hardened roads;
- Delivery of loose materials shall be done using adopted vehicles (transport boxes covered with tarpaulins);
- Time of operations for diesel machines and vehicles working at idle shall be limited to the minimum through application of an effective work organization.

## **2. Location of the investment, including possible hazard to the environment, and especially at the existing and planned land use, self-purification possibilities for the environment and renewal of natural resources, environmental and landscape values and local conditions under spatial management plans.**

The subject investment is located within the Municipality of Cracow, on the left bank of the River Vistula.

Previous method of use for the analyzed embankment sections:

- **Section 1** – flood embankment:

Km 0+000 to 0+990. Lane of Longinusa Podbipięty Street is located on the embankment crest. Mogilski Forest is located over the entire length, in the area beyond the embankment. Simultaneously, an asphalt road runs along the embankment at the buttress, and at chainage km 0+740 the asphalt road turns north-east, and a dirt road continues running along the embankment – it leads to a pumping station at the embankment on the Łęg Stream. From chainage km 1+142 an embankment sections downstream of the estuary of Dłubnia starts. Up to the end of the embankment section, a dirt road runs along, parallelly to the embankment slope's basis. In a reach from about km 1+425 to about km 1+550 the area on the landside is engineered, practically up to the level of the existing embankment crest. At chainage km 2+097 the embankment joins the right embankment of the Przewóz port channel. Then, on the left bank of the channel, it runs from the same chainage (spot, where it joins the left channel embankment). A dirt road runs on the embankment crest up to chainage km 2+300. In a reach from 2+300 to 2+500 the area on the landside rises, thus a distinct embankment crest is not visible, and the dirt road turns away from the route of embankment crest. It is a section running in vicinity of waste treatment plant's settling tanks, which have a higher level than the flood embankment's crest. A dirt road runs on the crest route up to km 3+030. The embankment crest is slightly visible in comparison to the adjacent area on the landside – it rises by about 30-50 cm over the land level. The embankment to be redeveloped ends at chainage km 3+317, in the area of a housing estate at Popielnik Street and at the inlet to the upstream channel of the lock's outer-harbor at the Przewóz Barrage.

- Right backwater embankment of the River Dłubnia:

A sewage collector pipe runs from km 0+710 to 1+255 along the embankment, in the bank on the landside. Sport fields of KS Hutnik are located along the embankment from km 1+455. The landside

slope of the embankment practically vanishes from km 1+615 – the area beyond the embankment is raised. The embankment vanishes from km 1+750, the existing land reaches the required elevations. A register end of the embankment is located at chainage km 1+830, and it reaches the pedestrian path along T. Ptaszyckiego Street.

- Left backwater embankment of the River Dłubnia:

A dirt road runs along the landside basis of the embankment slope from km 0+000 to about km 0+380 (up to the crossing with L. Podbipięty Street). Giedroycia Street runs along the embankment from km 0+385 to about km 0+555, and then Na Niwach Street from km 0+88835 (where the register embankment ends – at the embankment of the Channel of the Smelter). Further course of the embankment starts from km 0+835 on the opposite bank of the Channel. Redevelopment of embankments of that channel is not covered by the investment in question. An embankment lock and a pumping station, so-called “rotunda”, discharging water from the closed area surrounded by the embankments of the River Dłubnia and of the Channel from the Smelter, are located at km 0+843. From that spot up to the end of the embankment at chainage km 1+263 dense single-house and corral development is present along the landside embankment slope. The register embankment ends at chainage km 1+263, but the banks runs through a fence premises up to a descend road from Bardosa Street.

- **Section 2** - flood embankment:

The register embankment begins at a plateau located at the downstream station of the lock, but it gains its form at chainage km 0+060. A housing estate is located in the direct vicinity of the embankment at chainage about km 0+260, and it ends at the embankment crossing. Further on, at chainage km 0+440 a dirt road runs along the landside slope – Popielnik Street, which then turns away from the embankment. A dirt road with a dead end at one of arable fields runs up to km about 0+910. Simultaneously, the embankment crest in that section is used as a road up to km 1+210 (crossing with Łubinowa Street). Also in case of the further section – up to the end of the embankment at chainage km 2+875 – the crest has traces of its use as a road. The embankment ends with a widening forming a U-turn yard at the junction with embankments of Suchy Jar.

The assignment is related to the development of flood protection structures based upon the Act of 8 July on the special preparation rules for flood protection investments, and therefore in accordance with Article 82 (2) of the *EIA Act* it is not necessary to identify the compliance of its implementation with the valid LSDP.

## **Variant analysis for the planned investment**

- **Leaving the present condition**

Due to necessary maintenance of continuity for the flood protection for Cracow, including e.g. Płaszów housing estate, Rybitwy housing estate, it is not considered to remove the embankments or leave them in the present condition. A potential removal of the embankments would result in flooding of a huge area of the city at each bigger flood. Leaving the present condition would cause a huge disproportion in flood safety between the protected areas of the city, and also reduction of protection for areas with raised embankments, which directly adjoin the embankments covered by this investment, which would be caused by a possibility of spilling water over the embankments in question and by flooding of the areas protected by higher, already redeveloped embankments.

- **Location option**

As we refer to the existing embankments, it was not justified to look for new locations for their route. They currently correspond with the landscape, and the neighboring inhabitants got used to them. In order to minimize a risk of conflicts the extension is directed towards the embanked area, which contains much less development.

- **Options of typical section**

An option of redevelopment and extension assumed for investments of that kind is the variant, where crest raising is obtained through extension of the existing embankment terrace. However, its tightness shall be increased by embedding of bentonite mat into the new embankment body, and a cement and bentonite membrane shall be developed in the subbase. Such an arrangement would allow for reduction of the vertical membrane (by the height of embankment, on which the mat is placed), thus it enables the application of bucket-ladder excavators and significantly reduces the development time (and therefore limits noise, dusting, and emission of combustion gas). The exception from that rule are locations of embankment objects – locks, where a bearing membrane in the form of bentonite or steel sheet piling shall be done; and collisions with facilities, which will be locally sealed with a membrane in the form of cement pressure injections. In case of the planned investment it was considered to raise the embankment using a reinforced-concrete wall. An essential advantage of that solution is limitation of the area necessary for embankment raising, as it practically is equal to the area necessary for embankment crest's extension (in case of filling with soil, 1 m of raising generated acquisition of a land strip over a width of 4.5 m along the embankment). However, that solution has numerous defects, which resulted in the absence of its consideration for the embankment section in question. The basic defect of that solution is generation of permanent and difficult obstacle over the entire application length. Easy passing through the embankment is feasible only at embankment crossings. It generates use difficulties, including necessary assembly of portable flood protection barriers at those crossings in a short time, which would require a relevant number of workers and equipment for transportation of barriers. Furthermore, it is important that it would be an alien element in the landscape, as the most of the embankment route joins green areas and not developed ones, as in case of Cracow.

It was also considered to seal the embankment body using a concrete membrane with cement leaven (mixed with soil) done in the embankment axis. Such a location causes that it is longer than the embankment's height, and the performance technology (spot soil mixing using an auger) makes it very time- and labour-consuming. Furthermore, a tight vertical membrane in the embankment axis distinctly separates it in terms of water and soil conditions. Vegetation growing on the landside (area beyond the embankment) faces more difficult development conditions due to lower humidity at that part of the embankment body.

Finally, the planned redevelopment and extension of the embankments contains sealing of the embankment body according to three typical sections.

**Basic type I of typical section** includes extension of the embankment body on the embanked area's side (riverside), crest shall be hardened using gravel mix on geo-textile and breakstone, service roads shall be developed at the buttress or at the landside embankment foot (locally the road may move away from the embankment slope's basis to e.g. bypass and protect objects or habitats located within the embankment route), hardened with sand ballast on geo-textile, breakstone and voussoir for the purpose of service crossings. Section of that type shall be implemented in case of the most of the embankment sections to be redeveloped.

However, in locations where it is not possible to develop a service road at the buttress or at the slope basis (e.g. due to the lack of space for the buttress or fenced premises in a direct vicinity of the embankment colliding with the route) it is planned to apply **the so-called type II of typical section**, which differs from type I with placement of the service road on the embankment crest and with the absence of a buttress.

Furthermore, in location, where – due to environmental and conservatory reasons or the lack of space – it is not possible to perform redevelopment according to type I and II sections, **type III of typical sections was implemented**, which contains development of a membrane from the embankment crest, but using the same technology as in case of membrane arranged in the subbase for type I and II sections.

Considering the above it shall be stated that the method selected by the Investor to seal the embankment body is the most favorable one for the environment.

Furthermore, while analyzing the investment location in terms of hazard to the environment, the following was included:

***a) Occurrence of water and muddy areas, other than the area with shallowly occurring ground water, including riparian habitats and river estuaries.***

Except for waters of the River Vistula and of the River Dłubnia, the planned investment neighbors few smaller water-courses and channels, including a vast Przewóz channel. Moreover, an oxbow lake of Vistula is located in vicinity of Brzegi.

Parts of riparian forests (forests present in areas submerged by flood waters) and tree stands of anthropogenic origin are (disturbed groups, including acacia forests) occurring within the analyzed area. They are present in vicinity of e.g. settling tanks in the area joining the Kujawy Waste Treatment Plant, at Dymarek Street, on the right bank of Dłubnia, on banks of the Przewóz channel and in vicinity of the Przewóz Barrage, at overgrown oxbow lake of Vistula in vicinity of Brzegi (southern part of that area), and in the middle part of the right Vistula embankment (e.g. at “Lasówka: fort). However, the biggest forest complex undoubtedly is the Mogilski Forest.

***b) Presence of shores and maritime environment.***

The investment is located beyond the area of shore.

***c) Possible presence of mountainous or forest areas.***

The investment site is neither a mountainous nor forest area.

***d) Areas under protection, including protection zones for water intakes and protected areas of in-land water reservoirs.***

There are no areas under protection, including protection zones for water intakes and protected areas of in-land water reservoirs, within the planned investment site.

***e) Areas requiring special protection due to the presence of plant, animal, and fungi species or their habitats or natural habitats under protection, including Natura 2000 sites and other forms of environmental protection.***

Implementation and operations of the planned investment shall adversely affect legally protected areas established based upon the Act of 16 April 2004 on the conservation of nature. The analyzed investment is located beyond the boundaries of European Ecological Network Natura 2000. The closest site – Łąki Nowohuckie PLH120069 – is located in a distance of about 3 km south from the closest boundary of the investment site. The area is placed within the Vistula valley (in the former flood terrace). On the south it borders the Vistula's oxbow lake, on the north – with the center of Nowa Huta – precinct of Cracow. Łąki Nowohuckie is the last well-kept part of meadows at Vistula in



Nowa Huta. One can find over 10 diversified plant groups within a small area. The main objective of protection within the aforementioned area is the protection of meadow habitats (moor-grass meadows and oat-grass meadows) as habitats of butterflies remaining the main subject of protection. There is no adverse impact of the investment on subject of Natura 2000 site protection.

The biggest impact of the investment on the environment shall be seen on implementation stage. Due to the works and machines applied the following emission shall occur: gas and dust to the air, noise, waste; those shall however be short-term and reversible nuisances. Acoustic nuisance associated with the development time shall end at the completion of works.

The planned earthworks in the area of valuable habitats present on parts of riparian patches in the area of Cracow (codes 91E0 and 91F0) shall be maximally limited. Materials shall be delivered to the construction site using public roads, and temporary roads shall be developed beyond the aforementioned areas of valuable habitats.

The analysis done for the environmental inventory completed for the task proves that at the bank of Vistula and within the embanked area, on site grown with trees and shrubs, presence of beavers was noted. The biggest number of fresh traces was noted in **section no. 1**, from the Wandy Bridge to the Przewóz Barrage. In **section 2** the Vistula riverbed is deep, with steep and sliding banks, and agricultural land and wasteland dominate within the embanked area. In that section there are no spots inhabited by beavers. The designed land acquisition boundaries for the planned construction works runs in a distance of max. 5 m from the embankment foot. As a consequence, it shall be necessary to obtain a decision of the Regional Director for Environmental protection in Cracow allowing for deviation in case of protected animal species. During the construction works an adverse impact – i.e. scaring and disturbance of beavers – shall be exerted in case of specimens inhabiting spots grown with trees and shrubs in vicinity of the embankments and within the embanked area. After completion of the works the adverse impact shall stop.

Based upon the site tests species of plants to be strictly or partially protected were not identified within the discussed section of Vistula embankments. A habitat of hermit beetle occurs on willows growing along the basis of the left Dłubnia embankment at chainage from km 0+000 to 0+185. As a consequence, the axis of designed extension and the temporary road – to be used as a service road during the construction phase – were moved away, so the scope of works and deliveries were done beyond the roots; and during the works in that section of embankment they would be protected with a temporary barrier on the temporary road's side and the trunks would be wrapped with protective mat. They shall also not be covered. The embankment foot shall be left in the present place.

Necessary logging of trees and shrubs is planned under the investment. The logging shall be limited only to trees and shrubs growing just at the spot of redevelopment and extension, and trees growing in the direct vicinity of the works shall be protected against damaging.

In order to minimize nuisance associated with implementation of the subject task, the Investor obliged itself to apply the following solutions protecting the environment:

- Any work during implementation of the investment shall be performed under constant supervision of environmental team,
- It is forbidden to undertake any actions to dry the Vistula's oxbow lake in vicinity of Brzegi, what may adversely affect diverse humidity and humid habitats formed in that area,
- Works shall not be done where valuable environmental habitats occur – riparian forests (91E0, 91F0). Those patches are usually located in a distance from flood embankments, but one shall take care in planning the works, to avoid damaging, e.g. during deliveries of construction material to the construction site. It is forbidden to set the technological roads out through or in a

direct vicinity of that habitat. In case of a small distance any work associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment.

- In case of a habitat with oak-elm-ash riparian forest (91F0) at chainage km 0+250 to 0+350 of the Vistula embankment in section 2, the riparian forest grows on both sides of the embankment. In that case any works associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment. One is not allowed to set the technological roads out or located temporary backyard facilities within that habitat. Any work shall be done with high care to avoid damaging of the surrounding riparian tree-stand.
- It is forbidden to perform works, take natural materials, as well as set the technological roads out in the area of habitat of hay meadows (6510). Any works associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment.
- As a result of identifying a stand of very valuable species of hermit beetle, which is located in old, rotting willows growing at the embankment on the embanked area's side, the works at redevelopment of the embankments in that section were designed to avoid threatening to the existing stand. Relocation of the embankment shall assure the protection of the trees as well as their root system. A technological road shall be placed on the opposite side, i.e. in the area beyond the embankment. Prior to the commencement of works it was expected to protect the trees additionally against damaging and covering using protection made of straw mats and wooden fences. All of the protection works shall be supervised by an environmentalist,
- Any work shall be done to avoid drying of water pits, Vistula oxbow lakes,
- Any locations of back-up facilities shall be placed beyond the area of valuable environmental habitats, and also beyond areas of medium and high ornithological value, and beyond habitats of amphibians and beavers,
- The Contractor for the investment is obliged to inspect vehicles and construction machines in terms of technical efficiency. In case of machine failure any leakage of operating fluid and fuel shall be neutralized with relevant amount of absorbent stored at every back-up facility.
- Tree trunks located within the work site or in its direct vicinity under risk of mechanical damaging shall be protected against damaging at height not smaller than 1.5 m from the ground level, and materials shall not be stored and new delivery routes shall not be set out in a distance of 1 m from trunks of trees and shrubs,
- The area of back-up facilities, where machines and trucks would operate, shall be protected. Parts of back-up facilities, tightly insulated from the ground, shall be designated for servicing and fueling of the machines.
- Waste produced during implementation of the investment shall be segregated and selectively stored in containers or in separated sites adapted to that purpose, in conditions preventing dusting and blowing light fractions away, and preventing adverse impact on the environment; they should be consecutively taken over by units certified for their further treatment,
- Logging shall be done only beyond the hatching period for birds, i.e. from the beginning of October to the end of February. In case it would be necessary to perform an additional logging within the hatching period, the works may be done only under supervision of an ornithologist.
- Any work performed in vicinity of hatching habitats of amphibians – identified on an ongoing basis by the environmental supervisor – may be performed only at application of herpetological fencing protecting the construction site against migration of amphibians. In case of identifying

specimens of amphibians, they will be caught on an ongoing basis and relocated to substitute habitats existing in a safe distance. A list of those habitats shall be developed for an application on the issuance of derogation for measures forbidden in reference to protected species.

Prior to the commencement of spring migration of amphibians the construction site in the area of culverts, ditches and water-courses shall be surrounded with a temporary herpetological fencing. During the migration the amphibians gathering at the fencing shall be caught and relocated to a relevant habitat, i.e. in spring from the embanked area to a flowage in the area beyond the embankment, and in autumn – the other way round. After completion of the works the temporary fencing shall be removed.

In case of the works in occurrence locations from March to October, adult specimens of amphibians, their eggs (spawn) and larvae (tadpoles) shall be caught and relocated based upon a decision of the RDOŚ in Cracow on the deviation from bans related to the protected species of amphibians. Potential covering of habitats shall be done in autumn and in winter (November – February).

Considering the: character, location of the investment and planned mitigation measures, it was identified that its implementation shall not significantly and adversely affect the protected items of the closest Natura 2000 site Łąki Nowohuckie PLH120069 and the cohesion of the European Ecological Network Natura 2000.

***f) Areas, where quality standards for the environment were exceeded or there is a possibility of such an exceedance.***

Air quality monitoring within the Lesser Poland Voivodship is done by the Provincial Inspectorate for Environmental protection in Cracow. The current status of air quality in the area of planned investment proves that permissible values for dust are exceeded. It is linked to the large scale low emission. In case of the city of Cracow an air protection programme was developed, which assumes reduction of that emission within its priorities.

Implementation and use of planned modernization of the River Vistula's embankments shall not significantly affect the exceedance of air quality standards.

***g) Area, where landscape has a historic, cultural or archaeological meaning.***

There are no areas where landscape a historic, cultural or archaeological meaning within the discussed area.

***h) Population density***

Development existing within the analyzed section of flood embankment is in many locations adjacent to the embankment basis. Furthermore, the planned redevelopment of flood embankment section for the River Vistula runs in vicinity of developed areas and areas transformed by human.

***i) Areas adjacent to lakes.***

The assignment is located beyond the areas adjacent to lakes.

***j) Health-resorts and areas of health-resort protection.***

The investment is located beyond the areas of health-resorts and areas of health-resort protection.

***k) Water and environmental objectives referring to it.***

The planned modernization of embankments: section 1 – Left embankment of the Vistula River from km 87+900 to km 91+450 (Wandy Bridge – Klasztorna Street at the Przewóz Barrage) and section 2 – Left embankment of the Vistula River from km 91+990 to km 96+680 (Przewóz Barrage to Suchy Jar Stream) is located in two bodies of surface water BSW *Wiśła od Skawinki do Podtężanki* (having the European code PLRW2000192137759) and BSW *Dłubnia od MinóŹki (bez MinóŹki) do ujścia*, (having

the European code PLRW2000921376), where partially the modernized backwater embankments of the River Dłubnia are located.

In accordance with the Water Management Plan for the Vistula River Basin, adopted with a regulation of the Council of Ministers of 18 October 2016 on the Water Management Plan for the Vistula River Basin (OJ of 2016, item 1911), both of the BSW were classified as highly transformed body of water with bad water status. The environmental objective for highly modified and artificial water bodies is protection of those waters and enhancement of their ecological potential and chemical status in order to achieve the good ecological potential and good chemical status.

In case of BSW Dłubnia od Minóžki (bez Minóžki) do ujścia a moderate ecological potential decided about bad water status, and the determining factors were phytobenthos and ichthyofauna. The environmental objective for that BSW is the good ecological potential and good chemical status; however, achievement of the aforementioned objective was assumed as under risk, thus time derogation 4(4)-1 was implemented and the deadline for achievement of the environmental objective was rescheduled to 2021. Implementation of derogation was justified by the lack of technical possibilities for removal of reasons for the bad status. Pressure, which may be a reason for exceedance of quality rates, was not identified in catchment of BSW Dłubnia od Minóžki (bez Minóžki) do ujścia. It is necessary to recognize the reasons in details in order to properly plan the recovery measures. Identification of the reasons for not achieving the good status shall be secured by implementation of measures on the national level: development of a state database on hydro-morphological changes, performance of deep pressure analysis in terms of hydro-morphological changes, development of good practices for hydraulic works and maintenance works, including establishment of implementation rules and development of a state renaturalization programme for ground water. The proposed modernization of flood embankments shall not deteriorate hydromorphological elements, thus it shall not contribute to not achieving the environmental objectives.

In case of BSW Wisła od Skawinki do Podłęžanki, bad ecological potential decided on the bad water status. The environmental objective for that water body is the good chemical status, good ecological potential of water, migration possibilities for water organisms in a reach of significant water-course, i.e. Wisła od Podłęžanki do Skawinki. Update of the Water Management Plan for the Vistula River Basin stated that there is a risk of not achieving the established environmental objectives, thus derogation 4(5)-1 and 4(5)-2 was implemented. Implementation of derogation was justified with a lack of technical possibilities and disproportionate costs. Impact of human pressure on the status of BSW and on the absence of technical possibilities to limit that impact on the water generates necessary establishment of less rigorous objectives in case of coefficients specifying the salinity. Simultaneously, the time necessary for implementation of the measure comprising establishment of a boundary value for the good status/potential – for parameters, for which the environmental objective was decreased – results in necessary rescheduling of achieving the environmental objectives by the BSW until 2021. The present business activity is strictly associated with the occurrence of natural resources and with the industrial character of the river basin.

The planned investment shall not deteriorate biological elements and supporting physical and chemical elements and hydromorphological elements, and it shall not affect the chemical status of water adversely on the use stage. The use of flood embankments does not cause emission of pollutions, which may affect physical and chemical elements of water or their chemical status. In case of normal flow in Vistula the existing embankments are neutral for the water and soil environment. Water discharges from the river basin naturally or is pumped out to the embanked

area and flows down to Vistula (or to Dłubnia), and modernization of the embankments would not change that, as it results from few tens of years of embankments' presence. Previous discharge conditions would be kept in case of the river basin, and due to repairs, redevelopment and maintenance work done they would even be improved. Development of a water-tight membrane in the embankment body would result in its smaller saturation with rainfall water and with flood water. It would however not result in the total reduction of the inflow of rainfall water, and it would not affect capillary suction, thus plants growing on embankment slopes and on the crest would be kept, as in case of previously developed embankments (in sections developed earlier). A serious threat of deterioration of physical-chemical or hydromorphological elements of the Vistula River or the Dłubnia River would also not occur during implementation of the assignment. During the performance it is not expected to close the embankment locks completely for the water flow, and therefore there will be no long time damming of water within the area beyond the embankment. New outlets developed, new return valves assembled, and enhance capacity of discharge ditches shall reduce a failure risk and shall improve the discharge. Therefore those shall be positive measures.

In accordance with a division of bodies of ground water given in the Water Management Plan for the Vistula River Basin, the investment site is entirely located within the body of ground water *BGW no. 148*. In case of *BGW no. 138*, having the European code *PLGW2000148*, the quantitative status and the chemical status was determined as good and it is not under risk of not achieving the environmental objective. The environmental objective for the bodies of ground water is preventing or limiting implementation of pollution, preventing the deterioration and improvement of their status, protecting and undertaking recovery measures, as well as assuring the balance between the discharge and feeding for that water in order to achieve its good status. The environmental objective for the body of ground water in question is maintenance of its good status.

Impact of the investment shall mainly be seen during the implementation, during the: intake of materials for construction purposes from deposits located within the embanked area – short-time silting up of ground water at uncovering spot. Construction excavations shall be dug above the level of ground water (which is usually located on a depth of about 4-5 m, locally shallower – about 2.3 m b.g.l.), and it is not necessary to decrease the water-table for ground water.

Rising of the embankments shall not affect the ground water. However, the designed anti-filtration membrane shall remain a suspended membrane, i.e. it shall not reach non-permeable soil and it shall not affect the ground water. Non-permeable soil is present on a depth of about 12 m b.g.l., whereas the designed membrane shall reach maximally up to about 6 m b.g.l. The calculations prove that in regular flow conditions in the river the membrane shall affect the ground water table by about 5-10 cm. A distinct impact of the membrane on the level of ground water shall be seen during floods only – the membrane shall reduce velocity of ground water filtration towards the area beyond the embankment; thus it would reduce a risk of hydraulic puncturing and of flooding of the area beyond the embankment. In case of embankment redevelopment the designed “suspended” anti-filtration membrane shall not adversely affect the ground water, and its impact during floods shall be positive. Such materials applied for the membrane development as cement, bentonite and steel shall be certified materials, not having adverse impact on the ground water.

The designed investment shall not affect the quantity and the quality of water, it shall not change resources of surface water and of ground water. It is not associated with conditions justifying derogation. Therefore, there is no impact on the achievement of environmental objectives for the aforementioned BSW and BGW.

**3. Type, features and scale of the potential impact considered in reference to the criteria listed under items 1 and 2 and under Article 62 (1) item 1, resulting from:**

***a) Impact reach – geographical area and number of population, which may be affected by the assignment.***

The planned investment may cause temporary deterioration of the environmental condition in the direct vicinity of earthworks and construction site management. Those shall especially be the following works:

- Removal of top-soil from the slopes and from the embankment crest, and from the land strip adjacent to the embankment in order to prepare the extension (bank development);
- Profiling of the uncovered slopes for development of an earth-fill bank (so-called stair-shaping) and ploughing of the adjacent land for the purpose of extension;
- Development of a membrane in the subbase;
- Development of an earth-fill embankment – extension;
- Placement of bentomat;
- Completion of the embankment – extension;
- Placement of an intermediate layer made of mineral soil;
- Placement of top-soil with sowing using a mix of grass;
- Construction site organization: storage site for materials, storage of soil from excavations, development of technological roads for the traffic of construction vehicles, and development of a staff backyard for construction workers.

***b) Transboundary character of investment impact on particular environmental elements.***

Location of the investment excludes the possibility of transboundary impact due to a large distance from state boundaries.

***c) Character, size, intensity and complexity of impact, including load for the existing technical infrastructure and the expected moment of impact commencement.***

The planned investment shall not affect the load for the existing technical infrastructure.

***d) Impact probability.***

Short and temporary impact associated with the construction of embankment shall occur during the performance.

***e) Duration, frequency and reversibility of the impact.***

Due to character of the task, its implementation time shall be relatively short. After completion of the construction works its impact and potential nuisance caused by the traffic of vehicles and machines used as the works shall finish. During the use the investment shall not emit fixed, liquid, gas or acoustic pollutions.

***f) Connection with other investment, and especially accumulation of impact of investments in progress and of complete investments, for which a decision on environmental conditions was issued, which are located on sites where it is planned to implement the investments, and on investment impact site or on sites, where impact is contained within the impact area for the planned investment – in the scope in which their impacts may lead to accumulation of impacts with the planned investment.***

The left embankment of Vistula River from km 81+256 to 87+900. That section has already been modernized, and the construction works were completed. Elevation of the right embankment's crest in that section, running on the opposite side of Vistula, under this study, are located at a height

similar to the already developed embankments. During the research, which determined the necessary embankment elevation, it was taken into account that both embankments – the left one and the right one – shall be raised to the same height, including the same requirements associated with the structure class and with computational flows. Therefore, the modernization of the right embankment in a reach from km 81+256 to km 92+800 (Dąbie Barrage to Przewóz Barrage) forms a finishing for the work already done in the area of Cracow, and it does not require additional investment on the left bank between the Dąbie Barrage and the Wandy Bridge.

In case of the right embankment downstream of the Przewóz Barrage, where – on the opposite side – it is required to raise the embankment by from 0.52 m to 0.82 m, within the framework of **section 2** concerning modernization from km 91+990 to km 96+680, the Investor does not currently expect to perform modernization works. It results from successive obtainment of financial resources and staging of the performance. They will probably be continued after completion of modernization for sections included in this paper. Height of the crest for the right embankment between km 92+800 to km 97+600 is on the same level as in case of the left embankment (at the moment) to be modernized, with deviation not exceeding 10 cm. It results in the fact that in case of a flood in the Vistula riverbed, with a peak reaching 0.5 – 0.8 m below the crest of the left embankment, the land protected by the right embankment may be flooded at Vistula chainage from km 91+990 to km 96+680 (estuary of Drwina to the estuary of Podłężanka) in Brzegi and in Grabie. It would also be necessary to raise backwater embankments of Drwina, Serafa, and Zabawka Stream in reference to elevations of the right embankment of the River Vistula at chainage km 92+800. Absence of the modernization process for the right embankment downstream of the Przewóz Barrage results in increased flood hazard for the reach of Vistula from km 92+800 to km 97+600 at peak flows exceeding 2500 m<sup>3</sup>/s, i.e. in case of water of 1 in 100 years.

**g) Possibilities to limit the impact.**

In order to minimize nuisance associated with implementation of the task in question, the Investor obliged itself to apply the following solutions protecting the environment:

- Construction works to be performed during the day, i.e. from 6.00 am to 10.00 pm;
- Any work done during implementation of the investment shall be performed under constant environmental supervision;
- It is forbidden to undertake any measures to dry the Vistula's oxbow lake in vicinity of Brzegi, as it may affect habitats of various humidity and humid habitats formed there adversely;
- Works shall not be done where valuable environmental habitats occur – riparian forests (91E0, 91F0). Those patches are usually located in a distance from flood embankments, but one shall take care in planning the works, to avoid damaging, e.g. during deliveries of construction materials to the construction site. It is forbidden to set the technological roads out through or in a direct vicinity of that habitat. In case of a small distance any work associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment.
- In case of a habitat with oak-elm-ash riparian forest (91F0) at chainage km 0+250 to 0+350 of the Vistula embankment in **section 2**, the riparian forest grows on both sides of the embankment. In that case any works associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment. One is not allowed to set the technological roads out or locate temporary backyard facilities within that habitat. Any work shall be done with high care to avoid damaging of the surrounding riparian tree-stand.

- It is forbidden to perform works, take natural materials, as well as set the technological roads out in the area of habitat of hay meadows (6510). Any works associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment.
- As a result of identifying a stand of very valuable species of hermit beetle, which is located in old, rotting willows growing at the embankment on the embanked area's side, the works at redevelopment of the embankments in that section were designed to avoid threatening to the existing stand. Relocation of the embankment shall assure the protection of the trees as well as their root system. A technological road shall be placed on the opposite side, i.e. in the area beyond the embankment. Prior to the commencement of works it was expected to protect the trees additionally against damaging and covering using protection made of straw mats and wooden fences. All of the protection works shall be supervised by an environmentalist,
- Any work shall be done to avoid drying of water pits, Vistula oxbow lakes,
- Delivery of construction materials shall be done using hardened roads;
- Delivery of loose materials shall be done using adopted vehicles (transport boxes covered with tarpaulins);
- The Contractor for the investment is obliged to inspect vehicles and construction machines in terms of technical efficiency. In case of machine failure any leakage of operating fluid and fuel shall be neutralized with relevant amount of absorbent stored at every back-up facility.
- Time of operations for diesel machines and vehicles working at idle shall be limited to the minimum through application of an effective work organization.
- Any locations of back-up facilities shall be placed beyond the area of valuable environmental habitats, and also beyond areas of medium and high ornithological value, and beyond habitats of amphibians and beavers,
- Tree trunks located within the work site or in its direct vicinity under risk of mechanical damaging shall be protected against damaging at height not smaller than 1.5 m from the ground level, and materials shall not be stored and new delivery routes shall not be set out in a distance of 1 m from trunks of trees and shrubs,
- The area of back-up facilities, where machines and trucks would operate, shall be protected. Parts of back-up facilities, tightly insulated from the ground, shall be designated for servicing and fueling of the machines.
- Waste produced during implementation of the investment shall be segregated and selectively stored in containers or in separated sites adapted to that purpose, in conditions preventing dusting and blowing light fractions away, and preventing adverse impact on the environment; they should be consecutively taken over by units certified for their further treatment,
- Logging shall be done only beyond the hatching period for birds, i.e. from the beginning of October to the end of February. In case it would be necessary to perform an additional logging within the hatching period, the works may be done only under supervision of an ornithologist.
- Any work performed in vicinity of hatching habitats of amphibians – identified on an ongoing basis by the environmental supervisor – may be performed only at application of herpetological fencing protecting the construction site against migration of amphibians. In case of identifying specimens of amphibians, they will be caught on an ongoing basis and relocated to substitute habitats existing in a safe distance. A list of those habitats shall be developed for an application on the issuance of derogation for measures forbidden in reference to protected species.



The investment given in the application is not classified as an assignment, for which an area of restricted use is formed, as provided under provisions of the Act of 27 April 2007 Conservation of Nature Law.

The analysis of materials attached to the application on the issuance of a decision on environmental conditions for the subject investment proved that the most of conditions determined under Article 63 (1) of the Act of 3 October 2008 on access to information on the environment and its protection, public participation in environment protection and environmental impact assessments, shall not occur in case of the investment in question, and the remaining ones shall have minor impact. As a consequence it was assumed that the planned investment shall not significantly affect the environment, thus it is not necessary to provide an environmental impact assessment.

Considering the statement given above the Regional Director for Environmental Protection in Cracow stated in a decision dated 12/02/2016, ref. no.: OO.4233.4.2016.BM, that there is no obligation of providing an environmental impact assessment for the subject investment. The parties could not have appealed against that decision, it may be appealed against through appealing against this decision only. The Regional Director for Environmental Protection in Cracow informed the Parties in notification dated 12/02/2016, ref. no.: OO.4233.4.2016.BM, on the issued decision and on the completion of evidence hearing in case of issuing this decision and on the possibility of acknowledging and commenting the collected evidence. None of the parties commented the subject case and provided remarks. The notification was placed on the noticeboard of the RDOŚ in Cracow from 12/02/2016 to 12/16/2016, and on the noticeboard of the City Office of Cracow – from 12/02/2016 to 12/19/2016. Information on the issued decision was also included in the Public Information Bulletin at the website of the Regional Directorate for Environmental Protection in Cracow, and in the publicly accessible data register at the website of the Center on Information on the Environment.

As an obligation to perform an environmental impact assessment for the investment was not imposed, it was not necessary to assure the possibility of public participation in the proceedings, in accordance with Article 79 of the Act of 3 October 2008 on access to information on the environment and its protection, public participation in environment protection and environmental impact assessments.

Analysis of the provided application and of information on the planned investment proves that the intended investment shall not cause nuisance to the environment exceeding the standards.

As a result it was decided as given in the conclusion.

### **Instruction**

One may appeal against this decision to the General Director for Environmental Protection in Warsaw (00-922 Warsaw, 52/54. Wawelska Street) through the Regional Director for Environmental Protection in Cracow within 14 days from its serving date.

This decision is released from an administrative fee, in accordance with the Act of 16 November 2006 on the administrative fee (OJ of 2006 no. 225, item 1635, as amended).

Killing of protected animals and damaging of protected plants and fungi, and damaging of habitats of protected species requires obtainment of a relevant permit from the General Director for Environmental Protection or from the Regional Director for Environmental Protection in Cracow for

deviation from bans valid in reference to the protected species, which is issued based upon Article 56 (1) or (2) of the Act of 16 April 2004 on the conservation of nature (OJ of 2016, item 2134, c.t.).

Regional  
Director for Environmental Protection  
In Cracow  
Rafał Rostecki MSc

As this decision (resolution) was not  
appealed against in time and mode  
legally determined, it became final  
on 03/03/2017, and it shall be implemented.  
Cracow, on 03/16/2017.

pp. Regional Director  
for Environmental Protection

Eng. Bogdan Połomski MSc  
Chief of Environmental Impact  
Assessment Department

**Recipients:**

1. Mr. Jarosław Maciaś, Sweco ENGINEERING Sp. z o.o., 30. Wielicka Street, 30-552 Cracow – Investor's Proxy,
2. Remaining parties of the proceeding notified in the mode under Article 49 APC,
3. OO.BM file.

## **CHARACTERISTICS OF THE INVESTMENT**

The subject investment is located within the Municipality of Cracow, on the left bank of the River Vistula.

The planned investment includes redevelopment and extension of about 10 km long section of embankments at the River Vistula, including backwater embankment at the River Dłubnia, except for a short final section of the left embankment.

Section 1 begins at the Wandy Bridge, and then it overlaps Podbięty Street (Mogilski Forest joins it within that reach). Behind the lock, in the area of Zakarnie Street, Podbięty Street runs north on its own embankment. An independent flood embankment starts in that place. About 160 m further there is a registered beginning of the right backwater embankment of Dłubnia. It runs north and – running parallel to the River Dłubnia – reaches the area of Ptaszyckiego Street. Length of the right backwater embankment is about 1814 m.

The left backwater embankment on the River Dłubnia reaches the area of Bardosa Street. It is significantly shorter than the right one and has a length of about 1220 m, and is divided into two parts (length of about 758 m and about 462 m) before the estuary channel of the Smelter. Similarly as in case of the right one, it runs parallel to the River Dłubnia. In a distance of about 500 m from its estuary it runs south-east and turns – in registry meaning – into the River Vistula embankment. Na Niwach Street runs along the embankment in that section. The embankment crosses the newly constructed embankment of S7 road, passes the Thermal Treatment Waste Plant, and runs parallel to the Vistula River and joins the embankments of the Przewóz port channel. That section is about 1116 m long. Register course of the further sections – running between the Vistula channel and embankments of sediment tanks of the Kujawy waste treatment plant, and ending in the area of the inlet to the upstream channel of the lock at the Przewóz Barrage – starts on the other bank of the channel. This sections is about 1212 m long.

Section 2 starts in the area of the downstream abutment of the lock, runs as a curve on the high bank of the Vistula flooding terrace, and then parallel to the Vistula course, and ends – according to the register – at embankments of the Suchy Jar Stream. That section is about 2875 m long.

The planned area determined in the application is about 78 ha – section 1, and about 31 ha – section 2. The basic scope of works contains the works associated with redevelopment and extension of the embankments. Those shall mainly be the earthworks including e.g.:

- Removal of top top-soil layer from the slopes and from the embankment crest, and from the land stop adjacent to the embankment in order to prepare the site for extension (development of embankment);
- Profiling of uncovered slopes for the earth-fill embankment (so-called stair-shaping) and ploughing of the strip of land for the purpose of extension;
- Development of a membrane in the subbase;
- Development of an earth-fill embankment – extension;
- Placement of bentomat;
- Completion of the embankment – extension;

- Placement of a transition layer made of mineral soil;
- Placement of a top-soil layer with sowing using mix of grass.

The table given below provides chainage of the embankments covered by the investment, including corresponding working chainage.

Planned investment	Register chainage km		Working km
	Embankment km	Respective river km	Embankment km
Section 1. Left embankment of the Vistula River (from the Wandy bridge to the estuary of Dłubnia River)	87+600	87+900	0+000
	88+800	89+040	1+142
Section 1. Left embankment of the Vistula River (downstream of the estuary of Dłubnia River)	89+640	89+640	1+142
	90+560	90+550	2+097
Section 1. Left embankment of the Vistula River (downstream of the estuary of port channel)	90+638	90+640	2+097
	91+797	91+540	0+097
Section 1. Right embankment of the Dłubnia River	0+000	0+000	0+000
	1+832	2+373	1+830
Section 1. Left embankment of the Dłubnia River	0+000	0+000	0+000
	1+220	1+609	1+263
Section 2. Left embankment of the Vistula River (from the Przewóz Barrage to Suchy Jar)	91+997	91+990	0+000
	95+162	96+680	2+875

As it is not possible to raise and close the final section of the left embankment for the River Dłubnia at the existing route, the Investor decided about correcting the application in question through:

- Redevelopment and extension of that embankment at chainage from km 1+136 (river chainage km 1+577) to km 1+263 (river chainage km 1+609), i.e. up to the registered end of the embankment, including grading or total demolition of that reach of the embankment;
- Development of a new embankment reaching the high bank, covering all of the buildings, including those, which are currently located within the embanked area in a direct flood hazard area. A design for development of the new embankment shall be done based upon a separate investment task. The investor declares that both investments shall be implemented simultaneously, so the same level of flood protection would be provided.

The planned scale of rising for the embankments under the investment in question within particular sections:

- Section 1 covers:
  - Left embankment of Vistula from the Wandy Bridge to the estuary of the River Dłubnia – max. by about 0.5 m, about 0.3 m on average (embankment raising is not expected in a reach of embankments from km 0+000 to 0+985, but only development of a membrane at the embankment crest, reaching the depth of up to 6 m);
  - Right embankment of Dłubnia from the estuary to the area of Ptaszyckiego Street - max. by about 1.2 m, about 0.75 m on average;

- Left embankment of Dłubnia from the estuary to the area of Bardosa Street - max. by about 1.2 m, about 0.65 m on average;
- Left embankment of Vistula from the estuary of Dłubnia to the Przewóz Barrage – max. by about 1.0 m, about 0.3 m on average.
- Section 2 covers:
  - Left embankment of Vistula from the Przewóz Barrage to Suchy Jar - max. by about 1.2 m, about 0.75 m on average.

In case of the designed embankment the minimum parameters were adopted as follows: crest width of about 4.0 m (except for Podbipięty Street, where the width is greater and results from dimensions of the road course), grade of the riverside slope of 1:2.5 and of the landside slope of 1:2.0. The maximum height of the embankment shall rise to about 5.4 m for Section 1 and to 4.6 m for Section 2.

The planned modernization of the embankments contains sealing of the embankment body according to three typical sections.

**Basic type I of typical section** includes extension of the embankment body on the embanked area's side (riverside), crest shall be hardened using gravel mix on geo-textile and breakstone, service roads shall be developed at the buttress or at the landside embankment foot (locally the road may move away from the embankment slope's basis to e.g. bypass and protect objects or habitats located within the embankment route), hardened with sand ballast on geo-textile, breakstone and voussoir for the purpose of service crossings. Section of that type shall be implemented in case of the most of the embankment sections to be redeveloped.

However, in locations where it is not possible to develop a service road at the buttress or at the slope basis (e.g. due to the lack of space for the buttress or fenced premises in a direct vicinity of the embankment colliding with the route) it is planned to apply **the so-called type II of typical section**, which differs from type I with placement of the service road on the embankment crest and with the absence of a buttress.

Furthermore, in location, where – due to environmental and conservatory reasons or the lack of space – it is not possible to perform redevelopment according to type I and II sections, **type III of typical sections was implemented**, which contains development of a membrane from the embankment crest, but using the same technology as in case of membrane arranged in the subbase for type I and II sections.

Except for the redevelopment and extension of embankments for the River Vistula, including backwater embankments at the River Dłubnia, the scope of application also covers redevelopment, protection or liquidation of the related accompanying infrastructure (embankment locks, descend roads and embankment crossings), and construction, redevelopment, protection or liquidation of the existing road infrastructure (roads, culverts, ramps – descend roads and embankment crossings), power network, gas network, IT network, water supply network and sewerage network. The planned new descend roads most often join the embankment crest with a shelf on the embankment or they remain a bypass of objects in the embankment course (e.g. existing sewerage chambers) or a link with bicycle path. The descend roads joining public roads shall be developed as asphalt ones within sections of several meters.

Type II structure with modified course, i.e. open-work reinforced-concrete road slabs, was applied for embankment crossings and descend roads. Their application is necessary to protect the embankment crest against excessive passing over. The application of open-work slabs shall allow for

simultaneous maintenance of the surface as partially permeable. In order to limit the area acquired by embankments of embankment crossings and descend roads – as those often are arable fields – the grade of slopes beyond the embankment was increased to 1:1.5 and within the embanked area to 1:2. New descend roads most often link the embankment crest with a shelf on the embankment or remain a bypass for objects within the embankment course (e.g. existing sewerage chambers).

The greatest impact of the planned investment on the environment shall be seen during the implementation phase. As a result of the works done and machines applied the impact shall occur in the form of emission of: gas and dust to the air, noise, waste; those however shall be temporary and reversible nuisance. Acoustic nuisance shall be associated with the construction time, and it shall stop at the completion of works. Materials shall be delivered to the investment site using public roads, and temporary engineering works shall be developed beyond the aforementioned areas of valuable habitats.

In order to minimize nuisance associated with implementation of the task in question, the Investor obliged itself to apply the following solutions protecting the environment:

- Construction works to be performed during the day, i.e. from 6.00 am to 10.00 pm;
- Any work done during implementation of the investment shall be performed under constant environmental supervision;
- It is forbidden to undertake any measures to dry the Vistula's oxbow lake in vicinity of Brzegi, as it may affect habitats of various humidity and humid habitats formed there adversely;
- Works shall not be done where valuable environmental habitats occur – riparian forests (91E0, 91F0). Those patches are usually located in a distance from flood embankments, but one shall take care in planning the works, to avoid damaging, e.g. during deliveries of construction material to the construction site. It is forbidden to set the technological roads out through or in a direct vicinity of that habitat. In case of a small distance any work associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment.
- In case of a habitat with oak-elm-ash riparian forest (91F0) at chainage km 0+250 to 0+350 of the Vistula embankment in **section 2**, the riparian forest grows on both sides of the embankment. In that case any works associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment. One is not allowed to set the technological roads out or locate temporary backyard facilities within that habitat. Any work shall be done with high care to avoid damaging of the surrounding riparian tree-stand.
- It is forbidden to perform works, take natural materials, as well as set the technological roads out in the area of habitat of hay meadows (6510). Any works associated with embankment modernization shall be done only in the area of redevelopment, i.e. foundation of the modernized embankment.
- As a result of identifying a stand of very valuable species of hermit beetle, which is located in old, rotting willows growing at the embankment on the embanked area's side, the works at redevelopment of the embankments in that section were designed to avoid threatening to the existing stand. Relocation of the embankment shall assure the protection of the trees as well as their root system. A technological road shall be placed on the opposite side, i.e. in the area beyond the embankment. Prior to the commencement of works it was expected to protect the trees additionally against damaging and covering using protection made of straw mats and wooden fences. All of the protection works shall be supervised by an environmentalist.
- Any work shall be done to avoid drying of water pits, Vistula oxbow lakes.

- Delivery of construction materials shall be done using hardened roads.
- Delivery of loose materials shall be done using adopted vehicles (transport boxes covered with tarpaulins).
- The Contractor for the investment is obliged to inspect vehicles and construction machines in terms of technical efficiency. In case of machine failure any leakage of operating fluid and fuel shall be neutralized with relevant amount of absorbent stored at every back-up facility.
- Time of operations for diesel machines and vehicles working at idle shall be limited to the minimum through application of an effective work organization.
- Any locations of back-up facilities shall be placed beyond the area of valuable environmental habitats, and also beyond areas of medium and high ornithological value, and beyond habitats of amphibians and beavers.
- Tree trunks located within the work site or in its direct vicinity under risk of mechanical damaging shall be protected against damaging at a height not smaller than 1.5 m from the ground level, and materials shall not be stored and new delivery routes shall not be set out in a distance of 1 m from trunks of trees and shrubs,
- The area of back-up facilities, where machines and trucks would operate, shall be protected. Parts of back-up facilities, tightly insulated from the ground, shall be designated for servicing and fueling of the machines.
- Waste produced during implementation of the investment shall be segregated and selectively stored in containers or in separated sites adapted to that purpose, in conditions preventing dusting and blowing light fractions away, and preventing adverse impact on the environment; they should be consecutively taken over by units certified for their further treatment,
- Logging shall be done only beyond the hatching period for birds, i.e. from the beginning of October to the end of February. In case it would be necessary to perform an additional logging within the hatching period, the works may be done only under supervision of an ornithologist.
- Any work performed in vicinity of hatching habitats of amphibians – identified on an ongoing basis by the environmental supervisor – may be performed only at application of herpetological fencing protecting the construction site against migration of amphibians. In case of identifying specimens of amphibians, they will be caught on an ongoing basis and relocated to substitute habitats existing in a safe distance. A list of those habitats shall be developed for an application on the issuance of derogation for measures forbidden in reference to protected species.

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