

**REGIONAL DIRECTOR FOR  
ENVIRONMENTAL PROTECTION  
IN CRACOW**

OO.420.4.3.2019.BM

Cracow, September 18, 2020

**DECISION  
AMENDING THE DECISION ON ENVIRONMENTAL CONDITIONS  
DATED 10/29/2012, REF. NO.: OO.4233.13.2012.BM**

Based upon Article 71 (2) item 2, Article 75 (1) item 1 letter i) and Article 75 (1) item 1 letter p), Article 80 (1) and (2), Article 85 (1), (2) item 1, and Article 87 of the Law of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (consolidated text: OJ of 2020, item 283, as amended), as well as upon Article 17 of the Act of July 8, 2010 on the special preparation rules for flood protection investments (OJ of 2019, item 933, consolidated text), and Article 104 and 108 of the Act of June 14, 1960 Code of Administrative Procedure (consolidated text: OJ of 2020, item 256, as amended), as well as Article 3 (2) item 1 in reference to Article 2 (1) item 36 and Article 3 (1) item 65 of the regulation of the Council of Ministers of November 9, 2010 on the investments which may significantly affect the environment (OJ of 2016, item 71, consolidated text), with meaning given under Article 4 of the regulation of the Council of Ministers of September 10, 2019 on the investments which may significantly affect the environment (OJ of 2019, item 1839)

**after considering**

the application dated 07/31/2019, ref. no.: POPDOW/KR/60549311/18/0708, filed by Mrs. Barbara Chammas, representative of AECOM Polska Sp. z o.o., Odra-Vistula Flood Management Project Office (1. Pokoju Alley, Building K1, 31-548 Cracow), acting in the name of the State Water Holding Polish Waters Regional Water Management Authority in Cracow (22. Marszałka J. Piłsudskiego Street, 31-109), leading to the issuance of amendment to the decision on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, for the investment titled:

1. **"Construction of a flood storage reservoir "Bieżanów" on the River Serafa at chainage km 7+284 in the City of Cracow",**
2. **"Construction of a flood storage reservoir "Serafa - 2" on the River Serafa at chainage km 9+223 in the City of Cracow",**
3. **"Construction of a flood storage reservoir "Malinówka - 1" on the Malinówka Stream at chainage km 0+220 in the City of Cracow",**
4. **"Construction of a flood storage reservoir "Malinówka - 2" on the Malinówka Stream at chainage km 2+320 in the City of Cracow",**
5. **"Construction of a flood storage reservoir "Malinówka - 3" on the Malinówka Stream at chainage km 3+017 in the City of Cracow and in the City of Wieliczka"; in the range of tasks listed in items 2 and 5 above;**

**I hereby decide as follows:**

I. I modify the decision of the Regional Director for Environmental Protection in Cracow dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, as follows:

**In case of the name of the investment:**

**1) I amend the name of the investment under the aforementioned decision from:**

1. "Construction of a flood storage reservoir "Biezanów" on the River Serafa at chainage km 7+284 in the City of Cracow",
2. "Construction of a flood storage reservoir "Serafa - 2" on the River Serafa at chainage km 9+223 in the City of Cracow",
3. "Construction of a flood storage reservoir "Malinówka - 1" on the Malinówka Stream at chainage km 0+220 in the City of Cracow",
4. "Construction of a flood storage reservoir "Malinówka - 2" on the Malinówka Stream at chainage km 2+320 in the City of Cracow",
5. "Construction of a flood storage reservoir "Malinówka - 3" on the Malinówka Stream at chainage km 3+017 in the City of Cracow and in the City of Wieliczka";

**to the following:**

1. "Construction of a flood storage reservoir "Biezanów" on the River Serafa at chainage km 7+284 in the City of Cracow",
2. "Construction of a flood storage reservoir "Serafa - 2" on the River Serafa at chainage km 9+223 in the City of **Wieliczka**",
3. "Construction of a flood storage reservoir "Malinówka - 1" on the Malinówka Stream at chainage km 0+220 in the City of Cracow",
4. "Construction of a flood storage reservoir "Malinówka - 2" on the Malinówka Stream at chainage km 2+320 in the City of Cracow",
5. "Construction of a flood storage reservoir "Malinówka - 3" on the Malinówka Stream at chainage km **2+990** in the City of Cracow and in the City of Wieliczka";

**In case of the decision:**

**2) Clause I and sub-item 1.1.1 gain new meaning:**

*"I. I establish environmental conditions for the contract titled:*

1. "Construction of a flood storage reservoir "Biezanów" on the River Serafa at chainage km 7+284 in the City of Cracow",
2. "Construction of a flood storage reservoir "Serafa - 2" on the River Serafa at chainage km 9+223 in the City of **Wieliczka**",
3. "Construction of a flood storage reservoir "Malinówka - 1" on the Malinówka Stream at chainage km 0+220 in the City of Cracow",
4. "Construction of a flood storage reservoir "Malinówka - 2" on the Malinówka Stream at chainage km 2+320 in the City of Cracow",
5. "Construction of a flood storage reservoir "Malinówka - 3" on the Malinówka Stream at chainage km **2+990** in the City of Cracow and in the City of Wieliczka";

and simultaneously:

*1. I determine the:*

*1.1 Type and place of contract implementation:*

The planned contract includes construction of a group of five flood storage reservoirs at the River Serafa (two reservoirs) and at the Malinówka Stream (three reservoirs), within the City of Cracow and the City of Wieliczka – with a total flood storage capacity of **392 000 m<sup>3</sup>**. The total flood plain area for all of the reservoirs is **21 ha**. Those reservoirs are to provide flood storage during floods (they would remain empty in the remaining time – dry polders) only.

*Location of the reservoirs:*

- *Bieżańów Reservoir at chainage km 7+284 (dam section)* – located within the City of Cracow at Drożdżowa, Bogucicka, Ślusarczyka Streets and at the Cracow-Wieliczka railway line.
- *Serafa 2 Reservoir at chainage km 9+223 (dam section)* – located within north boundaries of the City of Wieliczka. It covers a part of a deep valley of the Serafa River at the Bogucice Estate between Krakowska Street and railway tracks of the Cracow-Wieliczka railway line.
- *Malinówka 1 Reservoir at chainage km 0+220 (dam section)* – located at A-4 motorway and Mała Góra, Szastera, Nad Serafą Streets. On the west it reaches Wielicka Street, and on the east – developed areas west of the railway line crossed by Serafa and its tributary stream, Malinówka.
- *Malinówka 2 Reservoir at chainage km 2+320 (dam section)* – located at the boundary between the City of Cracow and the City of Wieliczka. It covers a part of the Malinówka Stream's valley on the western side of the Krzyszkowicki Forest, just upstream of the A-4 motorway.
- *Malinówka 3 Reservoir at chainage km 2+990 (dam section)* – located at the boundary between the City of Cracow and the City of Wieliczka. It covers a part of the Malinówka Stream's valley on the south-western side of the Krzyszkowicki Forest, just upstream of the Malinówka 2 Reservoir.

A detailed scope of the contract in question is determined under "Appendix no. 1", which forms an integral part of this decision."

**3) I modify the condition determined under sub-clause 1.2 letter c) of *Conditions for using the land at the performance and at the use of the contract, with particular inclusion of the necessary protection of valuable environmental elements, natural resources and historic objects, and for limiting nuisance to adjacent areas*, and it gains the following new meaning:**

c) One shall guarantee discharge of rainfall water from the areas located in the area beyond the embankment – especially through the construction of a drainage ditch for the Malinówka 1 Reservoir **and Serafa 2 Reservoir**, and through the development of a ditch protected with concrete trenches along the boulevard for the Bieżańów Reservoir, or through another solution.

**4) Other conditions determined under sub-item 1.2 titled: „Conditions for using the land at the performance and at the use of the contract, with particular inclusion of the necessary protection of valuable environmental elements, natural resources and historic objects, and for limiting nuisance to adjacent areas” remain valid.**

**5) I determine additional significant conditions for application of the environment on the stage of designing, performance, and use, in reference to the modified scope of the investment (i.e. Malinówka 3 Reservoir and Serafa 2 Reservoir) under this decision:**

1. In order to minimize the acoustic nuisance generated during the performance the construction works in vicinity of acoustically protected sites and buildings, done using machines generating excessive noise, shall be done during the day, from 6.00 am to 10.00 pm.

2. Unorganized emission of dusty pollution during performance of the earthworks and of the construction works shall be limited through: transportation of loose materials with adapted vehicles protected against dusting, storage of loose materials in places protected against wind (in manufacturer's packaging, if possible) or covering them with e.g. tarpaulin, and – in case of high temperature occurrence – sprinkling the surface, which may cause dusting, with water.

3. Municipal waste produced during the performance shall be kept in tight holding tanks, content of which shall be transferred – without contact with the natural environment – to units having relevant permits for its treatment.

4. For the purpose of limiting discharge of pollution to the ground, the site facilities shall be located in a distance of at least 15 m from the temporary river-bed of Serafa and from the temporary river-bed of Malinówka.

5. Any work at the river-bed shall be limited to minimum.

6. One shall apply construction materials with any necessary attestation confirming the product quality and one shall apply technologies and construction materials not harmful to the soil and water environment.

7. Bulk materials and aggregate necessary for the planned works shall be properly protected against blowing away and excessive dusting, both: on the stage of transportation, storage, as well as embedding.

8. In order to reduce impact of the planned measures on the condition of water, the construction works at both of the water-courses shall be done in different time.

9. During the construction works one shall avoid forming of water pits and other land pits, where water may stand still, to avoid provision of potential unsteady breeding habitats for amphibians.

10. Provide replacement planting using native species and species corresponding with the present habitat in a relation of at least 1:1. The planting shall be completed up to 1 year from the completion of performance.

11. During the use of reservoir one cannot allow for expansion of such invasive plant species within the investment site as e.g.: Canadian goldenrod (*Solidago canadensis*), tall goldenrod (*Solidago*

gigantea), grass-leaved goldenrod (*Solidago graminifolia*), coneflower (*Rudbeckia* sp.), copper tops (*Impatiens glandulifera*), Japanese knotweed (*Reynoutria* sp.), hogbane (*Heracleum mantegazzianum*), Sosnowsky's hogweed (*Heracleum sosnowskyi*), wild cucumber (*Echinocystis lobata*). Identified species of listed plant species shall be immediately removed.

**6) I modify Clause VII of the environmental decision dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, referring to specificity of the planned investment and I provide it with new meaning stating “Appendix no. 1 – New Specificity of the Investment”, and it forms an integral part of the amended decision.**

**In case of the justification:**

**7) Provisions given on entire pages no. 9, 10, 11, and 12, and provision given up to the second paragraph on page 13, inclusive, of the aforementioned environmental decision dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, gain the following new meaning:**

“The planned contract forms an element of flood protection for the areas located in the Serafa river basin, as given in the “Improvement Program for Flood Protection in the Serafa River Valley, City of Cracow, Municipality of Cracow, District of the City of Cracow, Brzegi, Kokotów, Commune of Wieliczka, District of Wieliczka”. An objective of the planned actions is to completely protect the areas within the Serafa river basin, and especially the Złocień Estate and the Stary Biezanów Estate, in the range of a flow probability of  $Q_{1\%}$ .

**Three variants of technical solutions were analyzed:**

**Variant I – regulation of the Serafa river bed** – it assumed increasing a river-bed's cross-section for accommodation of  $Q_{1\%}$  water; however, the results of flow simulation proved that there is no technical possibility of safe accommodation for that water. It would be necessary to develop a gully with an opening of 3.0 m and a height of 3.0 m in a reach of at least 6.290 km, construct 1.400 km of flood embankments to protect the Złocień Estate, and redevelop all bridges and footbridges.

**Variant II – construction of a flood embankment to accommodate  $Q_{1\%}$  flow** – it would require developing about 4.56 km of embankments, raising the backwater embankments at the River Serafa from the River Vistula over a length of about 1.652 km, extensive expropriation, and redevelopment of road infrastructure.

**Variant III – construction of dry flood storage reservoirs** – that solution assumed that for the purpose of limiting the flood hazard at chainage km 3+467-8+024 of the River Serafa, it is necessary to reduce the  $Q_{1\%}$  flood wave to the  $Q_{10\%}$  flow. It is possible through achieving such a flood storage capacity at the Malinówka Stream as to stop the wave with a probability of  $Q_{1\%}$ , and therefore allow for the reduction of a flood wave at the River Serafa to the safe flow of  $Q_{10\%}$ . For that purpose it is expected to develop three dry flood storage reservoirs at the Malinówka Stream and two at the Serafa River, i.e.:

- Biezanów located at chainage km 7+284 (dam section),
- Serafa 2 at chainage km 9+223 (dam section),
- Malinówka 1 located at chainage km 0+220,
- Malinówka 2 located at chainage km 2+320,
- Malinówka 3 located at chainage km **2+990**.

The total flood storage capacity of the reservoirs shall amount to **392 000 m<sup>3</sup>** at the calculated volume of the flood wave of 399,060 m<sup>3</sup>. In case of applying the maximum capacity of the reservoirs at the Malinówka Stream – at Q<sub>1%</sub> flood flow – only 4.0 m<sup>3</sup>/s would be discharged from the Malinówka Stream to the River Serafa, what would reduce the flood wave in the Serafa River to the flow of Q<sub>1%</sub> - 22.24 m<sup>3</sup>/s. However, the reservoirs at the River Serafa are to reduce the aforementioned wave to the level of safe flow Q<sub>10%</sub> = 13.95 m<sup>3</sup>/s. It shall be necessary to construct embankments and boulevards over a length of 1.460 km and a height of about 1.40 m for safe accommodation of the flow Q<sub>10%</sub> in section at chainage km 3+467-4+921 of the River Serafa. However, for the purpose of protecting the Stary Bieżańów Estate and the Złocień Estate it shall be necessary to provide extension at chainage km 6+117-7+106.

Detailed parameters of the reservoirs are given in the table below.

Reservoir	Malinówka no. 1 /Motorway/	Malinówka no. 2	Malinówka no. 3	Bieżańów /Bieżańów/	Serafa no. 2 /Wieliczka/
Capacity of the reservoir [K m3]	115	55	<u>56</u>	130	<u>43</u>
Damming elevation [m a.s.l.]	216.50	229.50	<u>236.50</u>	210.00	<u>220.00</u>
Bottom elevation [m a.s.l.]	211.65	224.60	<u>229.20</u>	205.50	<u>216.20</u>
Dam section [km]	0+220	2+320	<u>2+990</u>	7+284	9+223
Area of the reservoir [ha]	6.5	2.5	<u>3.1</u>	7.0	<u>2.4</u>
Damming height [m]	4.85	4.90	<u>7.3</u>	4.50	<u>3.9</u>
Front dam length [m]	100	125.0	<u>About 116</u>	340	<u>About 40</u>
Side dam length [m]	850	-	-	-	-
Embankment:					
Boulevard:	-	-	-	450.0	-
River-bed relocation length [m]	About 140	About 226	<u>About 426</u>	About 180 m	<u>About 100</u>

Collision with utilities	k. 600, w. 110 (connection) eN – high voltage	k. 400 w. 80, piping Raba II, eN	<u>- Outlets from the main Raba I and II, - MV and LV power lines, - outlets kd. 300</u>	Removal of a deep-water well, development of a replacement well beyond the reach of reservoir's impact	- w. 50, - w. 300, <u>- w. 100,</u> - ks. 160 PE, - ks. 63, - kd., <u>- MV and LV power lines,</u> - <u>teletechnical cable.</u>
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According to the author of the contract's environmental impact report, the most beneficial variant for the environment is the variant proposed by the applicant, i.e. Variant III, which comprises construction of five dry flood storage reservoirs. Those reservoirs would be developed in a bead arrangement. At application of front dams with a discharge-spillway section and of side dams (where necessary), one would provide reservoirs operating as dry flood storage reservoirs functioning during excessive flows only. The achieved flood storage capacity amounts **from about 43 K m<sup>3</sup>** to 130 K m<sup>3</sup> for particular reservoirs, what in total – as mentioned above – amounts to **about 392 K m<sup>3</sup>**. It allows for reduction of a flood wave from the flow with Q<sub>1%</sub> probability to the flow with Q<sub>10%</sub> probability, which is safe for the Serafa river bed.

Front dams and side dams shall be protected against filtration through sealing of the body on the riverside with geo-membrane made of PEHD or PVC and with a vertical hydro-insulating DSM membrane or through a diaphragm wall located at the riverside foot of the embankment or a vertical hydro-insulating membrane driven from the embankment crest without a geo-membrane screen, depending on the ground and water conditions identified in details.

**Front dams and side dams of the Malinówka 3 Reservoir and of the Serafa 2 Reservoir shall be protected against filtration through sealing of the body on the riverside with bentomat or with geo-membrane made of PEHD or PVC and with a vertical hydro-insulating DSM membrane or CDMM or through a diaphragm wall located at the riverside foot of the dam or a vertical hydro-insulating membrane driven from the embankment crest without a bentomat or geo-membrane screen, depending on the ground and water conditions identified in details.**

Direct impact of the reservoirs on the construction stage shall be associated with earthworks in the area of the front dam and within bowls of the reservoirs, and with concrete works in the area of discharge and spillway section. Materials applied to seal the earth-fill dams shall be neutral to the environment. The reservoirs to be developed shall be done one by one. It results from the possible planning and funding for the contract. During implementation of the planned contract, due operations of the construction equipment and transportation and storage of construction materials there may be temporary emission of noise, dusts and combustion gases to the environment. However, according to the author of the report those shall be limited impacts not exceeding the noise generated by machines operating at farms or by vehicles passing-by in vicinity of the planned contract. Furthermore, it shall be temporary and shall cease after completion of the works. In order to minimize emission of dusts during the works in dry periods it is recommended to sprinkle the access roads and the technological roads with water, and during strong winds – to stop the works.

Site grading shall be done in bowl areas for the following reservoirs: Biezanów, Malinówka – 1, Malinówka – 2, in order to reach the proper flood storage capacity of the reservoirs. The site grading shall be done with a drop of 0.005 toward the water-course for the purpose of facilitating the discharge of water from reservoir bowls after transferring the flood wave. **In case of Serafa 2 and Malinówka 3 reservoirs site grading shall be done to obtain proper flood storage capacity for the reservoirs. The grading shall be done with a minimum drop of 0.005 toward the water-course for the purpose of facilitating the discharge of water from reservoir bowls after accommodating the flood wave.** Soil material obtained during site grading for the reservoir bowls shall be – when useful – applied for construction of dams, whereas its remaining portion shall be used for reinstatement works or stored at sites indicated by the City Office of Cracow. **Soil to be extracted from deposits located in the reservoir's bowl and applicable for embedding in the dam body shall be applied for development of earth-fill structures. Such remaining natural grounds as top-soil or soil not suitable for embedding, which are not waste, shall be embedded in pits left after deposits, and shall be applied to level its surface.**

Moreover, due to the protection of trees, the areas with valuable trees are left as islands, which may be partially flooded. Due to short-term flooding it shall not be harmful to the trees. The planned necessary logging of trees and shrubs is limited to the areas covered directly by the planned contract, i.e. the areas, where front dams and side dams and discharge and spillway sections are to be developed, beds of water-courses are to be relocated, **and where soil for development of dams shall be extracted from the reservoir's bowl**, and in the zone where **trees and shrubs** form a risk for **safety** of dam structures. The remaining trees shall not be logged, and valuable specimens of oaks present at the Malinówka 1 Reservoir shall be left. After completing the works top-soil shall be spread within the entire earth-fill area and it shall be sown with grass.

During the construction phase the facilities located within the bowls of the reservoirs, which need to be relocated to the area beyond the flooding zone, shall also be redeveloped:

- Biezanów Reservoir: relocation of the Serafa river bed over a length of about 180 m, removal of the existing deep-water well and development of a replacement deep-water well, relocation of a water-supply piping, relocation of an overhead telecommunication line.
- **Serafa – 2 Reservoir: re-location of the River Serafa channel over a length of about 100 m, removal of collision with networks from the reservoir's bowl or their protecting in case of water-pipings, sanitary canalization, storm drainage, LV and MV power lines, and teletechnical line.**
- Malinówka – 1 Reservoir: relocation of the Malinówka stream bed over a length of about 140 m, redevelopment of sanitary canalization with a diameter of 600 mm, HV power line's cabling, redevelopment of outlets for the motorway's drainage.
- Malinówka – 2 Reservoir: relocation of the Malinówka stream bed over a length of about 230 m, redevelopment of sanitary canalization with a diameter of 400 mm, LV power line's cabling, assembly of non-return valves at the water discharge from the Raba I piping and from the Raba II piping.
- Malinówka – 3 Reservoir: **re-location of the Malinówka Stream's channel over a total length of about 426 m, protection of MV or LV power posts or redevelopment of the line**, assembly of non-return valves at the water discharge from the Raba I piping and from the Raba II piping, **protection of outlets from storm drainage – diameter of 300 mm,**



**redevelopment of ditches discharging water to the Malinówka Stream, with demolition and development of new culverts within the investment site. Demolition of steel and concrete elements within the reservoir's bowl.**

According to the author of the report, during implementation of the entire contract the following waste may occur:

- Plastics – code 17 02 03,
- Damaged reinforced-concrete and concrete elements – code 17 01 01,
- Damaged wooden elements – code 17 02 01,
- Other waste not listed – bentonite-cement leaven – code 17 01 82.

All waste produced shall be removed and treated beyond the construction site, in designated places.

As informed by the author of the report, in the use phase for the planned contract there are no adverse factors, which may affect the environment significantly. During floods and operations of the reservoirs their bowls would be filled with water.

Drainage for the area beyond the embankment shall be provided by ditches (Malinówka 1), and short-term filling of the reservoir with water would not cause changes of climate, huge changes to ground water flows, change of temperature, or emission to the atmosphere. The time of reservoir's depletion is from 2 to 8 hours. The maximum time of reservoir's operations in a flood cycle is from about 3 to 4 days. As a consequence, operations of the reservoir do not affect the quality of air. In the remaining time the area of the reservoir shall be used the same way as before the development stage.

During the use of the reservoir (maintenance works) waste in a form of sediments shall be generated as a result of silting of the reservoir bowl's bottom after the discharge of flood water and waste plant mass. Silt and other pollutions shall be collected from the reservoir's bowl and reinstated for farming on site, grass would be mown and transferred for composting. The entire area of the reservoir shall be sown with grass and a meadow status from before the flood shall be restored.

The contract planned for implementation, working in a dry regime, is – as described in the report – determined as the least affecting for the environment among the known types of flood defenses. It especially refers to the method of water flow through the (front) dam. In case of the Bieżańów Reservoir at chainage km 7+284 and the Serafa 2 Reservoir at chainage km 9+223 the flow of water reaching the flow of  $Q_{10\%}$  takes place through the bottom discharge facilities of the dam, i.e. a structure, which does not interfere in the flow volume, it does neither provide artificial damming nor other obstacles at the water-course. Only an excess of water is stored in the reservoir in a controlled way, as it would not be accommodated within the river-bed. **Malinówka – 1 Reservoir and Malinówka - 2 Reservoir on Malinówka Stream shall have discharge facilities designed for a regulatory flow of  $Q=4 \text{ m}^3/\text{s}$ . Malinówka - 3 Reservoir on Malinówka Stream shall have discharge facilities designed for a regulatory flow of  $Q = 2.8 \text{ m}^3/\text{s}$ . All reservoirs shall operate within a bead arrangement; thus, filling of each downstream reservoir shall start just after complete filling of related upstream reservoir.** Such a system shall allow for maximal flattening of a flood wave. Due to the quality of water in both of the water-courses (Malinówka – water beyond any class, Serafa – Class V of cleanliness) fish are not present in them.

The areas designated for the contract are located beyond the areal forms of environmental protection. The ecological ground, Krzyszkowicki Forest, neighbors Malinówka 2 and Malinówka 3 reservoirs directly, but – as indicated in the report – development of the designed dry flood storage reservoirs shall not affect that ecological ground adversely. The closest Natura 2000 site is Łąki Nowohuckie PLH120069, which is located about 6 km north from the planned contract site. Impact on Natura 2000 sites is not anticipated.

The areas designated for the planned contract are under high human pressure; however, there are protected species of animals and plants, which may be endangered due to implementation of the contract – especially due to the site grading done for the bowls of the following reservoirs: Bieżanów, Malinówka 1, Malinówka 2, Malinówka 3, and Serafa 2. Those however are not rare species or ones threatened with extinction within the state. In order to minimize potential impacts one shall inspect the site in terms of protected animal species occurrence prior to the commencement of works, and identified amphibians and other animals of low mobility (not able to run away) shall be moved to the area beyond the contract site. Fish are not present in sections covered by the contract in case of Serafa and Malinówka.

**II. I state that provisions of the aforementioned decision of the Regional Director for Environmental Protection in Cracow dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, referring to remaining reservoir not covered by this amendment, remain unchanged.**

**III. I state that it is obligatory to provide an environmental impact assessment for the notified modification of the investment.**

**IV. I state that there are no requirements for limitation of transboundary impact on the environment – it was not necessary to provide that type of proceeding.**

**V. The investment does not belong to assignment in case of which it is necessary to verify the compliance with the local spatial development plan, as stated under Article 80 (2) of the Law of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments.**

**VI. Specificity of the investment scope given in this amendment is determined by appendix no. 1, which forms an integral part of this decision.**

**VII. Upon the request of the Investor's Proxy, I make this decision immediately enforceable.**

## Justification

The State Water Holding Polish Waters Regional Water Management Authority in Cracow, acting through the Proxy, Mrs. Barbara Chammas, representative of AECOM Polska Sp. z o.o., Odra-Vistula Flood Management Project Office (1. Pokoju Alley, Building K1, 31-548 Cracow), filed a motion dated 07/31/2020, ref. no.: POPDOW/KR/60549311/18/0708, to the Regional Director for Environmental Protection in Cracow on modification of the decision on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, for the investment titled:

1. **"Construction of a flood storage reservoir "Bieżanów" on the River Serafa at chainage km 7+284 in the City of Cracow",**
2. **"Construction of a flood storage reservoir "Serafa - 2" on the River Serafa at chainage km 9+223 in the City of Cracow",**
3. **"Construction of a flood storage reservoir "Malinówka - 1" on the Malinówka Stream at chainage km 0+220 in the City of Cracow",**
4. **"Construction of a flood storage reservoir "Malinówka - 2" on the Malinówka Stream at chainage km 2+320 in the City of Cracow",**
5. **"Construction of a flood storage reservoir "Malinówka - 3" on the Malinówka Stream at chainage km 3+017 in the City of Cracow and in the City of Wieliczka";** in the range of tasks listed in items 2 and 5 above.

As a result of amending the decision on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, part of the investment name under the application dated 07/31/2019, ref. no.: POPDOW/KR/60549311/18/0708 shall be as follows:

- ***"Construction of a flood storage reservoir "Serafa - 2" on the River Serafa at chainage km 9+223 in the City of Wieliczka",***
- ***"Construction of a flood storage reservoir "Malinówka - 3" on the Malinówka Stream at chainage km 2+990 in the City of Cracow and in the City of Wieliczka".***

In the course of proceeding the Investor's Proxy updated and corrected the investment data sheet with essential elements in the notes dated 12/23/2019, ref. no.: POPDOW/KR/60549311/19/1363, dated 01/09/2020, ref. no.: POPDOW/KR/60549311/20/0031, and dated 04/01/2020, ref. no.: POPDOW/KR/60549311/20/0727 (elements listed in the call of the Minister of Maritime Management and In-land Navigation).

In the course of the proceeding documents required under Article 74 (1) of the Act of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (consolidated text, OJ 2020, item 283, as amended) were provided, and they form appendices to the application.

The investment assignment in question is qualified to contracts, which may potentially affect the environment significantly, in accordance with **Article 3 (2) item 1**, and due to **Article 2 (1) item 36**, as well as according to **Article 3 (1) item 65** of the regulation of the Council of Ministers of November 9, 2010 on the investments which may significantly affect the environment (OJ 2016, item 71, consolidated text) in the meaning of Article 4 of the Regulation of the Council of Ministers of September 10, 2019 on the investments which may significantly affect the environment (OJ of 2019, item 1839).

In conformity with provisions of Article 155 of the Code of Administrative Procedure and due to Article 75 (1) item 1 letter i) and letter p) of the Act of October 3, 2008 on the access to information

on the environment and its protection, public participation in environment protection and environmental impact assessments, the Regional Director for Environmental Protection is responsible for the issuance of an amended decision on environmental conditions in case of which the Regional Director for Environmental Protection was responsible for the issuance.

According to Article 87 of the Act of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments, in case of amending the decision on environmental conditions, provisions under Chapter V of the Act are applied respectively.

The Regional Director for Environmental Protection informed the parties in the notification dated 09/27/2019, ref. no.: OO.420.4.3.2019.BM, about commencement of the proceeding and about the possibility of acknowledging the case documentation. The notification has efficiently been put on a noticeboard of the RDOŚ in Cracow and on a noticeboard of the City Office of Cracow and the City Office of Wieliczka. The notification informed that on the following proceeding stages, in accordance with Article 49 (1), the parties shall be notified through publication of notes (announcements, notifications) in the Public Information Bulletin of the RDOŚ in Cracow. Furthermore, information on the commencement of proceeding has been published in the Public Information Bulletin, at websites of the Regional Directorate for Environmental Protection in Cracow, and in a publicly accessible data list at the website of the Center of Information on the Environment.

A list of the parties has been adopted according to the boundaries of the implementation area and of the contract impact range. Owners of plots / units located within the investment's impact range, who have property rights to properties adjoining the plots, where the investment shall be implemented, have also been considered as the parties. Based upon provided maps and extracts from the land register it was established that the number of parties exceeds 20. Therefore, in accordance with Article 74 (3) of the Law of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments, Article 49 of the Administrative Procedure Code was applied for the proceeding, stating notifications of the parties through public announcements.

In the note dated 01/31/2020, ref. no.: OO.420.4.3.2019.BM, the Regional Director for Environmental Protection in Cracow notified the parties that it applied for an opinion on an obligation to provide environmental impact assessment for the contract in question and to establish a potential range of a report to the State District Sanitary Inspector in Cracow and to the Minister of Maritime Management and In-land Navigation, as well as about the possibility of reviewing the case documents by the parties.

The State District Sanitary Inspector in Cracow forwarded the application on the issuance of opinion to the State District Sanitary Inspector in Wieliczka, which is the authority responsible for the issue, with a note dated 02/17/2020, ref. no.: NZ-PG-421-25/20 ZL/2020/02/24.

The State District Sanitary Inspector in Wieliczka issued an opinion on 02/21/2020 (reception date: 03/02/2020), ref. no.: PSSE.ZNS-420-II-8/20, in which it stated that the contract in question does not require provision of an environmental impact assessment.

After calling the Investor's Proxy to update the investment data sheet (through the Regional Director for Environmental Protection) and receiving relevant clarifications, the Minister of Maritime Management and In-land Navigation issued an opinion in the note dated 04/23/2020 (reception date: 05/04/2020), ref. no.: DOK.DOK2.9750.1.3.2020.PK PW:122376, in which it stated that the contract in question does not require provision of an environmental impact assessment, and identified that it is necessary to include – within the framework of amended decision on

environmental conditions – conditions and requirements for the stage of investment implementation, as given in its opinion.

The Regional Director for Environmental Protection in Cracow issued a decision on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, for the investment titled:

1. *“Construction of a flood storage reservoir “Bieżanów” on the River Serafa at chainage km 7+284 in the City of Cracow”,*
2. *“Construction of a flood storage reservoir “Serafa - 2” on the River Serafa at chainage km 9+223 in the City of Cracow”,*
3. *“Construction of a flood storage reservoir “Malinówka - 1” on the Malinówka Stream at chainage km 0+220 in the City of Cracow”,*
4. *“Construction of a flood storage reservoir “Malinówka - 2” on the Malinówka Stream at chainage km 2+320 in the City of Cracow”,*
5. *“Construction of a flood storage reservoir “Malinówka - 3” on the Malinówka Stream at chainage km 3+017 in the City of Cracow and in the City of Wieliczka”.*

Originally the scope of application comprises development of five flood storage reservoir at the River Serafa (two reservoirs) and at the Malinówka Stream (three reservoirs), in the City of Cracow and the Town of Wieliczka.

The amendment of the decision on environmental conditions in question comprises a part of the investment referring to the development of two dry flood storage reservoirs: one at the Malinówka Stream at chainage km 2+990, and the other one at the River Serafa at chainage km 9+223.

The range of modifications to the decision on environmental conditions issued by the RDOŚ in Cracow (dated 10/29/2012, ref. no.: OO.4233.13.2012.BM), as requested by the Investor, for the Malinówka 3 and the Serafa 2 reservoirs results from the following:

- a) Changes resulting from necessary provision of details on the location for the Malinówka 3 and the Serafa 2 reservoirs in administrative range,
- b) Modification of chainage for the Malinówka 3 damming reservoir, resulting from regulation works on the Malinówka Stream done during construction of A4 motorway,
- c) Update of capacity and flooding area for the Malinówka 3 and the Serafa 2 reservoirs resulting in the change of the total for the capacity and for the flooding area of all of the reservoirs listed under the aforementioned ED,
- d) Changes in the system discharging rainfall water from the area protected with a side dam of the Serafa 2 reservoir,
- e) Necessary update of technical parameters for the Malinówka 3 and the Serafa 2 dams affecting specificity of the discussed investment,
- f) Necessary extension of the range of applicable technologies for development of anti-seepage shutters, including technical development and current know-how referring to durability of particular solutions,
- g) Obtainment of new and provision of detail for information associated with intake of soil, which shall be applied during the implementation, and site grading for bowls of the reservoirs,
- h) Obtainment of new and provision of detail for information associated with necessary works in water-courses at the Malinówka 3 reservoir and the Serafa 2 reservoir, as results from the necessary accommodation and transfer of water to discharge facilities.

All of those aspects result in a necessity of obtaining amendment to the decision on environmental conditions.

As a result of amending the decision on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, part of the name for two reservoirs comprised in the application dated 07/31/2019, ref. no.: POPDOW/KR/60549311/18/0708, shall be as follows:

- ***“Construction of a flood storage reservoir “Serafa - 2” on the River Serafa at chainage km 9+223 in the City of Wieliczka”,***
- ***“Construction of a flood storage reservoir “Malinówka - 3” on the Malinówka Stream at chainage km 2+990 in the City of Cracow and in the City of Wieliczka”.***

Modification of the name for the planned investment – referring to the Serafa 2 reservoir – results from a mistaken administrative location of the Serafa 2 reservoir in the original application on the issuance of environmental decision. However, modification of the investment name for the Malinówka 3 reservoir results from modification of chainage for dam section of the Malinówka 3 reservoir from 3+017 to 2+990, due to regulation works done at the Malinówka Stream during development of A4 motorway. Location of the dam was not changed, but new chainage – compliant with the current course – was implemented due to the new course of the Malinówka Stream.

The changes requested for the Serafa 2 reservoir and the Malinówka 3 reservoir result from e.g. update of technical parameters for reservoirs after repeated hydrological and hydraulic calculations, and from changed land development within the Serafa 2 reservoir done from the time of issuing the original environmental decision. Furthermore, it was also necessary to include valid regulations, i.e. regulation of the Minister of Environment of April 20, 2007 on technical conditions for hydraulic structures, which require (according to Article 76 (1)) to provide discharge facilities with at least two ducts, with a possibility of deactivating one duct for the purpose of overhaul and inspection, while keeping efficiency of remaining discharge facilities and their location. The solution adopted in the environmental decision is against those provisions, as it expects development of a single-duct discharge facility. It is therefore required to adapt the number of discharge holes to the regulations, and to re-calculate operations of the reservoir at accommodation of flood waves.

The amendment of environmental decision in question covers the area of about 9.7 ha, which is necessary to implement the investment referring to the development of the Malinówka 3 reservoir and the Serafa 2 reservoir. The forecasted reach of the impact for the investments at two of the aforementioned reservoirs – Malinówka 3 and Serafa 2 – covers the area of about 20.9 ha. The scope of requested amendment to the decision of the Regional Director for Environmental Protection in Cracow on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, for the investment in question, implements new plots referring to implementation and impact of the investment:

Malinówka 3 reservoir and Serafa 3 reservoir remain continuation of an investment associated with improvements to flood protection in the Serafa river valley. The reservoirs shall operate within a cascade of 5 dry flood storage reservoirs: two at the River Serafa and three at the Malinówka Stream. The first stage of implementation was development of the “Bieżanów” flood storage reservoir on the River Serafa at chainage km 7+284, which was completed in October 2015. In order to reduce the impact on the Malinówka Stream, the reservoir shall be developed separately. The reservoirs shall be developed from the mouth of the stream to the River Serafa (Malinówka 1 Reservoir), then Malinówka 2 reservoir, and finally Malinówka 3 reservoir. Development of the reservoirs shall not result in breaking the continuity of the water-course.

The aim of the investment, for which the decision on environmental conditions was issued, is direct improvement of flood protection for areas located downstream of the Bieżańów Reservoir, and – along with other planned objects and measures – improvement of flood protection in the Serafa river valley, including protection of Złocień Estate and Stary Bieżańów Estate.

The Serafa 2 reservoir is entirely located in the Town of Wieliczka. The Malinówka 3 reservoir is located in the City of Cracow and in the Town of Wieliczka.

Bowls of the Serafa 2 reservoir and of the Malinówka 3 reservoir are formed by a natural deep valley. A damming element for the reservoir is an earth-fill front dam with a reinforced-concrete discharge-spillway structure. The structure comprises two bottom discharge facilities with rectangular section, assuring unconstrained flow of water in the channel. During flood flows the discharge facilities reduce the flow in the water-course to the level of water kept in the channel. For the purpose of accommodating design water and control water, surface spillway and bottom discharge facilities shall be applied. It is not expected to provide gates at spillway-discharge facilities.

Due to operations of the cascade of reservoirs, the flow of water with probability of Q1% in the River Serafa shall be reduced to the flow of 10 m<sup>3</sup>/s downstream of the Bieżańów reservoir, which corresponds with capacity of a natural channel. The designed reservoirs shall periodically dam the water and store it only during flood levels. In the remaining time the reservoirs shall be left dry, while assuring natural flow of water in the channel only.

The planned investment covered by the amendment to the decision on Environmental conditions particularly comprises the following:

- **Construction of the Serafa 2 dry flood storage reservoir:**

The reservoir is located on the River Serafa, in the Town of Wieliczka, area 2. It shall be formed by a natural deep valley of the River Serafa between Krakowska Street and railway tracks of the Cracow – Wieliczka line, and Za Torem Stream at Bogucice Estate.

The expected works shall comprises the following:

- Development of an earth-fill front dam as a damming structure at chainage km 9+223, with development of a side dam on the right bank of the river, including a draining ditch;
- Sealing of the dam body and of the subbase;
- Development of a reinforced-concrete discharge-spillway facilities with a stilling basin;
- Development of a pedestrian and vehicle footbridge over the spillway-discharge facilities;
- Development of two descent roads to service roads running toward the front dam and the reservoir's bowl, with U-turn yards;
- Development of culverts underneath service roads;
- Shaping of the reservoir's bowl and its grading, with descent roads to the reservoir;
- Extraction of soil from the reservoir's bowl for development of a front dam and a side dam;
- Redevelopment or protection of colliding land utilities in the reservoir's bowl in the range of water-piping, sanitary canalization, storm drainage, LV and MV power lines, and teletechnical line;
- Relocation of the Serafa river-bed over a length of about 100 m at spillway-discharge facilities;

- Redevelopment of a railway ditch on the right bank of the reservoir at the side dam. The redevelopment shall comprise construction of a culvert with diameter of  $\varnothing 1000$  mm at the existing ditch, and desilting of the ditch over a length of about 36 m, with protection of the bottom and slopes of the ditch (to the level of over Q1%) with hollow-core slabs. The culvert shall secure discharge of rainfall water from the railway area and from the newly designed band ditch located along the side dam;
- Redevelopment of terminal sections for the ditches;
- Development of linear drainage in a form of concrete troughs (with a grate) or ditches;
- Development of sheet-piling, with a drainage, supporting the existing railway embankment on the right bank of the reservoir, due to the expected extension of the railway line;
- Development of measurement spots for the water-table at the inlet to and the outlet from the reservoir;
- Development of a container for provision of services to the reservoir;
- Demolition and reconstruction of the existing fences around objects of the reservoir, and development of new ones;
- Development of a temporary channel of the Serafa River with culverts, which would allow for accessing the site facilities on the right abutment of the dam.

The scope of regulation works for the Serafa 2 reservoir covers development of a transfer channel and of a discharge channel for the purpose of proper routing of water and its transfer to the designed spillway-discharge facilities located on a front dam. The designed channel shall mostly overlap the route of the existing channel. Due to development of a spillway-discharge section and assurance of a constant flow of water during the development, a temporary channel was designed on the right bank of the existing Serafa river-bed over a length of about 70 m, and a temporary passage through the river-bed in a form of an embankment reinforced with road slabs and of a culvert.

In order to minimize adverse impact on the condition of water during development of the reservoir, construction vehicles shall move to the other bank of the channel using the temporary passage only. The temporary channel shall protect the water against polluting and stirring, as all of the works shall be performed at development site for the spillway-discharge section separated from the channel with sheet-piling. For the purpose of limiting the transfer of potential pollution, the site facilities have been located in a distance of at least 15 m from the temporary channel, and the site surface has been protected with concrete slabs.

For the purpose of proper use of the reservoir and of the structures, a three-meter-wide technological zone has been set out around objects of the reservoir and its bowl, and traffic of vehicles on the front dam's crest is not anticipated – they shall move within the side dam's crest. The technological zone shall not be paved, and after completion of the works it shall be top-soiled and sown with a mix of grass.

Class III hydraulic structures was adopted due to protection of developed areas.

Basic technical parameters for designed objects are as follows:

- Km of the front dam's section – 9+223,
- Front dam – earth-fill trapezoid body with a width of 4 m at the crest and length of about 40 m, with a side dam with a width of 3 m at the crest and length of about 97 m,
- Length of the discharge-spillway structure with a stilling basin – about 23 m,
- Gradient of slopes – riverside 1:3, landside 1:2.5,



- Capacity of the reservoir – about 43 K m<sup>3</sup>,
- Area of the reservoir – about 2.4 ha,
- Damming level – 3.9 m,
- Damming elevation – 220.00 m a.s.l.,
- Dam crest's elevation – 220.70 m a.s.l.,

In case of that reservoir the following was adopted:

- Design flow  $Q = 30.3 \text{ m}^3/\text{s}$ ,
- Control flow  $Q = 56.8 \text{ m}^3/\text{s}$ ,
- Regulatory flow  $Q_{1\%} = 20.9 \text{ m}^3/\text{s}$ .

Operational cycle for the Serafa 2 reservoir during maximum levels shall be very short. The time of filling at flow  $Q_{1\%}$  is about 2 hours, and the time of depletion for the regulatory flow  $Q_{10\%}$  is over 4 hours.

- **Construction of the Malinówka 3 dry flood storage reservoir:**

The reservoir is located on the Malinówka Stream, in the City of Cracow and the Town of Wieliczka. It shall be formed by a natural valley of the Malinówka Stream between the Malinówka 2 reservoir in the north and Koszutki Street in the South.

The expected works shall comprises the following:

- Development of a front dam at chainage km 2+990, with development of a protection for land-slides on the right bank of the reservoir in the range of an access road to the dam crest and to the U-turn yard;
- Sealing of the dam body and of the subbase;
- Development of a reinforced-concrete discharge-spillway facilities with a stilling basin;
- Development of a pedestrian and vehicle footbridge over the spillway-discharge facilities;
- Development a service road, with U-turn yards and descent roads to the reservoir;
- Shaping of the reservoir's bowl through its grading;
- Extraction of soil from the reservoir's bowl for development of a front dam and service roads;
- Relocation of the Malinówka river-bed over a total length of about 426 m at spillway-discharge facilities and in the reservoir's bowl;
- Redevelopment of ditches in the reservoir's bowl;
- Development of linear drainage in a form of concrete troughs (with a grate) or ditches;
- Demolition of the existing culverts, with development of new ones at the transfer ditch on the right bank of the stream, within the reservoir's backwater range;
- Redevelopment or protection of colliding land utilities;
- Development of measurement spots for the water-table at the inlet to and the outlet from the reservoir;
- Development of a container for provision of services to the reservoir;
- Demolition and reconstruction of the existing fences around objects of the reservoir, and development of new ones;
- Development of retaining walls (sheet-piling) to protect already developed areas;
- Demolition of the existing concrete and steel elements in the reservoir's bowl;
- Development of a temporary channel of the Malinówka Stream with culverts and a road, which would allow for accessing the right bank of the reservoir's bowl.

The scope of regulation works for the Malinówka 3 reservoir covers development of a transfer channel and of a discharge channel for the purpose of proper routing of water and its transfer to the designed spillway-discharge facilities located on a front dam. The works shall be performed over a length of about 155 m. The designed channel shall mostly overlap the route of the existing channel. As a consequence of washing the right bank of the Malinówka Stream away at chainage 3+233 – 3+504 and partially in the section of existing development, it was designed to regulate the channel in the reservoir's bowl over a total length of about 271.0 m. Due to development of a spillway-discharge section and assurance of a constant flow of water during the development, a temporary channel was designed on the left bank of the existing Malinówka Stream over a total length of about 153 m, and a temporary passage through the river-bed in a form of an embankment and of a culvert were planned.

In order to minimize adverse impact on the condition of water during development of the reservoir, construction vehicles shall move to the other bank of the channel using the temporary passage only. The temporary channel shall protect the water against polluting and stirring, as all of the works shall be performed at development site for the spillway-discharge section on the right bank, separated from the channel with sheet-piling. For the purpose of limiting the transfer of potential pollution, the site facilities have been located in a distance of at least 15 m from the temporary channel, and the site surface has been protected with concrete slabs.

For the purpose of proper use of the reservoir and of the structures, a three-meter-wide technological zone has been set out around objects of the reservoir and its bowl. The technological zone shall not be paved, and after completion of the works it shall be top-soiled and sown with a mix of grass.

Class III hydraulic structures was adopted due to protection of developed areas.

Basic technical parameters for designed objects are as follows:

- Km of the front dam's section – 2+990,
- Front dam – earth-fill trapezoid body with a width of 4 m at the crest; length of the front dam of about 116 m, with protection of the land-slide on the right bank of the dam over length of about 97 m,
- Gradient of slopes – riverside 1:3, landside 1:2.5,
- Capacity of the reservoir – about 56 K m<sup>3</sup>,
- Area of the reservoir – about 3.1 ha,
- Damming level – 7.3 m,
- Damming elevation – 236.50 m a.s.l.,
- Dam crest's elevation – 237.70 m a.s.l.,

The following were adopted for the aforementioned reservoir:

- Design flow  $Q = 6.7 \text{ m}^3/\text{s}$ ,
- Control flow  $Q = 17.7 \text{ m}^3/\text{s}$ ,
- Regulatory flow  $Q_{1\%} - 2.8 \text{ m}^3/\text{s}$ .

Operational cycle for the Malinówka 3 reservoir during maximum levels shall be short. The time of filling at flow  $Q_{1\%}$  is about 3 hours, and the time of depletion for the regulatory flow  $Q_{10\%}$  is over 6 hours.

On the stage of environmental impact assessment for the investment in question the Investor made a variant analysis. Two variants were indicated as rational alternative options: variant 1 comprising

regulation of the River Serafa, including increase of a cross-section for the Serafa river-bed in the range of flow with occurrence probability of Q1%; and variant 2 comprising development of flood embankments allowing for accommodation of Q1% water. Based upon the calculations done it was assumed that variant 1 is unfavorable due to environmental reasons and costs of the investment; thus, that option was rejected. The possibility of transferring the assumed volume of water would be assured by a project of channeling the river through development of a reinforced-concrete feeding trough. The analysis done for variant 2 proved the possibility of safe accommodation of flood water, but implementation of that option causes great difficulties due to dense development of houses in a direct neighborhood of the river-bed. Development of new high embankments would require extensive expropriation and demolition of the existing objects, what would be related to numerous protests of inhabitants. Furthermore, the entire road infrastructure, bridges, footbridges, and linear facilities would need to be redeveloped to implement that variant. As a consequence, the option was rejected.

Variant 3 comprising development of dry flood storage reservoir was indicated as an option preferred for implementation. While testing the flood storage potential for the Serafa river basin it was stated that there is a technical possibility of reaching the necessary flood storage capacity on the Malinówka Stream and on the River Serafa, what would allow for reducing flood flows downstream of the Biezanów reservoir. That option may be implemented through development of remaining four dry flood storage reservoirs under the ED in question (reservoirs: Malinówka 1, Malinówka 2, Malinówka 3, and Serafa 2), which would form a supplementation for the Biezanów reservoir developed in 2015. That variant has been selected for implementation as the most favorable one for the environment. Implementation of the investment in that option assumes the smallest intervention in the natural environment.

Two dry reservoirs – Malinówka 3 and Serafa 2 – remaining subjects of the decision are further investments – consecutive to the Biezanów reservoir – to improve flood safety in the Serafa river valley.

According to data given in the environmental impact report, redevelopment of high-pressure gas-piping is planned within the Commune of Wieliczka, at Krakowska Street in Wieliczka. The planned investment shall be implemented in further distances from the investment in question and shall not result in accumulation of impacts with that investment.

Furthermore, in a distance of about 90 m south from the Serafa 2 reservoir “Galeria Wieliczka” [“Wieliczka Shopping Mall”] is currently being developed. However, its construction shall not be done parallel to the construction works for the Serafa 2 reservoir.

The aforementioned works shall be performed in further distances from the investment in question and shall not result in accumulation of impacts with that investment.

The scope of works determined in the original application, which has been included in the decision on environmental conditions dated 10/29/2012, ref. no.: OO.4233.13.2012.BM, as well as the present scope of amendment referring to the construction of the Malinówka 3 reservoir and the Serafa 2 reservoir, shall not be associated with other investment, which would lead to accumulation of impacts.

The designed investment shall not cause excessive impact on the environment.

The planned changes shall not cause significant change in the impacts undergoing assessment and analysis on the stage of issuing the decision on environmental conditions for 5 reservoirs.

For the purpose of the planned contract it is expected to apply standard values for the use of water, materials, fuel, and power. Implementation of the investment shall be related to the need for small

volume of water, which would be applied for social reasons and for concrete works. The estimated need for utilities and for some raw materials during the performance is as follows: water for social reasons – about 50 m<sup>3</sup>/d and for concrete works – about 300 m<sup>3</sup> /d – per one reservoir.

In case of the Malinówka 3 reservoir:

- the estimated volume of concrete is about 2 K m<sup>3</sup>,
- estimated volume of soil is: slope – about 11 K m<sup>3</sup>, and excavation – about 13 K m<sup>3</sup>.

In case of the Serafa 2 reservoir:

- the estimated volume of concrete is about 2 K m<sup>3</sup>,
- estimated volume of soil is: slope – about 3 K m<sup>3</sup>, and excavation – about 12 K m<sup>3</sup>.

The estimated need for electric power on the construction site is about over a dozen kW. Fuel shall be applied in the volume necessary for operations of heavy construction equipment. That use shall be limited by optimizing the operational time for construction machines.

Concrete mix shall be delivered to the construction site from the closest concrete plant certified for development of hydrotechnical concrete. Remaining construction materials and technological equipment shall be delivered to the construction site using the existing public roads. Excavations for the dam body and for the discharge facilities shall be done with hydraulic excavators, while storing the ground from the excavation at the edge of the works (after physical-chemical testing for further embedding) or loading it onto the trucks directly for removal from the investment site. In case of the soil excavated from below the water-table and suitable for embedding, it shall be temporarily stock-piled for the purpose of draining the water prior to further embedding.

Soil for development of the dam shall be taken from the reservoir's bowl and embedded – after draining and verifying if it meets granulation range, content of organic parts and loam fraction. Some soil unsuitable for use may be applied for grading of the reservoir's bowl in order to shape a constant, slight drop of land toward the river.

Local soil obtained from excavations and site grading done for bowls of future reservoirs – Serafa 2 and Malinówka 3 – shall be applied for development of earth-fill objects. Shaping of the area shall be done with a drop towards the water-course in order to allow for the discharge of rainfall water and water left by a flood wave. Geological tests shall prove the application range for the collected soil.

The use of objects in question shall not require application of water and other raw materials, materials, and fuel. All materials extracted during the performance shall be embedded. Exact volume of materials applied may be summarized after developing a Construction Design and a Detailed Design, along with a Bill of Quantities. On this stage it is not possible to inform precise volumes.

The scope of planned amendments shall not cause significant change in impacts assessed and analyzed on the stage of issuing the decision on environmental conditions.

During the use of the Serafa 2 reservoir and the Malinówka 3 reservoir there shall be no emission of pollutions to the air or emission of noise. Functioning of the analyzed assignment is not associated with regular emission of pollutions and emission of noise. The only emission that may occur due to the use of the investment shall be related to temporary service inspections referring to the maintenance of facilities and to necessary repairs.

During the performance done due to implementation of the discussed investment, gas and dust pollutions shall be emitted to the atmosphere. Sources of that emission shall mainly be vehicles and engines of operating machines. During the implementation there also may be unorganized emission of dusts blown away during deliveries of bulk materials. As a consequence, the construction works during implementation of the investment shall have small impact on the quality of air. Impact of emitted dust and gas pollutions shall be temporary and ceaseable.

During the performance – associated with development of both of the small retention reservoirs – there may be minor exceedance of acceptable noise emission values in their vicinity, the source of which would be operations of construction equipment and traffic of vehicles.

Areas with detached houses and residential and service buildings prevail in the neighborhood of the planned investment. There also are recreational and leisure sites, e.g. allotment gardens. In case of the Malinówka 3 flood storage reservoir the planned investment is partially located in the area of detached houses' development. In vicinity of the investment boundaries there is Secesja Estate. The closest buildings of the estate are located in a distance of about 1.8 m from the investment boundaries. The investment in question also borders directly upon areas of detached houses. In case of the assignment comprising development of the Serafa 2 dry flood storage reservoir the investment is located in a distance of about 5 m from the area of detached houses' development.

As a consequence, in order to minimize unfavorable impact on the environment, the works within developed areas shall be done during the day only, and unnecessary devices shall be turned off at so-called stoppage.

Those emissions cannot be eliminated completely, but the investment impact may be minimized on the performance stage through proper work organization, controlling the technical condition of machines and devices applied at the performance on an ongoing basis (so they would provide favorable acoustic features and be fully technically efficient), protecting delivered and stored bulk materials – e.g. with tarpaulins, and – if necessary – sprinkling technological roads and other surfaces with water to minimize dusting.

It shall be emphasized that the currently proceeded amendment to the aforementioned environmental decision is not associated with noticeable change of acoustic climate around the flood reservoirs in question, in case of impacts analyzed in the EIA Report forming a basis for the issuance of the valid environmental decision.

A risk of serious failure is not anticipated in case of the planned contract, as neither technologies nor substances posing risk to the environment shall be applied, in accordance with particular regulations.

Provided that the construction works would be performed in accordance with technical know-how, valid regulations, standards and H&S provisions, the occurrence of construction disaster in case of the discussed contract is unlikely.

The planned investment refers to recommended adaptation measures of Małopolskie Province related to climate changes. Those measures comprise the following, e.g.: flood protection for areas located within flood plains, and implementation of the Flood Protection Program for the Upper Vistula. The planned development of the Serafa 2 reservoir and the Malinówka 3 reservoir shall secure flood protection for Biezanów Estate, Złocień Estate, and for Brzegi. The investment itself remains a recommended adaptation measure; thus, it has a positive impact on adaptation of Małopolska to climate changes.

It shall be simultaneously indicated that escalating climate changes require implementation of mitigation measures. Mitigation of climate changes is understood as e.g.: limiting emission of greenhouse gas, which contribute to those changes (Source: Guidance on integrating climate change and biodiversity into environmental impact assessment, European Union 2013).

On the performance stage, due to combustion of fuel by vehicles and construction machines, exhaust gas shall be emitted, including carbon dioxide accounted to greenhouse gases. Furthermore, there shall be a need for electric power associated with the use of site facilities, operations of machines

and devices, and lighting for the construction site (consumption of electric power shall be associated with emission of greenhouses gases during production in power plants). On the stage of investment use a need for electric power shall be mainly associated with lighting for the dam and with the use of an outbuilding.

The planned dry reservoirs have been designed in accordance with valid hydrotechnical regulations, which refer to extreme events taking place in the environment due to climate changes. On the other hand, development of new dry flood storage reservoirs shall improve flood protection for Cracow and numerous localities placed in its neighborhood, and it shall therefore contribute to limitation of adverse effects of phenomena accompanying changes of climate. The analyzed amendments to the investment shall not generate adverse impacts resulting in escalation of climate changes.

Implementation of the contract shall result in production of waste due to: development of a construction excavation, earthworks associated with objects, use of construction equipment, operations at the utility facilities for the staff, and demolition of objects.

Quantity of waste to be produced cannot be determined unequivocally and in detail on the present stage of proceeding. It is expected that the following types of waste shall be produced in the construction phase: mixed packaging waste (code 17 01 06) in the forecasted amount of about 1 Mg/year; mixed concrete waste, waste ceramic materials and elements of equipment other than listed under 17 01 06 (code 17 01 07) in the forecasted amount of about 0.5 Mg/year; other unlisted waste (code 17 12 09) in the forecasted amount of about 0.5 Mg/year; absorbent, filtration materials, textile for cleaning (e.g. rag, cloths) and protective clothes, other than listed under 15 02 02 (code 15 02 03) in the forecasted amount of about 0.5 Mg/year; wood (code 17 02 01) in the forecasted amount of about 2.0 Mg/year; cables – other than listed under 17 04 10 (code 17 04 11) in the forecasted amount of about 0.5 Mg/year; iron and steel (code 17 04 05) in the forecasted amount of about 0.5 Mg/year; and brick debris (code 17 01 02) in the forecasted amount of about 0.5 Mg/year.

Soil collected in a form of gravel, all-in aggregate, and loam during the performance shall be applied as a material suitable for development of the dam's body. It is not anticipated to provide soil as waste, due to its management on the investment site.

All waste produced during the works shall be segregated and stored selectively in designated places protected against polluting the ground and water environment, and taken over by certified enterprises for recovery or treatment.

The designed objects are practically service-free objects; thus, during their use waste associated with their maintenance shall be produced. It is expected that during the use of objects the following types of waste shall be produced: worn-out devices – other than listed under from 16 02 09 to 16 02 13 (code 16 02 14) in the forecasted amount of about 0.1 Mg/year, and iron and steel (code 17 04 05) in the forecasted amount of about 0.1 Mg/year. All waste produced within the contract area shall be taken over by specialized companies.

Rational waste management – implemented in accordance with valid regulations – during the implementation and during the use shall not affect the environment adversely.

The proceeded amendment to the environmental decision refers to the construction of two dry flood storage reservoirs: Serafa 2 reservoir and Malinówka 3 reservoir. Malinówka 3 reservoir and Serafa 2

reservoir remain a continuation for the investment related to improvement of flood safety in the River Serafa valley. The Serafa 2 flood reservoir is located at the River Serafa at km 9+223, in the Town of Wieliczka. Malinówka 3 reservoir is located at km 2+990 of the Malinówka Stream, in the City of Cracow and in the Town of Wieliczka. Slight increase of the area for the Malinówka 3 reservoir from 3.4 ha to 3.5 ha, i.e. by 1000 m<sup>2</sup>) and development of side dams shall not have a significant meaning for the landscape in the scale of the entire investment.

Areas taken for the planned investment are mostly formed by wasteland grown with grass, shrubs and self-sown trees. Furthermore, on the investment site there are river-beds of two discussed water-courses, i.e. River Serafa and Malinówka Stream, public roads (bituminous ones and dirt ones), amelioration dikes, and areas with residential buildings and outbuildings. Valleys of both of the water-courses have been transformed and adapted to urban conditions and provided infrastructure.

The earthworks planned on the performance stage for the Malinówka 3 reservoir and for the Serafa 2 reservoir, the construction works, and the planned logging of existing trees shall directly affect the landscape present at the reservoirs, as they shall interfere in the existing lay of land and the existing trees.

On the use stage for the reservoirs natural succession shall be permitted, what would allow for merging the reservoirs with the landscape. The succession shall be controlled, so it would assure functionality for both of the reservoirs. Allowing for the natural succession shall affect the landscape positively.

Changes proposed in the aforementioned decision on environmental conditions shall not refer to noticeable changes of impact resulting from implementation of investments in question on the landscape in case of impacts analyzed on the stage of issuing the decision on environmental conditions.

The contract in question shall be implemented based upon the Act of July 8, 2010 on the special preparation rules for flood protection investments, so – considering provisions of the Act on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (Article 80 (2)) – compliance of the contract location with a local spatial development plan does not need to be stated for flood defenses.

The contract sites (to be applied for development of dry flood storage reservoirs at Serafa and at Malinówka) are located beyond water-mud areas. According to the Hydrogeological Map of Poland in a scale of 1:50000 – First water-bearing level (PPW): occurrence and hydrodynamics, sheet 997 – Wieliczka (2006), and to the Hydrogeological Map of Poland in a scale of 1:50000 – Main useable water-bearing level (GUPW), sheet 997 – Wieliczka (1997), the depth of water-table at the first water-bearing level (Miocene level in that case) in the area of the planned reservoirs is from about 2 to 5 m b.g.l. The water-table is unconstrained.

Elevations of the water-table at the first water-bearing level in the area of Serafa 2 reservoir is about 220-225 m a.s.l., at land elevations of 225-230 m a.s.l., whereas in case of the Malinówka reservoir it is about 230-235 m a.s.l. at land elevations of about 235-240 m a.s.l.

The contract is located beyond shore areas and maritime environment. The contract site is located beyond mountainous areas. According to data given in the Study of Conditions and Spatial Management Directions for the City of Cracow (Resolution of the City Council of Cracow dated April 16, 2003, ref. no.: XII/87/03, amended with Resolution of the City Council of Cracow dated March 3,

2010, ref. no.: Nr XCIII/1256/10, and with Resolution of the City Council of Cracow dated July 8, 2014, ref. no.: CXII/1700/14 Rady) and in the Local Spatial Development Plan for the Town and Commune Office of Wieliczka – area B (Resolution of the Town Council of Wieliczka dated April 7, 2016, ref. no.: XVII/232/2016), the areas intended for development of dry flood storage reservoirs are separated as areas of unordered greenery. Land register maps determined plots located in the direct neighbourhood of the rivers as wooded and shrubbed land.

The contract sites covered by amendment to the decision on environmental conditions are beyond the protection areas established based upon the Act of July 20, 2017 Water Law (consolidated text: OJ 2020, item 310, as amended); however, they are located entirely within the boundaries of one of two designed protective areas of the Main Ground Water Reservoir no. 451 Bogucice Sub-reservoir. That area has been designed within the framework of developing hydrogeological documentation for the reservoir (“Hydrogeological documentation determining hydrogeological conditions due to establishment of protective areas at the Main Ground Water Reservoir no. 451 Bogucice Sub-reservoir”, 2011) and it covers its southern part within the entire length of about 18 km.

The Contract is located beyond protective zones for water-intakes.

Implementation and functioning of the planned investment shall not have adverse impact on legal protected areas established based upon the Act of April 16, 2004 on the conservation of nature. The analyzed investment is located beyond the boundaries of European Ecological Network Natura 2000. The closest Natura 2000 site, i.e. Łąki Nowohuckie PLH120069, is located in a distance of about 6.0 km from the contract site. That area is located in the Vistula Valley (former flood terrace). On the south it borders the Vistula oxbow-lake, on the north – center of Nowa Huta, a district of Cracow. Łąki Nowohuckie remain the last well-kept part of Vistula meadows at Nowa Huta.

While analyzing environmental data given in the environmental impact report and hazards for the Natura 2000 Site in reference to the proceeded amendment to the decision on environmental conditions in the range of developing two dry flood storage reservoirs (Serafa 2 and Malinówka 3), it was deemed that the investment shall not affect the subject of protection at Natura 2000 site Łąki Nowohuckie PLH120069 adversely, as it is not anticipated that measures implemented under the investment may significantly affect species and habitats, for protection of which the aforementioned Natura 2000 site was established, as well as cohesion of that site.

In vicinity of the planned investment – understood as a 3 km buffer – there also are some natural monuments, ecological use sites, documentation spots, and nature reserves.

The investment is located south-east from the boundaries of Krzyszkowski Forest ecological use site. The ecological use site covers forests in vicinity of Malinówka Stream. The planned Malinówka 3 reservoir is located downstream of the use site (considering the direction of stream’s water flow). All works that would be performed shall not affect water feeding the stream before the reservoir and the ecological use site. Construction works done properly exclude effects of the planned investment on that form of environmental protection.

On the use stage the investment does not generate any effects for adjacent areas in case of keeping the maintenance status for wet-ground forests and for riparian forests, as well as for habitats of plants and animals present in the area of the aforementioned ecological use site. It is an element of infrastructure, which shall be merged with the existing land use.



The currently proceeded amendment to the decision on environmental conditions does not refer to noticeable change of impact associated with implementation of the investment in question on protected areas in case of impacts analyzed under the EIA Report forming a basis for the issuance of valid decision on environmental conditions dated 10/29/2012, ref. no.: OO.4223.13.2012.BM.

Field tests for vegetation, animals and fungi within the site were done for the discussed contract site in vegetation/hatching/breeding season from 05/14/2018 to 05/17/2018. The results of the inventory were presented in detail in the study titled: *Report on environmental inventory done in the area of dry flood storage reservoir in the Serafa river-basin (Serafa 2 and Malinówka 3)*, which remains an appendix to the environmental impact report. The examination area covered sites, where planned dry flood storage reservoirs – Serafa 2 and Malinówka 3 – are located and a buffer of 100 m from the boundaries of planned reservoirs.

A floristic inventory done in 2011 for the report (*Environmental Impact Report – dry flood storage reservoirs in the Serafa river-basin* (2012)), which remained a basis for the issuance of the decision on environmental conditions, does not differ from the results of inventory done in May 2018 in the area of planned reservoirs. The current environmental conditions related to plants and fungi have not changed in comparison to conditions dated 2011.

#### **– Serafa – 2 reservoir:**

The inventory done proves that two protected plant species are present within the examination site. Both plants are partially protected. Those are: ostrich fern *Matteuccia struthiopteris* and ramsons *Allium ursinum*. Protected species of fungi, including lichens, were not identified within the examination site.

In the area of the designed reservoir occurrence of environmental habitat \*91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Pandion, Alnion incanae, Salicion albae) was identified. Part of the riparian forest – located within the planned investment – shall be damaged in the total area of about 1750 m<sup>2</sup>. The logging shall be done during implementation of the following project elements: reservoir's bowl grading, protection of water-supply piping and canalization network. The entire patch of riparian forest has an area of about 31802 m<sup>2</sup>; thus, its minor part shall be damaged.

Environmental habitat \*91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Pandion, Alnion incanae, Salicion albae) is common in the country. Taking that fact into account and the occurrence of natural habitat in the direct neighbourhood of the investment site, as well as the fact that the patch is located beyond Natura 2000 sites, it shall be deemed that damaging 5% of the habitat patch has an insignificant impact on the environmental habitat \*91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Pandion, Alnion incanae, Salicion albae).

The Serafa river-basin has an area of about 75 km<sup>2</sup>. It flows from Wieliczka and reaches Vistula in Brzegi, at the boundary between the Commune of Wieliczka and the City of Cracow, downstream of the Przewóz Barrage at Vistula. Riparian forests in the area of the Serafa river-basin are common and occur in five locations. It shall be assumed that within the Serafa river-basin there is a minimum of about 237177 m<sup>2</sup> of riparian forests. Implementation of the investment shall result in damaging about 1750 m<sup>2</sup>, what means that due to implementation of the investment maximally about 0.7% of riparian area in the Serafa river-basin shall be damaged, whereas in the closest vicinity of the Serafa 2 reservoir about 5% of the area of 31 802 m<sup>2</sup> shall be damaged.

Single parts of the riparian patch shall be damaged, what would allow for natural succession in that area. Based upon the analysis given above it was stated that the impact referring to damaging of about 1750 m<sup>2</sup> of riparian forest 91E0\* during implementation of the investment shall not affect the entire environmental habitat 91E0\* adversely within the entire river-basin – on a local level, as well as on a regional level. Compensation for habitat 91E0\* is difficult (e.g. due to the lack of proper plantings in nurseries in reference to species purity and natural form), but leaving the area for natural succession may lead to unconditioned reinstatement of the habitat (as parts of the patch are damaged in various locations).

Presence of frogs of the green frog group – pool frog and edible frog – was confirmed in the analyzed area. This is small-scale occurrence. Furthermore, occurrence of common toad (observed adult specimens and larvae forms) and brown frogs' group (adult specimens and larvae forms) was identified. Activity of amphibians concentrates in the area of beaver reservoir in the western part of the planned reservoir and at water-pits in the eastern part of the planned reservoir. Presence of single specimens of other amphibian species is potentially possible within the examined site. Sand lizards were also identified within the site. Presence of other reptiles is possible. The habitat is proper for slowworms, viviparous lizard, and grass snake.

Observations done in 2018 proved that ornitho-fauna in vicinity of the designed Serafa 2 reservoir is diversified. It results from variety of habitats. In vicinity of the planned investment there are forest ecosystems, allotment gardens, and diversified open spaces. Species nesting there use the area of the designed reservoir. However, their nests are probably located beyond the area of planned investment. On site to be transformed due to the investment, nests of mallard and breeding flights of Eurasian woodcock were confirmed.

Furthermore, listening done proved single flights of common noctule and common pipistrelle. Analysis of habitat conditions proved that there are no anthropogenic habitats of bats within the site in question. The area does not provide engineering and bulk objects, which may be applied by bats. There are hollows in trees, which may be daily shelters for bats. Due to the vegetation present on site the area of the planned reservoir may be used as a feeding ground for pipistrelles, Natterer's bat, brown long-eared bat, and noctules. Also the beaver bay placed in the western part of the object may be used by Daubenton's bat.

One family of beavers was identified within the planned investment site. The habitat is located in the western part of the reservoir. In the west the habitat is limited by the dam – made of wood, soil, and waste. A very large reservoir is placed upstream of the dam. In vicinity of the reservoir a system of beaver lairs is located in slopes. Numerous beaver bites occur within the entire area of the reservoir and within its buffer.

Presence of otter is likely within the discussed section. However, its tracks or feeding traces were not identified. The only game on site is roe deer. Based upon direct observations, tracks and other traces it was stated that the investment site and its buffer are irregularly visited by at least 3 specimens. Within the investment site there potentially may occur the following: unprotected voles, rodents, and invasive American mink.

**– Malinówka – 3 reservoir:**

Stands of protected plant species were not identified in the area of the planned reservoir. Environmental habitats were also not identified.

In 2011 within the area of the planned Malinówka 3 reservoir the following reptiles and amphibians were identified: edible frog *Rana esculenta* and slowworm *Anguis fragilis*. Tests done in 2018 proved that within the planned reservoir there are at least 4 breeding sites of amphibians (brown frogs' group and common toad). Those are ephemeral pools and surroundings of beaver dams along Malinówka river. Those pools, just like pools at Malinówka 2, are unstable. Their number and placement vary in particular seasons depending on activity of beavers and changes in hydrological conditions. During the tests adult specimens of green frogs' group (edible frog type) and brown frogs' group (based upon morphological features the marked specimens were determined as common frogs) were observed. Sand lizards were also confirmed within the site. Presence of other reptiles is possible. The habitat is proper for slowworms and viviparous lizard.

Observations done in 2018 proved that the investment site is an open ecosystem, where small groups of shrubs occur. Small groups of common bird species – specific for open spaces and rural development – are present there. Developed areas and afforested sites are present within the common buffer for Malinówka 2 reservoir and Malinówka 3 reservoir.

Night listening done in the area of planned Malinówka 3 reservoir proved activity of bats. Flights and feeding of common noctule and common pipistrelle were notified. All identified specimens flew along the water-course and the trees. Analysis of habitat conditions proved that there are no potential habitats of bats within the site in question. The area does not provide engineering and bulk objects, which may be applied by bats. Trees do not provide hollows, which may be daily shelters for bats. Due to the vegetation present on site the area of the planned reservoir may be used as a feeding ground for pipistrelles and noctules. Potential habitats of bats are present within the buffer, and they shall not be degraded due to implementation of the investment.

The investment area is also a habitat of beaver, activity of which concentrates in vicinity of the existing water-course. However, activity of beaver on site is significantly lower than in case of the neighboring Malinówka 2 reservoir. There is a beaver dam, but it was not confirmed that a family group is present. The site may be used by the family present in the area of Malinówka 2.

Furthermore, feeding of roe deers was identified on the investment site. In contrary to the neighboring Malinówka 2 site, the area is not a habitat of roe deers.

Occurrence of fox and beech marten was identified in the buffer. Those are predators. Within the investment site there potentially may occur the following: unprotected voles, rodents, and invasive American mink.

On the stage of developing the Serafa 2 reservoir and the Malinówka 3 reservoir it is necessary to log trees and shrub. The logging of trees and shrubs shall be done due to performance of the following works: development of front dams and side dams, development of discharge and spillway sections, relocation of beds of water-courses, extraction of soil for development of dams, and management of the reservoir's bowl.

The logging refers to the area comprising developed structures and – in the necessary range – the reservoir's bowl. Current data provided by the Proxy prove that about 630 trees are proposed for logging in the area of Malinówka 3 reservoir, and about 570 trees on the area of Serafa 2 reservoir. The planned logging of trees and shrubs shall be done beyond the hatching period of birds (i.e. beyond the period from March 1 to October 15), in accordance with conditions determined in the decision on environmental conditions. Furthermore, a detailed dendrological inventory shall be done

for greenery to be logged. Trees and shrubs to be logged shall be precisely located and marked. It shall be noted that trees remain an important element of adaptation measures for climate changes and limitation of their effects. As a consequence, within the framework of keeping the environmental values, biological diversity, and maintaining biologically active sites – important in e.g. periods of storms or droughts – an obligation was imposed to apply compensation planting in relation of 1:1. Sizes of trees covered by the planned logging, their species and health shall also be considered, as well as the fact if they are habitats for particular protected species of animals (birds, beetles, etc.) or not, so the planned compensation would be the most adequate for the planned damages to habitats. The older the trees are, the greater the number of ecological niches found in them is and the greater the number of organisms living in them is. Trees so old that hollows are formed in them are of particular environmental value. Numerous species of birds, bats, and mainly insects and other arthropods depend on the hollows, as they use them as breeding sites and shelter. Many species so tightly depend on hollows that they occur only there. On the other hand, hollows are formed and extended due to activities of various life forms - fungi, insects and microorganisms mainly.

The implementation stage for the investment in question is associated with a risk of damaging the root system and bark of trees and shrubs growing in a direct vicinity of the planned works. Trees not to be logged, which grow in the direct vicinity of works zone shall be taken into special consideration, and the works shall be performed in a way avoiding damaging them, especially bark damage and damage to the root system. In that case special covers shall be applied for particular trees.

Due to the necessary logging of trees and shrubs, direct impact on birds – associated with reduction of habitats (potential sites of nesting and/or feeding) may occur on the performance stage. It shall however not be an impact that may pose risk to populations of bird species present in a regional or state scale. The valid decision on environmental conditions allows for partial damaging of bird habitats, but it was ordered to remove the trees beyond the hatching period of birds, what is to protect the birds against the loss of hatches. It was moreover indicated that the necessary logging of trees shall be done under supervision of an ornithologist, after obtaining a respective permit. Another potential impact on birds is noise generated on the performance stage by e.g. intensified traffic of equipment. It may result in scaring of birds nesting and feeding in vicinity of the designed investment. However, in the performance stage that impact shall be temporary and shall not affect the number of populations in case of particular bird species.

Within the entire section during the performance the earthworks may lead to development of temporary (subject to removal due to further construction works) land pits filled with water, which may spontaneously be occupied by species of animals using habitats of that type for breeding – amphibians mainly. As a consequence, for the purpose of minimizing losses among populations of the aforementioned types of animals, the proceeded amendment to the decision indicates that it is necessary to perform the works in a way preventing development of water pits and pools. However, considering the technology and the scope of works, as well as possible weather conditions (e.g. long-term rainfall), it is not always possible to avoid development of pits temporarily filled with water; an obligation of catching and moving all development forms – except for adults – of amphibians identified in pits of that type was additionally imposed.

Sites uncovered due to the earthworks may form areas of penetration for such invasive species of plants of foreign origin as e.g.: Canadian goldenrod (*Solidago canadensis*), tall goldenrod (*Solidago gigantea*), grass-leaved goldenrod (*Solidago graminifolia*), coneflower (*Rudbeckia sp.*), copper tops (*Impatiens glandulifera*), Japanese knotweed (*Reynoutria sp.*), hogbane (*Heracleum mantegazzianum*), Sosnowsky's hogweed (*Heracleum sosnowskyi*), wild cucumber (*Echinocystis*

*lobata*). Species of listed plant species identified during the use of reservoirs shall be immediately removed.

As results from generally available data, within the area, where the investment in question is located, exceedance of air quality standards was noticed (excessive concentration of nitrogen dioxide, suspended particles PM 2.5, suspended particles PM 10, and benzo(a)pyrene in MP 10 (source: WIOŚ Report 2018)). It is associated with large-scale low emission. In case of the City of Cracow an air protection program was developed, which assumed reduction of that emission within its priorities.

The subject contract does not generate pollutions that may result in deterioration of the environmental quality. During the performance the emission of pollutions to the air shall be temporary and cease after the completion, and during the use of the investment the impact shall be minor and shall not result in deterioration of acceptable values.

According to data given in the Study of Conditions and Spatial Management Directions for the City of Cracow, the Serafa 2 reservoir is located within the boundaries of archaeological supervision zone.

In the closest vicinity of the investment site (up to 300 m) there are no fixed heritage or archaeological stands under conservatory protection.

The planned investment shall be implemented in the area of the Vistula river-basin. The task has not been included in the Resolution of the Council of Ministers dated October 18, 2016 on the updated of Water Management Plan for the Vistula river-basin (OJ 2016, item 1911), hereinafter referred to as "uWMP", as one that may form a risk for achieving environmental objectives. The task was however included in the Flood Risk Management Plan for the Vistula river-basin adopted with a Resolution of the Council of Ministers dated October 18, 2016 on accepting the Flood Risk Management Plan for the Vistula river-basin (OJ 2016, item 1841) as a strategic-technical investment, and in the MasterPlan for the Vistula river-basin as investment, which shall not affect achievement of environmental objectives established for body of surface water adversely.

The planned investment shall be implemented within the body of surface water (BSW), i.e. PLRW2000262137749. According to the binding uWMP, PLRW2000262137749 (Serafa) is a heavily modified body of water with bad status, monitored, under risk of not achieving the environmental objectives. Derogation under Article 4 (4) of the Water Framework Directive (2000/60/EC), hereinafter referred to as "WFM", was established for that BSW, due to the lack of technical possibilities, the aim is good ecological potential and good chemical status. The body of water is designated for the intake of water for the purpose of providing the inhabitants with potable water and is not designated for recreational purposes, including bathing. The body of water in question does not remain an area designated for protection of habitats or species discussed under provisions of the Act of April 16, 2004 on the conservation of nature (OJ 2020, item 55, consolidated text), for which the maintenance or the improvement of water status is an important feature of its protection.

The contract is also located within the body of groundwater with a code PLGW2000148. It is BGW having good quantitative status and good chemical status, environmental objectives of which are good quantitative status and good chemical status, and it is not under risk of not achieving the aforementioned environmental objectives. Departures associated with establishments of less rigorous objectives or with extension of the time for achievement of environmental objectives (Articles 4.4 and 4.5 of the WFD) were not established for the indicated body of water. That BGW is established as a body of water for provision of potable water to citizens.

On the stage of proceeding prior to the issuance of a decision dated October 29, 2012 an environmental impact assessment was done, and the impact of 5 dry reservoirs on the environment was analyzed and presented in detail in the environmental impact report. According to the results of

those analyses and provisions given in the decision it was stated that their impact on surface water and on ground water shall not be adverse. It shall be limited to the performance stage and to the area of works.

Within the framework of proceeded amendment to the decision, the impact of the planned development of the Serafa 2 reservoir and the Malinówka 3 reservoir on the possibility of achieving the environmental objectives, including currently available monitoring data for the assessment of water status (data collected under the EMP for BSW and BGW in the years 2015-2017), was analyzed. The investment in question shall not deteriorate the status for bodies of surface water or bodies of ground water. Additionally, on the stage of using the reservoirs there shall be no adverse factors that may have a significant impact on the environment. The reservoirs shall operate as dry reservoirs, so – at regular levels – the flow shall not face damming and shall not hamper migration of ichthyofauna.

According to data presented in the environmental impact report, the measures planned within the framework of the discussed assignment shall not result in permanent deterioration of biological, physical-chemical, and hydro-morphological elements. The works associated with relocation of the Serafa river-bed and of the Malinówka channel in vicinity of spillway-discharge facilities shall not result in deterioration of living conditions for water organisms. Implementation of the investment in question shall not affect morphological continuity, shall not permanently modify the size and dynamics of flows in the River Serafa and in the Malinówka Stream.

Implementation of the investment shall not be associated with intake of water or with discharge of wastewater to the environment. Additionally, the investment areas are located beyond the reach of protective zones for water intakes. As a consequence, the planned investment shall not affect the quantitative status and the qualitative status of the BGW. For the purpose of limiting the transfer of potential pollutions to the ground, the Investor planned preventive measures and minimizing measures during the investment implementation.

The issue of accumulated impact has been analyzed by the Investor in reference to the investment discussed under the decision on environmental conditions dated 10/29/2012. According to information given in the environmental impact report, development of the Malinówka 3 reservoir and the Serafa 2 reservoir shall not result in accumulation of significant adverse impact with other investments to be implemented / completed within the Serafa river-basin.

Considering the above, it shall be stated that impacts resulting from the planned works within the framework of the investment shall be local and temporary, limited to the performance phase mainly, and they shall not pose risk to achievement of environmental objectives discussed under Article 56, Article 57, Article 59, and Article 61 of the Water Law.

The current scope of the investment does not increase the impact in a range that may cause occurrence of transboundary impact on the environment.

The planned contract shall not have a significant impact on the load for the existing technical facilities.

After completion of the construction works the time of impact shall end and potential nuisance caused by traffic of vehicles and machines applied for the construction works shall cease.

Application of such solutions protecting the environment as: use of efficient mechanical equipment, shortening of the performance time to the necessary minimum, selective collection of waste and its removal from the construction site and handing over to entities having relevant certification for recovery or treatment, shall cause that the impact of the contract on the environment would be temporary, ceaseable, of local range; thus, it would limit the possibility of adverse impact of the contract on the environment.

Considering standpoints of authorities providing opinions, as well as screening done by this Authority, taking into account the scope of investment given under the application on modification of the decision, based upon Article 63 (1) of the Law of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments, the authority responsible for amending the decision on environmental conditions has obliged the Investor – through a resolution – to provide an environmental impact assessment and develop a report.

The Regional Director for Environmental Protection in Cracow stated in the resolution dated 05/28/2020, ref. no.: OO.420.4.3.2019.BM, that it is obligatory to provide an environmental impact assessment for the investment in question. The parties were able to file claims against that resolution to the General Director for Environmental Protection through the Regional Director for Environmental Protection in Cracow. The parties were efficiently notified about the issuance of that resolution with an announcement dated 06/01/2020, ref. no.: OO.420.4.3.2019.BM. The announcement in question has been published in the Public Information Bulletin, at websites of the Regional Directorate for Environmental Protection in Cracow, as well as in the publicly accessible data summary at websites of the Center of Information on the Environment.

Mrs. Barbara Chammas, Proxy of the Investor, provided the Directorate with an environmental impact report, including appendices and a CD, with a note dated 06/10/2020, ref. no.: POPDOW/kr/60549311/20/1345, and on 07/02/2020 it was updated with a summary in non-technical language, including a CD.

The Regional Director for Environmental Protection in Cracow applied on 07/06/2020, ref. no.: OO.420.4.3.2019.BM, to the State District Sanitary Inspector in Wieliczka for the issuance of an opinion on implementation conditions for the subject investment. The State District Sanitary Inspector in Wieliczka did not issue the opinion within 30 days (from receiving the documents), which is understood as lack of reservations.

In accordance with Article 33 (1), due to Article 79 (1) of the EIA Act, for the purpose of assuring the possibility of public participation in the proceeding, and based upon Article 74 (3) of the EIA Act, due to Article 49 of the CAP, in order to inform the parties, an announcement of the Regional Director dated 07/03/2020, ref. no.: OO.420.4.3.2019.BM, was placed on a noticeboard and on a website of the RDOŚ in Cracow, on website of the Center of Information on the Environment, as well as on notice boards of the City Office of Cracow and of the Town and Commune Office of Wieliczka, while informing about the commencement of proceeding on the issuance of amendment to the decision on environmental conditions for the contract in question, on the possibility of acknowledging the case documentation (including application on the issuance of decision, decision on necessary assessment and establishment of the report range, environmental impact report), as well as on provision of remarks and motions in the case in question within 30 days. The announcement was published on the noticeboard and in the PIB of RDOŚ in Cracow, and on noticeboards of the City Office of Cracow and Town and Commune Office of Wieliczka for 30 days (from 07/07/2020 to 08/05/2020).

The Regional Directorate for Environmental Protection in Cracow did not receive any remarks and motions in the subject case from the parties, the public, as well as from social and ecological organizations within the legally binding time of 21 days.

In the note dated 07/06/2020, ref. no.: OO.420.4.3.2019.BM, the Regional Director for Environmental Conditions in Cracow notified the parties about applying for opinion to the State District Sanitary Inspector in Wieliczka. As on the earlier stage of proceeding the Minister of Maritime Management and In-land Navigation issued an opinion for the subject investment dated 04/23/2020

(reception date: 04/23/2020), ref. no.: DOK.DOK2.9750.1.3.2020.PK PW:122376, in which it stated that in case of the analyzed investment it is not required to provide an environmental impact assessment, the Regional Director for Environmental Protection in Cracow did not requested for the issuance of opinion to the Minister of Maritime Management and In-land Navigation again, in accordance with Article 77 (1) item 2.

The Regional Directorate for Environmental Protection in Cracow did not receive any remarks and motions in the subject case from the parties, the public, as well as from social and ecological organizations within the legally binding time of 30 days and during the proceeding in progress.

In the note dated 07/08/2020, ref. no.: POPDOW/KR/60549311/20/1431, Mrs. Barbara Chammas – Proxy of the Investor – applied for departing from application of Article 10 (1) of the Act of June 14, 1960 Code of Administrative Procedure (consolidated text, OJ of 2020, item 256, as amended – hereinafter referred to as “CAP”). Her request was justified through indicating that *“(…) completing the case is urgent due to hazard to the life and health of people or due to irreparable material damage”*. She furthermore emphasized that considering specificity of the investment and the aim, which shall be achieved, i.e. securing flood safety and resulting guarantee of protecting the life and health of people and properties, it shall be deemed that it is implemented in the public interest. It therefore has a significant meaning, and – considering identified necessity of its implementation and a risk of flood occurrence – its implementation is urgent.”

Her request was additionally justified by the fact that *“(…) the investment shall be applied using funds of the World Bank (WB). Delays in implementation of the investment may make conditions of the agreement concluded between the Polish Government and the WB unstable, and make it necessary to return the funds, what may lead to suspension of implementation. That may in turn cause adverse economic effects in reference to that particular project, and that may make the WB’s policy toward the Republic of Poland and other projects implemented at support of the WB unstable”*.

On that stage of proceeding, after completing the public participation, the RDOŚ in Cracow received a motion of Towarzystwo na Rzecz Obrony Przyrody [Association for Protection of Nature] (note dated 08/13/2020, ref. no.: L.dz.253/TnROP/2020) for accepting the organization as a party in the mode under Article 44 (1) of the EIA Act, and the Regional Director for Environmental Protection in Cracow deemed that in that case it is justified to keep the deadline given in Article 10 of the CAP to allow all of the parties (including Towarzystwo na Rzecz Obrony Przyrody) for acknowledging the collected evidence. As a consequence, it did not support the Investor’s motion and notified parties of the proceeding about completing evidence hearing in accordance with Article 10 of the CAP.

Notification dated 08/17/2020, ref. no.: OO.420.4.3.2019.BM, on the completion of evidence hearing for the amendment to the decision on environmental conditions, and on the possibility of reviewing and commenting the evidence and materials and requests notified in that case, has been published efficiently on a notice board of the RDOŚ in Cracow and in the Public Information Bulletin at website of the Regional Directorate for Environmental Protection in Cracow.

None of the parties commented the case or filed remarks.

Upon request of the Investor acting through a proxy, Mrs. Barbara Chammas, dated 04/08/2010, ref. no.: POPDOW/KR/60549311/20/0822, the decision was made immediately enforceable in accordance with Article 108 (1) of the CAP.

In conformity with Article 108 (1) of the CAP, a decision that may be appealed against may be provided with immediate enforceability, if it is necessary due to the protection of human health or life, or for protection of the state against heavy losses, or due to other social interest or significant interest of a party.



While justifying its request the Investor indicated significant social interest, i.e. protection of human health and life within flood risk sites, and important state interest, i.e. protection of the state against heavy losses. The planned dry reservoirs Malinówka 3 and Serafa 2 – covered by the investment in question – shall operate within a cascade of 5 dry small retention reservoirs in the Serafa river-basin: two at the River Serafa (the existing Biezanów reservoir and the planned Serafa 2 reservoir) and three at the Malinówka Stream (planned reservoirs: Malinówka 1, Malinówka 2, and Malinówka 3). Development of those reservoirs results from the necessary increase of flood protection in the River Serafa valley (including areas of Złocień Estate and Stary Biezanów Estate in Cracow) and from limitation of flood damage within those areas. Reservoirs Malinówka 3 and Serafa 2 are included on a list of strategic measures, according to the Resolution of the Council of Ministers dated 10/18/2016 on adopting the Flood Risk Management Plan for the Vistula River-Basin titled “Improvements to flood protection in the River Serafa valley, City of Cracow, Town of Wieliczka: Stage II Serafa 2 Reservoir with a dam at km 9+223, Stage III Malinówka 1 Reservoir with a dam at km 0+220, Stage IV Malinówka 2 Reservoir with a dam at km 2+320, Stage V Malinówka 3 Reservoir with a dam at km 3+017”.

Those reservoirs are necessary to protect the life and health of people in areas under flood risk. The reservoirs shall protect state assets (e.g. bridges and roads, including A4 motorway) against serious damage.

As well as the significant interest of the party, as development of the Malinówka 3 reservoir and the Serafa 2 reservoir shall be implemented under the OVFMP co-funded by the International Bank for Reconstruction and Development (World Bank), Council of Europe Development Bank, European Union’s Cohesion Fund, and the State Budget. In case of delaying the administrative procedures, the Investor, i.e. State Water Holding Polish Waters Regional Water Management Authority in Cracow, may lose funding for the subject investment.

Considering the arguments given above, the Investor’s request to make this decision immediately enforceable was accepted, as the arguments provided correspond with rationale under Article 108 (1) of the CAP.

The collected evidence (application, investment data sheet – developed along with an update, environmental impact report for the investment – developed along with a summary) prove that at meeting the conditions given in the aforementioned document and in this decision amending the environmental decision, the planned investment shall not cause excessive nuisance to the environment.

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.

One may relinquish the right to appeal to the public administration unit, which issued the decision, in case of this decision. On the day the public administration unit received statements relinquishing the right to appeal by the last of the proceeding parties, the decision becomes final and binding.

**Recipients:**

1. Mrs. Barbara Chammas – Investor's Proxy,
2. Remaining parties of the proceeding notified in the mode under Article 49 APC,
3. OO.BM file.

**CC:**

1. State District Sanitary Inspector in Wieliczka (ePUAP),
2. Ministry of Maritime Affairs and Inland Navigation in Warsaw (ePUAP).

Due to enactment of the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 *on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC* (hereinafter referred to as GDPR) on 25 May 2018, we hereby inform that:

- 1) The Regional Director for Environmental Protection with its office in Cracow, 25. Mogilska Street, 31-542 Cracow, administers your personal data.
- 2) Your personal data shall be processed by the Regional Directorate for Environmental Protection for the purpose of administrative / court-administrative proceedings, in accordance with Article 6 (1) letter c) of the GDPR.  
Provision of your personal data is voluntary, but necessary for fulfilling the legal obligation of addressing the case.
- 3) Your data may be provided by the Regional Director for Environmental Protection in Cracow to units authorized to obtain information based upon commonly valid provisions of the law.
- 4) Personal data provided by you shall be stored by the time required by provisions of the law.
- 5) You have a right to access your personal data and a right to adjust them, limit their processing, and a right to transfer the data.
- 6) Due to processing of your personal data you have a right to file a claim to the President of the Personal Data Protection Office.
- 7) Contact data to the Data Protection Inspector: e-mail address: [iod.krakow@rdos.gov.pl](mailto:iod.krakow@rdos.gov.pl), postal address: 25. Mogilska Street, 31-542 Cracow.
- 8) A legal basis for processing of your personal data are provisions of the Act of October 3, 2008 on the access to information on the environment and its protection, public participation in environment protection and environmental impact assessments, and the Act on Code of Administrative Procedure.

## **NEW SPECIFICITY OF THE INVESTMENT**

The planned contract comprises construction of a group of five flood storage reservoirs at the River Serafa (two reservoirs) and at the Malinówka Stream (three reservoirs), within the City of Cracow and the Town of Wieliczka – with a total flood storage capacity of 392 000 m<sup>3</sup>.

### **Basic technical parameters of particular reservoirs:**

- **Bieżanów Reservoir at chainage km 7+284 (dam section)** – located within the City of Cracow at Drożdżowa, Bogucicka, Ślusarczyka Streets and at the Cracow-Wieliczka railway line.

### **Technical parameters of the reservoir:**

- Dam section chainage: 7+284,
- Area of the reservoir  $F = 7$  ha,
- Capacity of the reservoir  $V = 130\,000$  m<sup>3</sup>,
- Standard and maximum damming elevation: 210.00 m a.s.l.,
- Dam crest elevation: 210.70 m a.s.l.,
- Bottom elevation at the dam: 205.50 m a.s.l.,
- Outflow water-table elevation: 207.39 m a.s.l.,
- Damming height  $H = 4.5$  m.

The following was adopted for the aforementioned reservoir:

- Design flow  $Q = 35.17$  m<sup>3</sup>/s,
- Control flow  $Q = 41.19$  m<sup>3</sup>/s,
- Regulatory flow  $Q_{1\%} = 13.95$  m<sup>3</sup>/s.

Regulatory water shall be transferred via a rectangular bottom discharge facilities with an opening of 2.0 m x 1.20 m, with an inspection chamber base unit for low water, length of about 11.0 m and drop of 0.005; whereas design water and control water shall be discharged using a spillway with an opening of 12 m at the crest and filling depth of 1.5 m. An inflatable-hydraulic gate is planned at the spillway. Due to the type of subbase the discharge-spillway structure shall be placed on bored concrete piles.

The front dam with a length of 340 m and a width of 3.0 m at the crest, riverside slope inclination of 1:3 and landside one of 1:2. The dam body and the subbase shall be sealed.

Side dam in a form of a reinforced-concrete boulevard over a length of 310.0 m on the left bank and 85 m on the right bank. Class III hydraulic structure was adopted due to protection of developed and inhabited sites.

Within the framework of the contract it shall be necessary to relocate the Serafa Stream over a length of about 135 m, remove the existing deep-well and construct a new one S12 beyond the reach of reservoir's water, relocate a piping and an overhead telecommunication line.

Rainfall water from the areas located on the landside of the boulevard (left side dam) shall be channeled in concrete throughs placed along the boulevard, and discharged to the Serafa Stream downstream of the dam.

- **Serafa 2 Reservoir at chainage km 9+223 (dam section)** – located within north boundaries of the Town of Wieliczka. It covers a part of a deep valley of the Serafa River at the Bogucice Estate between Krakowska Street and railway tracks of the Cracow-Wieliczka railway line.

#### **Technical parameters of the reservoir:**

- Dam section chainage: 9+223,
- Area of the reservoir  $F = 2.40$  ha,
- Capacity of the reservoir  $V = 43\,000$  m<sup>3</sup>,
- Standard and maximum damming elevation: 220.00 m a.s.l.,
- Dam crest elevation: 220.70 m a.s.l.,
- Bottom elevation at the dam: 216.20 m a.s.l.,
- Outflow water-table elevation: 218.44 (h = 2.44 m),
- Damming height  $H = 4.2$  m.

The following was adopted for the aforementioned reservoir:

- Design flow  $Q = 30.3$  m<sup>3</sup>/s,
- Control flow  $Q = 56.8$  m<sup>3</sup>/s,
- Regulatory flow  $Q_{1\%} = 20.9$  m<sup>3</sup>/s.

Regulatory water shall be transferred via a rectangular bottom discharge facilities with an opening of 1.0 m x 1.0 m, length of about 3.0 m and drop of 0.005; whereas design water and control water shall be discharged using a spillway with two spans and an opening of about 2 x 5.0 m at the crest and filling depth of 1.5 m. An inflatable-hydraulic gate is planned at the spillway with a height of 1.0 m, controlled automatically depending on the level of water in the reservoir.

Class III hydraulic structure was adopted due to protection of developed and inhabited sites.

For the purpose of reducing the hydraulic jump it is planned to develop a stilling basin with the following dimensions: length of about 10 m, width of about 10.5 m, depth of about 1.0 m.

The front dam with a length of 40 m and a width of 4.0 m at the crest, riverside slope inclination of 1:3 and landside one of 1:2.5. The dam body and the subbase shall be sealed.

On the right abutment of the dam it is designed to develop a side dam with a width of 3.0 m at the crest and length of about 97 m, riverside slope inclination of 1:3 and landside one of 1:2. A band ditch shall be excavated along the side dam, and further on – a service road with a U-turn yard. On the crest of the front dam and of the side dam traffic of pedestrians and vehicles is planned. The front dam's crest shall be paved with breakstone, and the side dam's crest shall be left unpaved – it will be top-soiled and sown with a mix of grass.

For the purpose of protecting railway areas in vicinity of the reservoir a sheet-piling with a drainage was designed. Within the reservoir's bowl site grading shall be done to obtain proper capacity of the reservoir. The investment requires relocation of the Serafa river-bed over a length of about 100 m at chainage from km 9+162 to 9+262, removal of collisions with networks in the reservoir's bowl or their protection in case of water-piping, sanitary canalization, storm drainage, LV and MV power lines, and teletechnical line. The land utilities to be redeveloped within the Serafa 2 reservoir are not included in a catalogue of assignments that may significantly affect the environment, as it is only planned to redevelop 15 kV MV power line, protect DN 100 PE and wD300 water-piping, and protect ks63 sanitary canalization and DN 90PE pressure piping.

At the inlet to and at the outlet from the reservoir measurement points for the elevation of water-table are located. In order to assure the access to the reservoir, development of service roads with culverts is expected, as well as development of a footbridge for pedestrians and vehicles – width of 4.0 m – over the spillway-discharge facilities, and development of U-turn yards. Access to the crest of the front dam and of the side dam and to the reservoir's bowl shall be possible through service road no. 1 with a width of 3.0 m and length of about 67.0 m, and through service road no. 2 with a length of about 79.0 m and subsequently through a road on the dam's crest with a width of 4.0 m and length of about 40 m.

At passage of the road on the dam crest over the spillway-discharge facilities a footbridge for pedestrians and vehicles was designed – width of 4.0 m and length of about 11.5 m. Two U-turn yards were also designed – dimensions of about 20x20 m and about 7x12.0 m, respectively. Surface of roads and yards shall be made of breakstone and asphalt concrete. Service roads and U-turn yards shall be applied during the use of the reservoir and shall be left on site.

Within the framework of the investment demolition of the existing fences and development of new ones around objects of the reservoir is expected.

For the proper use of the reservoir and structures a three-meter-wide technological zone shall be set out around objects of the reservoir and its bowl. The technological zone shall not be paved, and after completion of the works it shall be top-soiled and sown with a mix of grass.

- **Malinówka 1 Reservoir at chainage km 0+220 (dam section)** – located at A-4 motorway and Mała Góra, Szastera, Nad Serafą Streets. On the west it reaches Wielicka Street, and on the east – to developed areas west of the railway line crossed by Serafa and its tributary stream – Malinówka.

#### **Technical parameters of the reservoir:**

- Dam section chainage: 0+220,
- Area of the reservoir  $F = 6.5$  ha,
- Capacity of the reservoir  $V = 115\,000\text{ m}^3$ ,
- Standard and maximum damming elevation: 216.50 m a.s.l.,
- Dam crest elevation: 217.20 m a.s.l.,
- Bottom elevation at the dam: 211.65 m a.s.l.,
- Outflow water-table elevation: 213.15 (h = 1.50 m),
- Damming height  $H = 4.85$  m.

The front dam with a length of 100 m and a width of 4.0 m at the crest, riverside slope inclination of 1:3 and landside one of 1:2.5. The dam body sealed with a geo-membrane and the subbase with a vertical hydro-insulating membrane.

The side dam with a length of 850 m, a width of 3.0 m at the crest, riverside slope inclination of 1:3 and landside one of 1:2.5.

Class III hydraulic structure was adopted due to protection of developed and inhabited sites.

Within the framework of the contract it shall be necessary to relocate the Malinówka Stream over a length of about 140 m, develop a drainage ditch in the area beyond the embankment over a length of about 900 m, relocate a collector of sanitary canalization, redevelop outlets for the motorway drainage, and cable HV power lines.

- **Malinówka 2 Reservoir at chainage km 2+320 (dam section)** – located at the boundary between the City of Cracow and the Town of Wieliczka. It covers a part of the Malinówka Stream's valley the on western side of the Krzyszkowicki Forest, just upstream of the A-4 motorway.

**Technical parameters of the reservoir:**

- Dam section chainage: 2+320,
- Area of the reservoir  $F = 2.5$  ha,
- Capacity of the reservoir  $V = 55\,000$  m<sup>3</sup>,
- Standard and maximum damming elevation: 229.50 m a.s.l.,
- Dam crest elevation: 230.20 m a.s.l.,
- Bottom elevation at the dam: 224.60 m a.s.l.,
- Outflow water-table elevation: 226.08 (h = 1.48 m),
- Damming height  $H = 4.90$  m.

The front dam with a length of 130 m and a width of 4.0 m at the crest, riverside slope inclination of 1:3 and landside one of 1:2.5. The dam body shall be sealed with a geo-membrane and the dam subbase with a vertical hydro-insulating membrane.

For the purpose of reducing the hydraulic jump it is planned to develop a stilling basin with a length of 16 m, a width of about 9.0 m, and a depth of about 1.0 m.

Class III hydraulic structure was adopted due to protection of developed and inhabited sites.

Within the framework of the contract it shall be necessary to relocate the Malinówka Stream over a length of about 230 m, relocate a collector of sanitary canalization with a diameter of 400 mm, redevelop outlets at discharge facilities from the Raba I piping and the Raba II piping (assembly of a non-return valve), and cable LV power lines.

- **Malinówka 3 Reservoir at chainage km 3+017 (dam section)** – located at the boundary between the City of Cracow and the City of Wieliczka. It covers a part of the Malinówka Stream's valley on south-western side of the Krzyszkowicki Forest, just upstream of the Malinówka 2 Reservoir.

**Technical parameters of the reservoir:**

- Dam section chainage: 2+990,
- Area of the reservoir  $F = 3.1$  ha,
- Capacity of the reservoir  $V = 56\,000\text{ m}^3$ ,
- Standard and maximum damming elevation: 236.50 m a.s.l.,
- Dam crest elevation: 237.70 m a.s.l.,
- Bottom elevation at the dam: 229.20 m a.s.l.,
- Outflow water-table elevation: 229.52 (h = 0.78 m),
- Damming height  $H = 7.30$  m.

In case of the aforementioned reservoir the following was adopted:

- Design flow  $Q = 6.7\text{ m}^3/\text{s}$ ,
- Control flow  $Q = 17.7\text{ m}^3/\text{s}$ ,
- Regulatory flow  $Q_{1\%} = 2.8\text{ m}^3/\text{s}$ .

The front dam with a length of 116 m and a width of 4.0 m at the crest, riverside slope inclination of 1:3 and landside one of 1:2.5, including protection for the land-slide over a length of about 50 m on the right bank of the dam. The dam body and the subbase shall be sealed. Band ditches are designed along the front dam.

Class III hydraulic structure was adopted due to protection of developed and inhabited sites.

Regulatory water shall be transferred via two bottom discharge facilities with opening of 0.5 x 0.5 m, length of 4.0 m, and drop of 0.005; whereas design water and control water shall be discharged using a spillway with an opening of about 5.0 m at the crest and a filling depth of 1.0 m. Gates are not planned for the spillway-discharge facilities.

For the purpose of reducing the hydraulic jump it is planned to develop a stilling basin with a length of not more 16 m, a width of about 5.0 m, and a depth of not more than 1.6 m.

Within the framework of developing the reservoir it shall be necessary to relocate the Malinówka Stream over a length of about 155 m at chainage from km 2+901 to 3+056, in the area of the spillway-discharge facilities, and over a length of about 271 m at chainage from km 3+233-3+504 – total length of about 426 m, to protect posts of MV and LV power lines, or to redevelop the lines and assemble non-return valves at discharge facilities from Raba I piping and from Raba II piping, and to develop storm drainage discharging water from the parking lot and from the estate.

The land utilities to be redeveloped within the Malinówka 3 reservoir are not included in a catalogue of assignments that may significantly affect the environment, as it is only planned to redevelop 15 kV MV power line and 0.4 kV LV power line, and remove a section of kD300 storm drainage.

Redevelopment of ditches draining the area in the reservoir's bowl comprising modification of ditches' bottom drop and their reinforcement to avoid damage to the designed channels of water-

courses during accommodation of a flood wave in the reservoir. Reinforcement of water-courses shall be done after completing the works associated with grading of the reservoir's bowl. It was additionally designed to reinforce the ditch located on the tailwater side of the dam on the left bank of Malinówka, which discharges water from the band ditch.

Demolition of the existing culverts and development of a new one at the transfer ditch to the Malinówka Stream within the reservoir's bowl.

At the inlet to and at the outlet from the reservoir measurement points for the elevation of water-table are located. Access to the reservoir shall be assured by service roads with U-turn yards, by a footbridge for pedestrians and vehicles over the spillway-discharge facilities, and by descent roads to the reservoir's bowl. Access to the crest of the front dam and to the reservoir's bowl shall be possible through service road no. 1 with a width of 3.0 m and length of about 36.0 m, and through a descent road no. 2 with a length of about 5.9 m, on the left bank of the dam.

In order to assure the access to the right bank of the reservoir, a footbridge for pedestrians and vehicles was designed over the spillway-discharge facilities – width of about 4.0 m and length of about 5.0 m. Two U-turn yards were also designed – dimensions of about 15x15m and about 13x14 m, respectively. Surface of service road no. 1 with U-turn yards and a descend road to the dam crest shall be reinforced with breakstone. The service road and U-turn yards shall be applied during the use of the reservoir and shall be left on site.

Site grading shall be done within the reservoir's bowl to obtain the proper capacity of the reservoir and relevant drops allowing for the discharge of water to the river-bed.

For the purpose of protecting the areas adjacent to the Malinówka 3 reservoir against flood water it is planned to raise the area at the right abutment of the dam and at the Secesja Estate, as well as to construct retaining walls / sheet-piling along the parking lot at the Secesja Estate in Wieliczka on the right bank and on the left bank of the Malinówka Stream, within the reach of reservoir's backwater, along the existing detached houses. It is additionally planned to demolish and reconstruct fences at objects of the reservoir and to develop new ones, as well as to demolish the existing concrete and steel elements within the reservoir's bowl.

For the proper use of the reservoir a three-meter-wide technological zone shall be set out around its objects. The technological zone shall not be paved, and after completion of the works it shall be top-soiled and sown with a mix of grass.

In case of the Malinówka 1 reservoir and the Malinówka 2 reservoir at the Malinówka Stream the following was adopted:

- Design flow  $Q = 13.83 \text{ m}^3/\text{s}$ ,
- Control flow  $Q = 16.31 \text{ m}^3/\text{s}$ ,
- Regulatory flow  $Q = 4.0 \text{ m}^3/\text{s}$ .

Regulatory water shall be transferred via a bottom discharge pipe with a diameter of 1.0 m, length of 4.5 m and drop of 0.005; whereas design water and control water shall be discharged using a spillway with an opening of 6 m at the crest and a filling depth of 1.0 m.



For the purpose of reducing the hydraulic jump it is planned to develop a stilling basin with a length of 16 m, a width of about 9.0 m, and a depth of about 1.0 m.

A cycle of reservoir operations at maximum levels shall be very short. The time of filling at  $Q_{1\%}$  flows is about 4-6 hours, and the time of depletion for the regulatory flow  $Q_{10\%}$  is about 12 hours.

It is expected to clean the reservoir's bowl, i.e. to remove sediments collected after accommodation of every flood wave and depletion of the reservoir.

Temporary acquisition of land for site facilities and technological roads shall be done during implementation of the investment. After completing the investment the site facilities and the technological roads shall be removed, and the acquired land shall be restored to its original condition and use method. The site facilities for the Malinówka 3 reservoir shall be located at the left abutment of the front dam, just at Antoniego Hoborskiego Street in Cracow.

Access to the right bank of the Malinówka Stream during the performance shall be available through a temporary road – in a form of an embankment reinforced with road slabs – crossing the Malinówka river-bed within the designed reservoir's bowl. In order to assure the flow underneath the temporary passage, temporary culverts were designed in the Malinówka channel.

The site facilities for the Serafa 2 reservoir shall be located in vicinity of the right abutment of the front dam. Access to the site facilities shall be available through a temporary road and through a temporary access road – in a form of an embankment reinforced with road slabs – crossing the Serafa river-bed at chainage km 9+196 (downstream of the designed dam). Temporary culverts in the Serafa river-bed were designed to assure the flow underneath the temporary passage.