State Water Holding Polish Waters

Regional Water Management Authority in Szczecin

ENVIRONMENTAL MANAGEMENT PLAN

ODRA-VISTULA FLOOD MANAGEMENT PROJECT – 8524 PL

Environmental category B – in accordance with the World Bank OP 4.01

Component 1:

Flood protection of the Lower and Middle Odra

Subcomponent 1B:

Flood Protection on the Middle and Lower Odra

Contract 1B.2/3:

Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking – Part 3

WORKING VERSION - DOCUMENT MAY BE CHANGED AFTER THE CONSULTATION PROCESS

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ODRA-VISTULA FLOOD MANAGEMENT PROJECT

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ENVIRONMENTAL MANAGEMENT PLAN

Component: ***1 – Flood protection of the Lower and Middle Odra***

Subcomponent: ***1B – Flood Protection on the Middle and Lower Odra***

Contract: ***Task 1B.2/3 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking – Part 3***

Project Implementation Unit:
State Water Holding Polish Waters
Regional Water Management Authority in Szczecin

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Szczecin, August 2020

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List of basic definitions and abbreviations used in the EMP

Name	Description
IBRD / WB	International Bank for Reconstruction and Development / World Bank
PCU / OVFM PCU	Project Coordination Unit / OVFM Project Coordination Unit
BP	Bank Procedure[1]
Environmental Permit/ EP	Environmental Permit
Species Permit	A decision to permit certain activities banned for protected plant, animal or fungal species
Epidemics	The occurrence of infections or infectious disease cases in a given area in a number clearly higher than previously, or the occurrence of infections or infectious diseases that have not occurred before.
ESMF	Environmental and Social Management Framework for OVFMP[2]
GDOŚ	General Directorate for Environmental Direct Protection
Investor / Employer/ PIU	State Water Holding Polish Waters in Warsaw represented by the Director of the Regional Water Management Authority in Szczecin / Odra-Vistula Flood Management Project Implementation Unit
JCWP	Body of surface water
JCWPd	Body of groundwater
JRP	Odra-Vistula Flood Management Project Implementation Unit
Concept / BAW concept	"Concept of regulation of the border Odra watercourse" / Update of the concept of regulation of the border Odra watercourse. Ruling, May 2014. 3.02.10132.3. BAW, Karlsruhe, 30.05.2014 – design study referred to in Article 3 of the Polish-German Agreement, prepared by the Federal Institute of Water Construction in Karlsruhe (BAW).
Consultant / Engineer / Contract Engineer	Company or legal entity providing technical support consultant for the State Water Holding Polish Waters Regional Water Management Authority in Szczecin as part of the OVFM Project

[1]The World Bank's Operational Policies and Procedures are set out in The World Bank Operational Manual, available at *https://policies.worldbank.org/sites/PPF3/Pages/Manuals/Operational%20Manual.aspx*.

[2] Document available on the OVFM PCU website, at: *http://odrapcu2019.odrapcu.pl/popdow_dokumenty/* and on the World Bank website, at: *http://documents.worldbank.org/curated/en/717671468333613779/Poland-Odra-Vistula-Flood-Management-Project-environmental-and-social-management-framework*.

Name	Description
Contract/ Task	Contract/ Task 1B.2/3 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking – Part 3
EIA	Environmental Impact Assessment
OP	Operational Policy[1]
TOR	Terms of Reference
PAD	Project Appraisal Document[2] for OVFMP
OSH Plan	Occupational Safety and Health Plan.
PMŚ	State Environmental Monitoring
IE OP	Infrastructure and Environment Operational Program
POM	Project Operations Manual[3] for OVFMP
LA&RAP	Land Acquisition and Resettlement Action Plan
Project / OVFMP / OVFM Project	Odra-Vistula Flood Management Project
EMP	Environmental Management Plan
RDOŚ	Regional Directorate for Environmental Protection / Regional Director for Environmental Protection
ORBMP	Odra River Basin Management Plan
PGW WP	State Water Holding Polish Waters
Natural habitats	The term "natural habitats" used in the text refers to the definitions of natural habitats and their types contained in Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.07.1992, as amended). (Polish nomenclature of natural habitats is defined by the Regulation of the Minister of Environment of 13 April 2010 on natural habitats and species of Community interest, as well as the criteria for the selection of areas eligible for recognition or designation as Natura 2000 sites (consolidated text Journal of Laws of 2014, item 1713), this Regulation specifies, among others, the types of natural habitats of Community interest that require protection by designating Natura 2000 sites, indicating the priority types of natural habitat)
SNW	Multi-annual average low water level

[1] See footnote for BP (World Bank Procedure).

[2] Document available on the World Bank's website at *http://documents.worldbank.org/curated/en/320251467986305800/Poland-Odra-Vistula-Flood-Management-Project*

[3] Document available on the OVFM PIU website, at: *http://odrapcu2019.odrapcu.pl/popdow_dokumenty/*

Name	Description
Epidemics	A legal situation introduced in an area in connection with an outbreak of an epidemic in order to take measures laid down in the Act of 5 December 2008 *on preventing and combating infections and infectious diseases in humans* (consolidated text: Journal of Laws of 2019, item 1239, as amended), i.e. anti-epidemic and preventive measures to minimise the effects of the epidemic.
The state of epidemic risk	A legal situation introduced in an area in connection with the threat of an outbreak of an epidemic in order to take preventive measures laid down in the Act of 5 December 2008 *on preventing and combating infections and infectious diseases in humans* (Journal of Laws 2019, item 1239, as amended).
SWP2010	the so-called average design water, i.e. the elevation defined in the BAW Concept
EU	European Union
Polish-German Agreement	Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany on joint efforts to improve the situation on waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015.
Contractor / Task Contractor / Partial Contractor	The company or legal person executing Contract 1B.2/3 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking – Part 3
EHS Guidelines	The Environmental, Health, and Safety (EHS) Guidelines, General EHS Guidelines[1].
Road manager	An organisational unit performing duties of public road management within the meaning of *the Act on Public Roads* or duties of non-public road management.

List of abbreviated names of legal acts used in the EMP

The names of the legal acts referred to in the text of this EMP are given in abbreviated form. The full names of the individual legal acts are given in the list below.

Name in the text	Full name (including publication reference)
Birds Directive/BD	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 288, 06.11.2007)

[1] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

Name in the text	Full name (including publication reference)
Habitats Directive/HD	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.07.1992, as amended)
Water Framework Directive (WFD)	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, as amended)
Special purpose Flood Protection Act	Act of 08 July 2010 on special principles of preparation for the execution of investments in the field of flood-control structures (consolidated text: Journal of Laws of 2019, item 933 as amended)
Public Roads Act	Act of 21 March 1985 on public roads (consolidated text: Journal of Laws of 2020, item 470 as amended)
Nature Conservation Act	Act of 16 April 2004 on nature conservation (consolidated text: Journal of Laws of 2020, item 55)
Waste Management Act	Act of 14 December 2012 on waste management (consolidated text: Journal of Laws of 2019, item 701 as amended)
EIA Act	Act of 3 October 2008 on access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (consolidated text: Journal of Laws of 2020, item 283 as amended)
Construction Law Act	Act of 07 July 1994 Construction Law (consolidated text: Journal of Laws of 2019, item 1186 as amended)
Environmental Protection Law Act	Act of 27 April 2001 Environment Protection Law (consolidated text: Journal of Laws of 2019, item 1396 as amended)
Water Law Act	Act of 20 July 2017 Water Law (consolidated text: Journal of Laws of 2020, item 310 as amended)

SUMMARY

This Environmental Management Plan (EMP) applies to Task *1B.2/3 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking - Part 3*, constituting part of the Odra-Vistula Flood Management Project (OVFMP) and implemented as *Contract: 1B.2/3*.

This EMP includes the following information:

- a brief description of the OVFM Project and its Component 1, which includes the Task in question (chapters 1.1 and 1.2);
- description of the Task covered by this EMP (chapter 2);
- the characteristics of the institutional, legal, and administrative arrangements for the implementation of the Task, including the current status of the EIA procedures for the Task (chapter 3);
- description of individual elements of the environment in the Task area (chapter 4);
- summary of the Environmental Impact Assessment for the Task (chapter 5);
- description of mitigation measures aimed at eliminating or limiting the potential negative impact of the Task on the environment (chapter 6), and a tabular summary of these measures (Appendix 1);
- description of environmental monitoring activities applicable to the Task (chapter 7) and a tabular summary of these activities (Appendix 2);
- description of the public consultations conducted at the various stages of preparation of environmental documentation for the Task (chapter 8);
- description of the EMP implementation structure (chapter 9);
- schedule for the implementation of the EMP and a description of the reporting procedures (chapter 10);
- list of source materials cited in the EMP (chapter 11);
- list of annexes to the EMP (chapter 12);
- copies of administrative decisions on environmental protection matters issued for the Task (Appendix 4).

Task Characteristics

The task which is the subject of this EMP involves the modernisation of river control structures on the border Odra within a selected section of the Odra, to be implemented as part of the Odra-Vistula Flood Management Project (OVFMP).

This task is included in Appendix no. 2 to the Masterplan for the Odra River basin area (2014) under item ID 3_381_O, in the so-called List no. 1 entitled "Investments that do not have an adverse impact on the achievement of good water condition or do not impair the condition of waters".

The Task Investor is the State Water Holding Polish Waters in Warsaw, represented by the Director of the Regional Water Management Authority in Szczecin, acting for and on behalf of the State Treasury.

Scope of the Task

The planned Task involves modernisation works on the border Odra, to be carried out as part of the Odra-Vistula Flood Management Project (OVFMP). The OVFMP is carried out with the help of international financial institutions, including the International Bank for Reconstruction and Development (also known as the World Bank) and the Council of Europe Development Bank, as well as with the support of the Cohesion Fund under the Infrastructure and Environment Operational Program 2014-2020 and the State Budget.

The planned reconstruction, which is an element of the Task, is part of the implementation of the provisions of the "Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany on joint efforts to improve the situation on waterways on the Polish-German border (flood protection, flow, and shipping conditions)" signed in Warsaw on 27 April 2015. The Polish-German agreement defines the so-called limiting places, i.e. places on the border Odra where river control structures need to be modernised. The task is the 3 Part of Stage I of Task 1B.2 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking.

The planned Task 1B.2 will be implemented in stages, i.e. stage I is currently planned for implementation, while stage II will be implemented at a later date, after the necessary project documentation is prepared.

The total scope of Stage I of Task 1B.2 is divided into 5 independent sections, at the following kilometres of the Odra:

1) 581.0 – 585.7 km
2) 604.0 – 605.0 km
3) 613.1 – 614.7 km (including the longitudinal dam at 613.1 - 613.5 km from Stage II, which is an extension/continuation of the Stage I structure)
4) 645.5 – 654.0 km
5) **654.0 – 663.0 km – covered by this EMP.**

The ice phenomena in the Odra pose the risk of ice jam-related floods of significant size, when the accumulated ice in sections blocks the outflow of water, especially during spring water level rises. Effective prevention of such floods on the Odra requires ice breaking operations with the use of large size, powerful units. In order to ensure that such operations can be carried out, it is necessary to maintain the appropriate depth parameters of the Odra, which is the overarching objective of the currently planned investment. Therefore, the subject matter of the Task is the reconstruction of existing groynes and construction of new ones on the border Odra to improve flood protection by enabling icebreaking (achieving a depth of at least 1.80 m with the mean annual probability of exceeding of at least 90% of the year), stabilising the flow conditions, and removing ice jam-prone areas and enabling ice to flow from the Odra to the Baltic Sea.

The scope of the Task encompasses an approx. 9.0 km-long section of the river Odra from 654.0 km to 663.0 km.

As part of the Task it is planned to:

- reconstruct 55 groynes
- construct 18 new groynes.
- construct 1 lead-in pier,
- construct 1 river wall,
- execute 3 revetments.

The reconstruction will consist in the lengthening or shortening of the existing groynes, ensuring that the structures have the appropriate crest elevation, and profiling slopes.

Institutional, legal, and administrative arrangements

The task, with regard to its characteristics, its anticipated potential impact on the environment, and its location in relation to protected sites, shall be carried out in accordance with the relevant national environmental legislation in this area and the relevant policies of the World Bank.

Status of administrative procedures for EIA

The Regional Director for Environment Protection in Szczecin conducted an environmental impact assessment for the entire investment, i.e. Stage I and Stage II of modernisation works on the border Odra, which includes the Task.

The proceeding was concluded with the Regional Director for Environment Protection in Szczecin issuing the environmental permit No. 5/2020 (WONS-OŚ.4233.1.2017.KK.68) with an order of immediate enforceability. This permit is included in Appendix 4a to the EMP. As of the date of publication of the EMP, the decision is not final.

The environmental permit specifies the environmental impact and the scope of mitigation activities, taking into account the total implementation of the full scope of the investment included in the environmental permit.

Status of elements of the environment in the Task area

As a result of the works related to the identification of natural and cultural environment values, it was found that the area of Task implementation and its vicinity are characterised by environmental conditions that include the following:

- the planned works are located within the boundaries of the body of surface water of the Odra (JCWP) from the Warta to the West Odra; JCWP code: PLRW60002119199 and within body of groundwater (JCWPd) number 23 (PLGW600023);
- protected plant species and protected animal species were found in the Task implementation area and in its close vicinity;
- Two types of natural habitat listed in Appendix I to the Habitats Directive were inventoried within the Task implementation area.

- the following Natura 2000 sites are located within the Task implementation area: Lower Odra PLH320037 and Lower Odra Valley PLB320003;
- the following other forms of nature protection is located within the Task implementation area – the Cedynia Landscape Park.

Environmental Impact Assessment summary

Land and landscape

The scope of the Task within the planned works on the border Odra will be based on the existing river control structures, and changes will not extend beyond the existing riverbed.

No land use is foreseen during the operation phase. The landscape of the Odra Valley is characterized by a controlled riverbed, so changes in the surface of the earth will not change the overall physiognomy of this area.

Climate

Neither the implementation nor operation of the Task has any impact on the climate.

Atmospheric air

The impact of the implementation of the Task on the sanitary condition of the air applies only to the construction stage and is not significant.

The functioning of reconstructed and newly constructed structures at the stage of operation does not involve air emissions.

Soils and earth

The execution of the works will cause local impact on the condition of soils and earth, on a small scale and of little significance. Areas within the riverbank slopes will be occupied for the purposes of the works only in the case of groynes that require construction or reconstruction of the body in the part adjacent to the riverbank slope. The impacts on soils and earth will be local and dispersed over a large area of the Odra section.

At the operation stage, limiting the flooding of the valley bottom during rises will result in reduced deposition of sediments and slower changes in the morphology of the valley bottom.

Surface waters

In accordance with the findings of the environmental impact assessment, taking into account the nature of the Task, the manner of its implementation, including the adopted design assumptions, as well as the obligation to implement a number of mitigation measures imposed by virtue of the environmental permit – including in particular those aimed at maintaining the necessary habitat conditions in the riverbed, it was concluded that the implementation of the Task will not negatively affect the state of either the JCWP within which the implementation of the Task is planned or other nearest water bodies. According to the judgement of the competent authority (RDOŚ in Szczecin), the Task will not cause permanent changes affecting the condition of

hydromorphological elements or the biological and hydromorphological continuity of the JCWP.

Taking into account the results of the analysis of the impact of the investment on environmental elements affecting the condition of the JCW in the EP, it was pointed out that maintaining the groynes in good condition, in addition to enabling effective icebreaking to prevent flooding, may also contribute in the longer term to the maintenance of the biodiversity of the regulated Odra.

Groundwater

The Task, both at the stage of implementation and operation, will not cause the inflow of contaminants into groundwater, so it will not deteriorate the quality of groundwater and thus the chemical condition of the groundwater body. Furthermore, the planned Task will not have a negative impact on the environmental objectives related to groundwater quantitative status.

Acoustic climate

The execution stage will cause a short noise emission during the temporary use of the machinery and equipment required to carry out the works. The emitted noise will be intermittent, and its intensity will vary at different stages of works, depending on their course and the use of specific machines and equipment.

Nature

The implementation of the Task will cause impacts resulting primarily from the necessary scope of work within the area of the Task structures, i.e. modernised and newly built groynes, lead-in pier, river wall, and revetments, and their effects will be significantly reduced by the adoption of appropriate deadlines and technology of works. Earthworks in the riverbed will be carried out outside the fish spawning season of and the majority of the growing season. Due to the nature of the works and the adopted periods of execution, the implementation of the Task does not significantly affect Natura 2000 sites or other protected areas. The impact on natural habitats will be manifested within the limits of the following forms of nature conservation.

Cedynia Landscape Park.

- 91E0 - willow, poplar, alder, and ash riparian forests - possible direct destruction of 6.79 ha of the habitat, which constitutes 0.83% of the known Park resources.
- *Euphorbia palustris* (Marsh spurge) - destruction of 4 sites of the species; the population of the species in the Odra Valley is not endangered.

Impacts on protected animal species are of minor scale and significance.

In accordance with the findings contained in the EP, taking into account factors such as: the section-by-section performance of works, the technology of conducting the works with floating equipment, conducting the works only in the autumn-winter season, no cumulation with the works on the German bank, implementation of additional minimising measures preventing the impact on the environment and the results of the assessment of investment impact on the above-

mentioned protected areas, it was concluded that the implementation of the Task is not associated with any risk of significant negative impacts on Natura 2000 sites. The planned mitigation measures allow to achieve the technical assumptions of the Task while minimising the negative impact on the environment, including on species and habitats protected under national regulations.

Objects of cultural heritage and material goods

Taking into account the scope of construction works and the manner of carrying them out (from the water, significant part of works carried out manually, no significant emission of vibrations – no heavy works with the use of pile drivers, small range of earthworks outside the riverbed), no possibility of potentially unfavourable impacts on tangible property, including objects of cultural heritage located in the Odra riverbank zone, was found at the stage of Task implementation.

In terms of protection of material goods, the implementation of the Task will improve flood protection in the areas covered by the Task. No negative impact on objects of cultural heritage or material goods was found in the areas of groyne modernisation works.

Human health and safety

The implementation of the Task does not generate any significant threats to the health and safety of people. Such threats may occur in the event of accidents, catastrophes, and other random events (such as leakage of contaminants, fire, discovery of unexploded ordnance, or flooding). Increased occupational safety risks will mainly be associated with carrying out work on water using floating equipment, also in difficult weather conditions, in autumn and winter.

The EMP sets appropriate conditions to prevent and minimise the possible effects of events that threaten human health and safety.

After the Task is implemented, its long-term indirect impact will be an increased level of safety of the people living in the areas along the banks of the border Odra.

Mitigation and monitoring measures

Chapters 6 and 7 and Appendices 1 and 2 of the EMP describe and present in tabular form a set of mitigation and monitoring measures aimed at eliminating or limiting negative impacts of the implementation of the Task on the environment and ensuring effective implementation of the conditions of the EMP. These measures include the conditions set out in the issued administrative decisions on environmental protection matters, as well as additional conditions formulated at the stage of EMP preparation.

Public consultation

Chapter 8 of the EMP contains a report from the public consultation conducted as part of the procedures related to the environmental impact assessment for the planned Task, including:

- public consultation on the document entitled *Environmental and Social Management Framework (ESMF)* for the OVFM Project (2015);

- public consultations carried out at the stage of environmental permit issue - an environmental impact assessment procedure was carried out for the Task - as part of which the participation of the public in the procedure was ensured in accordance with the rules set out in the EIA Act;
- public consultations on this Environmental Management Plan - the final version of the EMP will be supplemented with this description, after the procedure of making the draft EMP publicly available and after the public consultation concerning the EMP.

1. INTRODUCTION

This Environmental Management Plan (EMP) applies to Task *1B.2/3 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking*, constituting part of Sub-component 1B as part of the Odra-Vistula Flood Management Project (OVFMP) and implemented as *Contract: 1B.2/3.* **This task is included in Appendix no. 2 to the Masterplan for the Odra River basin area (2014) under item ID 3_381_O, in the so-called List no. 1 entitled "Investments that do not have an adverse impact on the achievement of good water condition or do not impair the condition of waters".**

1.1 ODRA-VISTULA FLOOD MANAGEMENT PROJECT (OVFMP)

The objective of the Odra-Vistula Flood Management Project (OVFMP) is to increase flood protection for people living in selected areas of the Odra River and Upper Vistula River basins and to strengthen the institutional capacity of the government administration to mitigate the impact of summer, winter, and flash floods more effectively.

The project consists of the following components:

Component 1 – Flood Protection of the Middle and Lower Odra, including:

Subcomponent 1A – Flood protection of areas in the Zachodniopomorskie voivodeship;

Subcomponent 1B – Flood Protection on the Middle and Lower Odra;

Subcomponent 1C – Flood protection of the town of Słubice.

Component 2 – Flood Protection of the Kłodzko Valley, including:

Subcomponent 2A – Active protection;

Subcomponent 2B – Passive protection.

Component 3 – Flood Protection of the Upper Vistula, including:

Subcomponent 3A – Flood protection of Krakow and Wieliczka;

Subcomponent 3B – Flood protection of Sandomierz and Tarnobrzeg;

Subcomponent 3C – Passive and active protection in the Raba catchment area;

Subcomponent 3D – Passive and active protection in the San catchment area.

Component 4 – Institutional Strengthening and Enhanced Forecasting

Component 5 – Project Management and Studies

Detailed information and additional documents regarding the OVFM Project are available on the website of the Odra-Vistula Flood Management Project Coordination Unit (*http://odrapcu2019.odrapcu.pl/*) and on the World Bank website (*http://documents.worldbank.org/curated/en/docsearch/projects/P147460*).

1.2 FLOOD PROTECTION OF THE MIDDLE AND LOWER ODRA (COMPONENT 1 OF OVFMP)

Component 1 of OVFMP entitled *Flood Protection of the Middle and Lower Odra* is aimed at flood protection by strengthening protection against summer and winter floods in towns located along the Odra.

Three Subcomponents are implemented as part of Component 1:

Subcomponent 1A – Flood protection of areas in the Zachodniopomorskie voivodeship;

Subcomponent 1B – Flood Protection on the Middle and Lower Odra:

Subcomponent 1C – Flood protection of the town of Słubice.

Subcomponent 1B consists of the following tasks:

- 1B.1/1 (a). Reconstruction of river control infrastructure on the Odra – adaptation to the conditions of Class III waterway from Ścinawa to the mouth of Nysa Łużycka – Stage II.
- 1B.1/1 (b). Reconstruction of road bridge in Krosno Odrzańskie, including the access roads.
- 1B.2 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking:
  - Part I: Section 1 581.0-585.7 km, Section 2 604.0-605.0 km, Section 3 613.1-614.7 km;
  - Part II: Section 4 645.5-654.0 km;
  - Part III: Section 5 654.0-663.0 km.
- 1B.3/1 Stage I – Construction of mooring base for icebreakers.
- 1B.3/2 Stage II – Construction of mooring facilities of the lower and border Odra and new waterway signage.
- 1B.4/1. Improvement of flood water flow from Lake Dąbie in winter.
- 1B.4/2. Dredging of Klucz-Ustowo ditch.
- 1B.5/1. Reconstruction of a bridge to ensure minimum clearance - a railway bridge at 733.7 km of the Regalica in Szczecin
- 1B.5/2. Reconstruction of a bridge to ensure minimum clearance – a road bridge at 2.45 km of the Warta in Kostrzyn nad Odrą.
- 1B.5/3. Reconstruction of a bridge to ensure minimum clearance – a railway bridge at 615.1 km of the Odra in Kostrzyn nad Odrą.
- 1B.6. Flood protection of Nowa Sól and areas south of Krosno Odrzanskie:
  - 1B.6/1. Nowa Sól Stages I and II,
  - 1B.6/2. Wężyska - Chlebowo.
- 1B.7. WWW Widawa - reconstruction of flood protection systems, communes of Czernica, Długołęka, Wisznia Mała, and Wrocław.
- 1B.8. Flood protection of the city of Krosno Odrzańskie.

2. TASK DESCRIPTION

The Task which is the subject of this EMP involves the modernisation works on boundary section of Odra River. The Project Implementation Unit (PIU) for the task is the State Water Holding Polish Waters the Regional Water Management Authority in Szczecin.

This Task covers a selected section of the border Odra. The planned reconstruction, which is an element of the Task, is part of the implementation of the provisions of the Polish-German agreement, within the framework of which a comprehensive reconstruction of the regulatory structures of boundary section of Odra River covering approx. 95 km in total (Task 1B.2 covers a total of 24.8 km), was planned. The task is Part 3 of Task 1B.2 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking.

2.1 TASK LOCATION

The task implementation area is located in Zachodniopomorskie Voivodeship, in Gryfino district, in the commune of Cedynia. It encompasses the right bank of the river Odra, from 654.0 to 663.0 km. The location of the Task is shown on the map below.

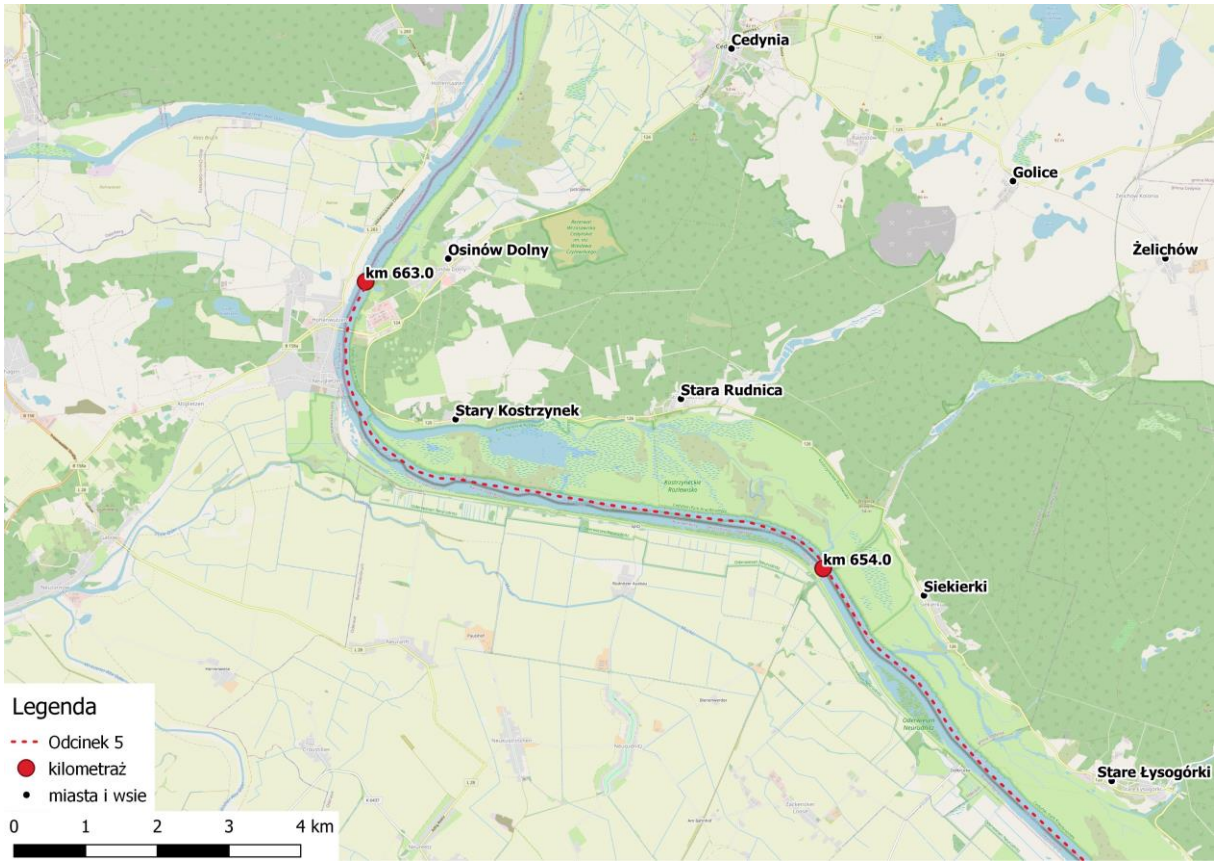

Figure 1 Overview of the Task implementation area.

2.2 TASK CHARACTERISTICS

The purpose of the Task is to create the possibility of safe work for icebreakers by rebuilding, reconstructing and expanding existing control structures (achieving a depth of at least 1.80 m with the mean annual probability of exceeding of at least 90% of the year), stabilising the flow conditions and removing ice jam-prone areas, and enabling ice to flow from the Odra to the Baltic Sea.

Existing Odra groynes are in an unsatisfactory state. Damage to those structures has a significant impact on the disturbance of the water flow of the Odra, which results in the formation of bars and numerous shallows in the riverbed. Places of reduced depth result in the formation of so-called "bottlenecks" of water flow, especially in winter, which significantly hinders the movement of icebreakers. This results in a gradual deterioration of icebreaking activities due to insufficient depth of the riverbed within which the icebreaking units move. Only high-power vessels with a reinforced hull, which create a drainage channel for floe as they move up the river, are suitable for effective icebreaking on the Odra. Vessels of this type have a draught of 1.8 m or more and therefore this depth is required for their effective operation.

Groynes are built in such a way as to be transverse in relation to the river flow direction and used to maintain adequate depths in lowland riverbeds. River walls and longitudinal dams are structures parallel to the direction of the river flow. The main purpose of their construction is protecting banks from being washed away and narrowing the riverbed, which leads to increased depth in the main riverbed.

The scope of the Task encompasses an approx. 9.0 km-long section of the river Odra from 654.0 km to 663.0 km.

The reconstruction of 55 existing groynes and construction of 18 new groynes, 1 lead-in pier, 1 river wall, and 3 revetments is planned as part of the Task, as well as demolition of revetment to construct the river wall.

The reconstruction will consist in the lengthening or shortening of the existing groynes, ensuring that the structures have the appropriate crest elevation, and profiling slopes.

Construction of the existing river control structures

The existing groynes which are covered by the Task were built in the 1930s. The site inspections and survey led to the conclusion that the top layer of the groyne body is a revetment in the form of riprap or paving laid on a crushed stone bed. Sources and historical information show that the Odra groynes are made of fascine and stone. This means that they may be filled with fascine mattresses and strengthened with riprap.

At 661.0-661.3 km there is an existing lead-in pier, separating the main Odra riverbed from the oxbow. It is a stone structure located at the top of the existing natural peninsula which separates the main Odra riverbed from the oxbow.

Technical condition of the existing river control structures

The site inspections and survey led to the conclusion that the majority of groyne structures have defects in the revetment zone. Groyne bodies are largely damaged. A significant loss of paving stone has been noted, stone elements are loose. The groynes are overgrown with vegetation. The vegetation consists mainly of grasses, reeds, shrubs, and some scattered trees. The condition of individual groynes varies. Some of them are almost entirely destroyed, or destroyed to a very large extent; Some are in satisfactory condition, i.e. the groyne body is maintained, but there has been a considerable loss of paving stone, especially on the heads.

The inventoried revetments are in a good condition. Small amounts of stone are only missing in few places.

The inventoried longitudinal dams (including the existing lead-in pier at 661.0-661.3 km) are in sufficient or bad condition. Significant amounts of stone are missing. Dams rarely protrude above the average water level.

Description of planned demolitions and tree clearing

The demolition of revetment at 660.5-661.0 km is planned in connection with the construction of a river wall on this section.

No reconstruction of revetments or longitudinal dams is planned in this area. In some places, it may be necessary to reconstruct or demolish only fragments of these structures in order to tie in the reconstructed control structures or the new ones to the existing structures, but these works shall be treated as an integral part of the construction works concerning the reconstruction of existing groynes or the construction of new ones.

The Task also includes plans to completely remove vegetation from the reconstructed groynes, including tree felling. Trees will only be felled if their removal proves necessary for the implementation of the Task. The felling will be carried out outside the period of bat breeding (early May to mid-August), in the period of reduced activity and wintering of bats, and will be preceded by an inspection conducted by a chiropterologist; it will also be carried out outside the bird breeding period (1 March to 15 October). The felling has been limited to the necessary minimum and as many trees as possible are to be left undisturbed.

Design intent

The following works are provided for as part of the planned modernisation:

- reconstruction of existing river control structures in order to adapt their parameters to the values defined in the BAW Concept,
- construction of new river control structures:
    - on sections of the river where there are no river-control structures,
    - in the places where existing structures are demolished due to the need to provide the assumed control width,

- if the technical condition of the existing structure is so bad that a reconstruction poses the same or a greater construction challenge than the construction of a new structure.

Newly designed groynes:

- head slope 1:10
- body slope 1:100
- crest width 1.5 to 2.0 m
- side slope 1:2 (from the top of the stream), 1:3 (from the bottom of the stream)
- slope of the groyne axis in relation to the river axis: 72° (upstream), corresponding to existing structures.

In accordance with the Investor's guidelines, the requirements for the slope of groyne axis in relation to the river axis - 72° (upstream) and the body slope 1:100 were adopted as appropriate only for newly designed structures. In the case of the reconstruction of existing groynes, the existing axis was the basis and the longitudinal slope of the body was adjusted to the terrain conditions outside of the 6 m section from the head landwards.

Depth of the foot in the head part of the groyne was assumed to be min. 3.0 m below SWP2010, in a 12 m wide belt. In some cases, this means that the foot must be below the existing bottom. Outside of the 12 m-wide strip, the revetment must be tied in to the existing bottom. Foot slopes in the head part buried in the bottom should not exceed ~1:10.

The BAW Concept provides for the so-called accompanying dredging. These works may be necessary to carry out on sections of the river not directly covered by this investment task, located downstream of the structures executed as part of the project, as these structures will, by narrowing the control width of the watercourse bed, lead to an increase in the amount of river load, which may lose its speed and start to settle in an area with a larger width of the bed. This will result in bottom material being deposited below the Task area. Therefore, the bottom, as well as the water table, will rise. The impact that leads to the rising of the water table continues upstream, so that when more projects are implemented, this impact accumulates. To avoid this effect, there are plans to dredge the accumulated material on a section of approx. 500 m below each section of Task 1B.2 Stage I and II. However, dredging itself is not part of this investment task. The Contractor is nonetheless obliged to draw up a bathymetric plan of the Odra over a stretch of 500 m downstream from the place of completion of the works:

1. before construction works begin: this survey will be a basis for determining the quantity of works performed,
2. following the completion of construction works: this survey will be a basis for carrying out any possible accompanying dredging.

Accompanying dredging is not part of this task. It will be executed as part of the maintenance works in the event of significant deposition of bottom material below the reconstructed section.

The Contractor shall be obliged to perform the bottom surveys described above in order to determine the initial situation for monitoring the condition of the bottom after the execution of the construction works. Bathymetric plans will be a reference point for the assessment of changes concerning dredging or deposition of spoil on the river sections where the works were carried out.

When designing the modernisation of the river control structures, for this and the other sections of the river planned for modernisation, the principle of least interference in the existing control structures was applied, i.e. the modernisation of the river control structures consists mainly in the reconstruction of existing structures, and to a small extent in the construction of new ones. New structures have been designed only on sections where the distance between existing structures is too large for the proper functioning of the river control system (groynes) and in places where the current arrangement of the banks indicates the need for their construction (longitudinal dams, river walls, revetments).

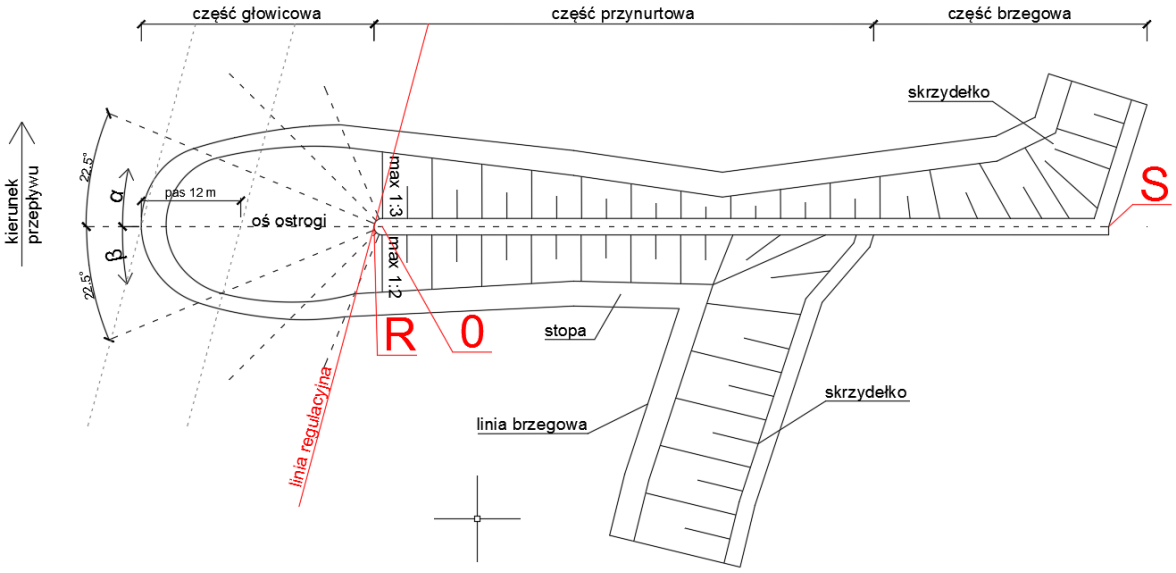

Figure 2 Groyne drawing

R: intersection of minimum setback and the planned groyne axis,

0: point at a distance of 1.0 m from the minimum setback landwards,

S: point on the groyne axis that projects furthest into the land

Each planned groyne has a head part. The remaining parts (stream part, bank part, wings) are either used or not, depending on the existing terrain configuration.

Most of the groynes consist of a head part, stream part, and two wings.

Planned longitudinal dams:

- slope to the river 1:2.5 to 1:3.0
- slope to the bank 1:1.5 to 1:3.0

- crest width 1.5 to 2.0 m
- the crest of the longitudinal dam should be extended into water, 10.5 m from the minimum setback

According to the BAW concept, "in the case of longitudinal dams, the aim should be to create a backflow in order to reduce the possible rise in water levels in flood conditions. Therefore, as many remnants of the existing groynes as possible should be removed when building new structures". For this purpose, groynes behind the longitudinal dam at approx. 30 m, counting from the land side of the dam crest to the bank, will be demolished.

In order to avoid washing out at the transition from the longitudinal dam to the section of the river regulated by groynes, two transition groynes will be constructed behind the dam. The first groyne behind the dam should have the slope of 1:5 (groyne axis). The head part of the next groyne will have a 1:7.5 slope.

Planned river walls:

- slope inclination: 1:2.5 to 1:3.0,
- the crest of the river wall should be extended into water, 10.5 m from the minimum setback.

In order to avoid washing out at the transition from the river wall to the section of the river regulated by groynes, two transition groynes will be constructed behind the wall. The first groyne behind the wall should have the slope of 1:5 (groyne axis). The head part of the next groyne will have a 1:7.5 slope.

Below is a drawing of the transition from the section of the river regulated by the longitudinal dam/river wall to the section regulated by groynes:

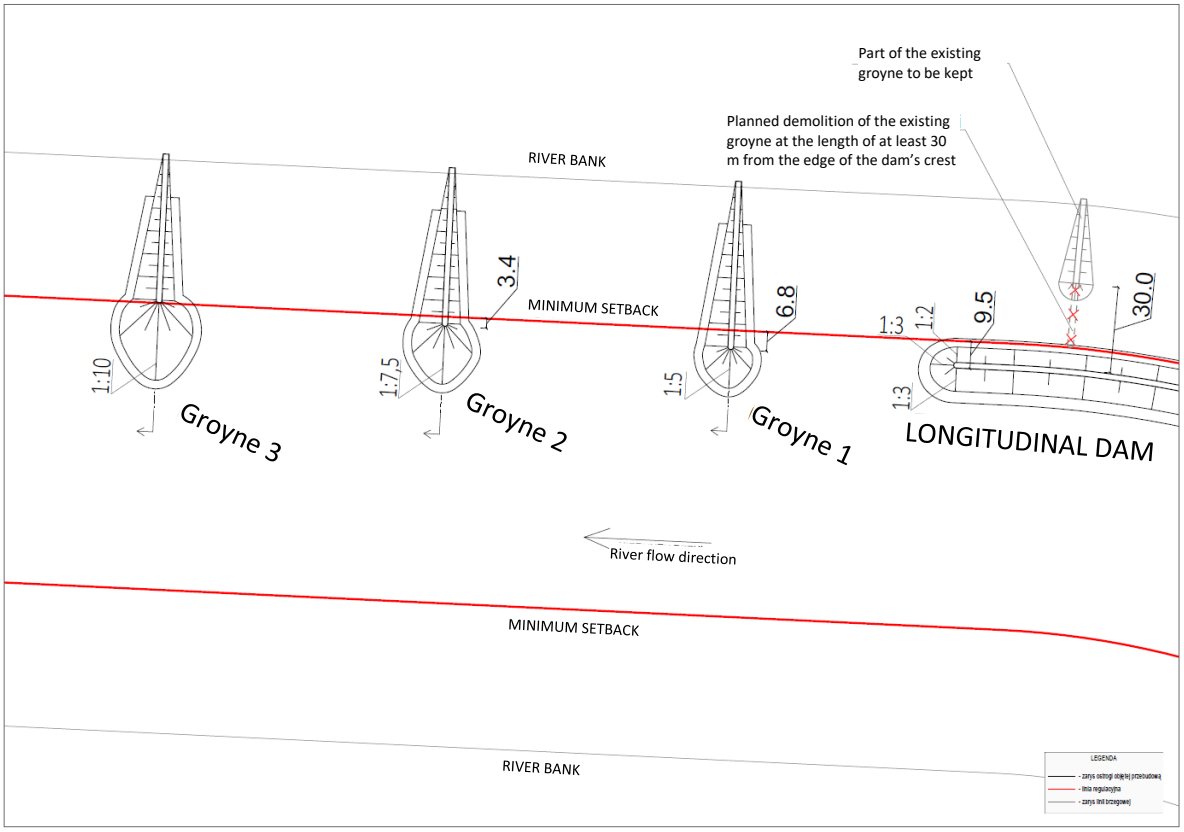

Figure 3 Drawing of the transition from the system of control with the longitudinal dam or river wall

Revetment:

- slope inclination: max 1:3.0

Execution method

The priority is the execution of works from water. In the event of unfavourable hydrological conditions, it is permissible to carry out works from the land while maintaining all other indications of this EMP.

Modernised and newly built groynes

It is expected that river control structures will be built successively, one after the other, beginning with the structure closest to the river spring and then moving along the flow (downstream).

The reconstruction of a groyne should be executed as follows:

1. Removal of vegetation along the entire length of the existing groyne and on the surfaces where the construction of reinforcements (wings) is planned.
2. Removal of groyne revetment made of paving stone to the SNW depth. Material obtained in the course of demolition can be put to further use.
3. Possible working excavations, if necessary.
4. Laying the geotextile layer. The width of overlap should be at least 1.0 m. Welding is permitted when dry laying, with the width of overlap of 0.15 m. When laying geotextile

under water it is necessary to stabilise it, to prevent it from moving under the influence of the stream.

The constructor decides on the best method to install geotextile on the underwater surface to guarantee that it does not change its position, depending on:

a. the width of laid strips
b. current hydrological conditions (water flow speed)
c. local ground conditions (surface hardness).

5. Construction of a riprap layer. Beginning the stone laying by creating the revetment toe, and then laying the riprap from the bottom of the side. Plans provide for the use of crushed stone of igneous rock (light granite). The use of riprap of other types of igneous rock is permitted after prior consultation with the project supervision.
6. Filling the riprap on the body of the groyne with crushed stone, granulation 5-15 cm. This will cause the proper riprap to lock in under water and ice pressure.

The construction of new groynes should be executed as follows:

1. Removing vegetation and cleaning the bottom on the site of the designed structure.
2. Laying the geotextile layer. The width of overlap should be at least 1.0 m. Welding is permitted when dry laying, with the width of overlap of 0.15 m. When laying geotextile under water it is necessary to stabilise it, to prevent it from moving under the influence of the stream.

The constructor decides on the best method to install geotextile on the underwater surface to guarantee that it does not change its position, depending on:

a. the width of laid strips,

b. current hydrological conditions (water flow speed),

c. local ground conditions (surface hardness).

3. Construction of a riprap layer. Beginning the stone laying by creating the revetment toe, and then laying the riprap from the bottom of the side. Plans provide for the use of crushed stone of igneous rock (light granite). The use of riprap of other types of igneous rock is permitted after prior consultation with the project supervision.
4. Filling the riprap on the body of the groyne with crushed stone, granulation 5-15 cm. This will cause the proper riprap to lock in under water and ice pressure.

<u>Lead-in pier (longitudinal dam)</u>

The river control structure will be constructed starting from tying in the lead-in pier (dam) to the planned river wall. The construction works will move along with the flow of water in the river.

1. Fascine mattresses will be constructed in accordance with BN-69 8952-26.
2. Sinking fascine mattresses.
3. Construction of a riprap layer. Laying stones starting from the bottom of the slope.

4. Filling the riprap with crushed stone, granulation 5-15 cm. This will cause the riprap to lock in.

River wall

The river control structure will be constructed starting from tying in the planned river wall to the groyne wing. The tie-in should be made as a transition section of approx. 50 m in length. The construction works will move along the flow of water in the river.

1. Fascine mattresses will be constructed in accordance with BN-69 8952-26.
2. Sinking fascine mattresses or laying geotextile.
3. Construction of a riprap layer. Laying stones starting from the bottom of the slope.
4. Filling the riprap with crushed stone, granulation 5-15 cm. This will cause the riprap to lock in.

Revetments

1. Removing vegetation and cleaning the bottom on the site of the designed structure.
2. Laying the geotextile layer. The width of overlap should be at least 1.0 m. Welding is permitted when dry laying, with the width of overlap of 0.15 m. When laying geotextile under water it is necessary to stabilise it, to prevent it from moving under the influence of the stream.
3. Construction of a riprap layer. Laying stones starting from the bottom of the slope.

Filling the riprap with crushed stone, granulation 5-15 cm. This will cause the riprap to lock in.

Waste

Works related to the execution of the Task will generate waste. This waste will include: 17 02 01 wood (fascine), 17 05 04 soil and stones other than those mentioned in 17 05 03.

Waste will be generated mainly during the demolition of the groynes which cannot be reconstructed. Materials from demolitions will be sorted depending on the type and condition. The Contractor may use materials from demolitions after obtaining the Construction Engineer's consent.

In addition, municipal waste will be generated during the implementation phase: paper and cardboard (20 01 01), biodegradable kitchen waste (20 01 08), paper and cardboard packaging (15 01 01), plastic packaging (15 01 02), glass packaging (15 01 07). Due to the fact that welfare facilities will be located on vessels, storage areas will also be on these vessels.

Waste will be collected selectively, in areas and containers suitable for the particular type of waste, in accordance with applicable regulations. All waste shall be handed over for collection to authorised operators and, where possible, recovered. Waste which will not be recoverable for technological or economic reasons will be handed over to an authorised external company for disposal.

The Contractor shall obtain all the necessary permits for waste management, including those required for obtaining permits and determining waste characteristics for analysis and testing in accordance with legal requirements and/or the requirements of the waste collector.

Land and spoil management

It is assumed that the soil necessary to build into the reconstructed structures will be obtained from earthworks carried out at each of the designed structures. The remaining spoil will be removed from the construction site and transported to a location within 200 km. The assumed, indicative balance of ground masses is as follows:

Table 1 Indicative earth mass balance

Total amount of spoil (100% for a given section)	20,415.99 m^3
10% – contaminated spoil	2,041.60 m^3
25% – spoil containing invasive species	5,104.0 m^3
40% – spoil to be used at the construction site	8,166.40 m^3
The remaining 25% of the spoil – to be removed from the work area	5,104.0 m^3

The final method of utilisation of the spoil will be determined by the Contractor and will be subject to the Engineer's approval as part of the approval of the Land Management Plan (see chapter 6.14).

The management of sediments extracted from the riverbed must take into account the guidelines for the management of sediments extracted from the riverbed contained in the World Bank's Environmental, Health, and Safety Guidelines for Ports, Harbors, and Terminals[1]. The Contractor shall develop a Land Management Plan, which shall specify, among others, the manner of carrying out the works related to the excavation of spoil and the rules of handling the riverbed spoil during the works.

The Contractor shall obtain all the necessary permits required for the management of earth masses, including those required for obtaining permits for analyses and testing (in accordance with legal requirements and/or the requirements of the collector of earth masses).

Welfare facilities

Taking into account the specifics of the Task in question, its linear nature, as well as the assumption of implementation from water, there are also plans to organise welfare facilities on floating vessels in order to minimise interference in the land part. This solution enables efficient transport of facilities closer to the work site, and also protects against flooding with high waters.

[1] https://www.ifc.org/wps/wcm/connect/ddfac751-6220-48e1-9f1b-465654445c18/20170201-FINAL_EHS+Guidelines+for+Ports+Harbors+and+Terminals.pdf?MOD=AJPERES&CVID=lD.CzO9

Ship crews and equipment operators will be provided with welfare facilities on the vessels on which they work. Other employees will use social facilities on a houseboat (floating hotel) or a floating pontoon (e.g. W-Z type) equipped with a set of containers.

This solution enables efficient transport of facilities closer to the work site, and also protects against flooding with high waters.

The containers will be powered by an electric power generator.

Water for welfare purposes will be supplied in plastic tanks with a capacity of approx. 1000 l and drinking water in 5 litre bottles.

Water supply, garbage collection, and replacement of portable toilets will be carried out using floating equipment such as a bolting rig with a loaded crane. Sewage from vessels will be collected in ports equipped with appropriate infrastructure.

The berth of the houseboat or pontoon with container facilities will provide a free, safe access from the land side with access gangways. The employees will be transported from the welfare facilities to individual building sites and back by a pusher, bolting rig or motor boat.

Land occupation

Temporary occupation will be carried out in accordance with the content of the Land Acquisition and Resettlement Action Plan and the World Bank's Operational Policy OP. 4.12[1]. The LA&RAP contains a detailed list of activities and procedures related to the acquisition of land for the purposes of the Task. The activities related to the acquisition of land for the purposes of the investment are also carried out in accordance with the procedures set out in the LA&RPF (Land Acquisition and Resettlement Policy Framework[2]).

When acquiring real estate, the Contractor will be obliged to apply the World Bank Policy as expressed in the Operating Manual for the Odra-Vistula Flood Management Project (OVFMP) and to apply the LA&RAP. Negotiations and agreements between the Contractor and the real estate owner on temporary occupation shall be supervised by the Engineer in order to ensure the fairness of the agreement and its beneficial character for the landowner.

Contractor's equipment

The detailed selection of equipment units for the execution of the works covered by this Task shall be left to the discretion of the Contractor, after prior agreement with the Engineer. The Contractor shall be obliged to use only such equipment that will not adversely affect the quality of the executed works and the environment. The quantity and performance of the equipment

[1] https://policies.worldbank.org/sites/ppf3/PPFDocuments/090224b0822f89db.pdf

[2] http://odrapcu2019.od-rapcu.pl/doc/OVFMP/Ramowy_dokument_dotyczacy_Przesiedlen_i_Pozyskiwania_Nieruchomosci.pdf

will guarantee the execution of the works, in accordance with the principles set out in the designs, in the Technical Specifications and the Engineer's instructions within the time limit provided for in the Contract. The Equipment owned by the Contractor or hired to perform the works shall be to be maintained in good condition and ready for work. It shall comply with environmental standards and regulations for its use. The Contractor shall provide the Engineer with copies of the documents confirming the admission of the equipment for use, where required by law. If the Design Documentation or Technical Specifications provide for the possibility of variant use of the equipment in the performed works, the Contractor shall notify the Engineer of its intention to select the equipment and shall obtain the Engineer's approval before using the equipment. Upon the Engineer's approval, the selected equipment shall not be changed on a later date without the Engineer's consent. Any equipment, machines, devices and tools not guaranteeing compliance with the Contract terms and conditions, including the provisions of the EMP, shall be disqualified and unaccepted to the works by the Engineer, and the Contractor will be obliged to remove them immediately from the construction site.

The selection of the parameters of the floating equipment should take into account the conditions resulting from the navigational regulations for the waterway and the conditions prevailing on the waterway during the Task implementation period (including the occurrence of low-water periods and the risk of unfavourable sailing conditions).

Minimum requirements for the Contractor regarding the type and characteristics of key equipment are included in the Bidding Documentation (Part 1, Section II, p. 3.6. Equipment).

Schedule of works

The detailed design of the technology and organisation and the schedule of works will be developed by the Contractor depending on the equipment and human resources at disposal, and will be subject to the approval of the Contract Engineer. The design of the technology and organisation of the works and the schedule of works developed by the Contractor and approved by the Engineer must take into account all the conditions resulting from the provisions of the Contract (including this EMP) and the issued administrative arrangements and decisions, in particular environmental permits, species permits, water permits and the flood protection investment permit.

In particular, the schedule of works will take into account the time constraints indicated in the environmental permit, the species permits and the EMP.

The basic periods excluded from the schedule for the Task in question are:

Table 2 Basic periods excluded from the schedule for this Task

Object of protection	Excluded period	Comment
Flora and natural habitats	from the beginning of April to the end of September	Additional periods excluded from the schedule in places where the presence of natural habitat 3270, strapwort or

Object of protection	Excluded period	Comment
		fringed water lily will be demonstrated**
Fish, macroinverte-brates	16 July to the end of February	Applies to earthworks in the riv-erbed
Amphibians	from the beginning of March to the end of May	In places where the presence of toads and brown frogs will be demonstrated**
Amphibians	from the beginning of April to the end of June	In places where the presence of green frogs will be demon-strated**
Bats	from the end of April to 15 August	Applies to 655; 658-659.5; 662.5-663 km
Bats	from the end of April to 15 August	Applies to felling of trees within bat habitats**
Mammals	from the beginning of April to the end of August	In the sections of the demon-strated presence of mammals, i.e. otters and beavers**
Birds	from late February to early August	Applies to the removal of vege-tation within 30 m of the groyne base
Birds	From the end of April to 15 August	Applies to felling. Condition-ally, felling allowed after an in-spection carried out by an orni-thologist during the breeding season, up to 3 days before the date of felling, which will con-firm the absence of nests and broods of birds.

* flooded muddy riverbanks

** depending on the results of the natural inventory carried out as part of the Task

In the schedule, the Contractor shall also provide for the required deadlines for the execution of selected mitigation measures, in particular replanting patches of submerged plants with float-ing leaves and patches of rushes growing on the bed of the Odra (especially the nymphaea, including all identified endangered sites of the fringed water lily) from the area of works to a nearby location with similar habitat conditions.

Note: This Task Characteristics is only indicative and does not replace the Task's design documentation. All works should be executed in accordance with the Construction and Commissioning Requirements for works appropriate for individual sectors.

3. INSTITUTIONAL, LEGAL, AND ADMINISTRATIVE ARRANGEMENTS

3.1 INSTITUTIONS INVOLVED IN THE TASK IMPLEMENTATION

The Task Investor is the State Water Holding Polish Waters in Warsaw, represented by the Director of the Regional Water Management Authority in Szczecin, acting for and on behalf of the State Treasury. Ongoing coordination of the implementation is the responsibility of the Odra-Vistula Flood Management Project Coordination Unit, which has been functioning since 1 January 2020 as an organisational unit within the structures of the National Water Management Authority (KZGW), which is an organisational unit of the State Water Holding Polish Waters. In addition, the implementation of the Task requires the involvement of public administration authorities in the scope of environmental permits, decisions issued on the basis of the Nature Conservation Act or waste management arrangements.

3.2 APPLICABLE NATIONAL ENVIRONMENTAL LEGISLATION

In accordance with Polish law, the investment process in the field of environmental protection is regulated by several laws and regulations. A list of selected basic legal acts related to the abovementioned thematic scope applicable during the period of EMP preparation is contained in Appendix 3 to the EMP and is valid as of the date of submitting the EMP documentation for publication. The number and content of the acts listed therein may change as national environmental legislation changes. In each case, the Contractor is obliged to comply with all applicable legal regulations in force in Poland during the term of the Contract.

3.3 EIA PROCEDURE IN POLAND

The description of the environmental impact assessment procedure in Polish legislation is included in *the Environmental and Social Management Framework (ESMF)*, published, among others, on the websites of the Odra-Vistula Flood Management Project Coordination Unit[1] and the World Bank[2].

3.4 WORLD BANK GUIDELINES

This Task is co-financed by the World Bank and the conditions for its implementation in the field of environment protection are consistent with the *Operational Policies* and *the Bank Procedures* in the field of environment protection, including, among others, *OP/BP 4.01* (concerning environmental impact assessment), *OP/BP 4.04* (concerning natural habitats) and *OP/BP 4.11* (concerning cultural resources) and OP/BP 4.12 (concerning resettlement). In accordance

[1] Website: *http://odrapcu2019.odrapcu.pl/popdow_dokumenty/*.

[2] Website: *http://documents.worldbank.org/curated/en/717671468333613779/Poland-Odra-Vistula-Flood-Management-Project-environmental-and-social-management-framework*.

with the above Operational Policies for the Task, this EMP has been prepared and any temporary and permanent occupation of land in connection with the implementation of the Task is carried out on the terms specified in the Land Acquisition and Resettlement Action Plan (LA&RAP) prepared for the Task.

The source texts of the above policies and procedures can be found in *The World Bank Operational Manual*[1] and their descriptions are contained, among others, in the *Environmental and Social Management Framework (ESMF)*.

In addition, the Task is carried out taking into account the World Bank's Environmental, Health, and Safety (EHS) Guidelines.

3.5 CURRENT STATUS OF THE EIA PROCEDURE FOR THE TASK

In accordance with the requirements of national legislation, a decision on the environmental conditions of the implementation of the project (an environmental permit) was obtained for the Task.

The procedure for issuing an environmental permit, during which an environmental impact assessment of the project and a transboundary impact assessment were carried out, was concluded by the decision of the Regional Director for Environment Protection in Szczecin of 18 March 2020, ref. no.: WONS-OŚ.4233.1.2017.KK.68), with an order of immediate enforceability. This permit is included in Appendix 4a to the EMP. As of the date of publication of the EMP (04/09/2020) the decision is not final. This decision sets out the environmental requirements for the implementation of the Task. A copy of the permit is attached as Appendix 4a to the EMP.

Note: the investment scope of the Contract (section of the Odra from 654.0 to 663.0 km) concerns the part of the scope included in the environmental permit, which includes jointly the works in the following sections of the Odra:

- 581.0 – 585.7
- 600.4 – 617.6
- 645.5 – 663.0
- 668.0 – 683.0.

The conditions of the environmental permit are binding for the Investor and the Contractor and are included in this EMP in Appendix 1 to the EMP (mitigation measures) and Appendix 2 to the EMP (monitoring activities). The EMP is also supplemented by provisions resulting in particular from (1) World Bank policies (including EHS guidelines and anti-discrimination practices); (2) reporting principles in the implementation of EMP; (3) good building practices; (4) occupational safety and health requirements. In addition, provisions have been introduced

[1] Website: *https://policies.worldbank.org/sites/PPF3/Pages/Manuals/Operational%20Manual.aspx*.

aimed at eliminating extraordinary threats to human health and life and protecting cultural goods (in particular, conduct in the event of discovery of monuments, conditions of providing a team of expert archaeologists).

Notwithstanding the above, the Contractor is obliged to obtain all further administrative decisions and permits necessary at the stage of execution of the works, if such a necessity arises during the execution of the Task.

3.6 GRIEVANCE REDRESS MECHANISM

All affected persons shall have access to appropriate and accessible mechanisms for submitting complaints and requests. Everyone has the right to file a complaint or motion. The submission of complaint is not subject to any fee. Furthermore, in accordance with the regulations, the person filing a complaint or request may not be exposed to any damage or allegation on account of such submission.

For more information on the mechanism of submitting complaints and requests applicable to the Tasks co-financed by the World Bank, see the Operating Manual for the Odra-Vistula Flood Management Project, available on the Project Coordination Unit website (http://odrapcu2019.odrapcu.pl/doc/POM_PL.pdf).

4. DESCRIPTION OF ELEMENTS OF THE ENVIRONMENT IN THE TASK AREA

4.1 LAND AND LANDSCAPE

The Task is located in the Zachodniopomorskie Province in the valley of the Odra, a large lowland river, outside built-up areas, with only small sections being located in the vicinity of such areas. With respect to the physical-geographical division of Poland (Kondracki 2004), the planned Task will be implemented within the Oderbruch mesoregion.

The Odra Valley within the range of the potential impact of the Task is characterised by significant, albeit variable, natural and landscape values. The river itself is controlled, with a changed course of the riverbed and transverse structures, i.e. groynes. The structure of the landscape in the river valley (restricted by flood embankments) is a mosaic of natural and anthropogenic elements. The Odra riverbed on the section covered by the Task is controlled, with some sections embanked, and there are bars in the riverbed. At the bottom of the valley, meadows, pastures, arable land, and fallow land dominate, with some riparian forest areas.

The works carried out as part of the Task will be carried out in areas of varied spatial development. Some of the works will be carried out in the vicinity of forested areas, meadows and farmlands. The only works carried out near urbanised areas will be in the vicinity of Osinów Dolny.

4.2 CLIMATE

The Zachodniopomorskie Voivodeship belongs to the climatic region of Silesia-Wielkopolska and Pomorskie. The analysed area is within the range of marine and terrestrial climate impact. The climate is temperate with transitional characteristics, between marine and continental climates. The climate is characterised by a wide variety of types of weather, related to the location near the sea, large rivers, and lakes, as well as to the terrain (urstromtal, hills). Due to a higher humidity, phenomena such as mists and rime are more common. The climate is moderate with predominantly westerly, north-westerly, and northerly winds.

Table 3 Climate features of the town of Cedynia (located near the Task area)

	January	February	March	April	May	June	July	August	September	October	November	December
Aver. Temperature (° C)	-1.5	-0.5	3.9	8.7	13.7	17.1	18.7	18.2	14.7	10.1	4.7	0.7
Min. Temperature (° C)	-3.9	-3.4	0.1	4	8.3	11.9	13.7	13.1	10.1	6.8	2.2	-1.5
Max. Temperature (° C)	0.9	2.4	7.7	13.5	19.1	22.3	23.8	23.4	19.3	13.5	7.2	2.9
Precipitation / rainfall (mm)	37	29	31	37	51	61	64	56	43	38	42	42

Source: https://en.climate-data.org/

4.3 SANITARY CONDITION OF THE AIR

Based on the research conducted by the Voivodeship Inspectorate for Environment Protection in Szczecin in 2018[1], both the PM10 suspended dust (limit value determined for 24-hour concentrations) and benzo(a)pyrene contained in PM10 dust exceeded the applicable air quality norms in the Zachodniopomorskie zone. However, the exceedances in relation to the concentrations of PM10 suspended dust were recorded only at one station outside the Task area. As in previous years, high concentrations of these pollutants were recorded during heating periods. Low emissions from individual heating of buildings are identified as the main cause of exceeding the standards.

The target of 1 ng/m^3 for the average annual concentration of benzo(a)pyrene was exceeded at 4 (out of 5) measuring stations in the Zachodniopomorskie zone, where average annual concentrations of benzo(a)pyrene were recorded at levels of 3 to 6 ng/m^3. Therefore, the Zachodniopomorskie zone was given class C due to excessive concentrations of benzo(a)pyrene.

For the remaining pollutants, the concentrations of which did not exceed the criteria established for health protection applicable in 2018: sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter PM10, particulate matter PM2,5, benzene (C_6H_6), carbon monoxide (CO), ozone (O_3) – target level, arsenic (As), cadmium (Cd), nickel (Ni), and lead (Pb), all three voivodeship zones: the Szczecin agglomeration, the city of Koszalin, and the Zachodniopomorskie zone were classified as A.

In connection with classifying the Zachodniopomorskie zone as class C due to the recorded exceedances of the permissible concentrations of PM10 suspended dust and benzo(a)pyrene, in the current air protection programme for the Zachodniopomorskie zone[2] a programme of short-term activities was included, the aim of which is to reduce the emission of PM10 suspended dust and particulate matter, including benzo(a)pyrene and heavy metals. These activities are aimed at enforcing an absolute ban on the incineration of waste by residents and promoting the use of better fuel quality, as well as reducing urban traffic and maintaining road cleanliness. The actions specified in the action plan do not affect the conditions for the implementation and operation of the Task.

[1] Annual assessment of air quality in the Zachodniopomorskie Voivodeship for 2018, Voivodeship Inspectorate for Environment Protection in Szczecin, April 2019

[2] Resolution No. XXX/468/18 of Zachodniopomorskie Province Assembly of 27 February 2018 on the determination of the air protection programme and short-term action plan for the Zachodniopomorskie zone.

4.4 SOILS AND EARTH

The task covers mainly the riverbed, riverbank slopes, and the riparian zone. In the Odra valley there are mainly soils of modern alluvia. Fluvisol developed on the floodplains. These soils develop in conditions of very high groundwater levels, so they are subject to varying degrees of gleying processes (Musierowicz, 1961[1]; Systematyka Gleb Polski [Systematics of Polish Soils][2], 2011). To the south of Kostrzyn, there are light, medium and heavy fluvisols, and to the north – sandy fluvisol and river sands (Musierowicz, 1961). Peat soils developed in places where peat is found, especially the section between Kaleńsko and Stary Błeszyn (north of Kostrzyn). Initial accumulation soils are found within bars, which are formed as a result of modern fluvial processes.

Podzolic soils and podzols developed on floodplains made of sand and on postglacial uplands and outwash plains (Musierowicz, 1961).

Initial accumulation soils are found within bars, which are formed as a result of modern fluvial processes. No levels are observed in them, although beginnings of organic matter accumulation may be found in the roof. They are an unstable, usually seasonal form of river accumulation and are often removed at successive rises (Systematyka Gleb Polski, 2011).

Anthropogenic soils are found in places transformed by man, that is, primarily in cities, but also in excavation sites.

River sediments in the border Odra were subjected to quality tests in 5 locations downstream of 548.4; 572.0; 595.3; 607.5 and 663.1 km of the border Odra[3] in February and March 2019. According to the results of the tests, the tested bottom sediments did not have components in concentrations exceeding the limit parameters specified in Appendix 1 to the Regulation of the Council of Ministers on the recovery of waste outside plants and equipment (Journal of Laws of 2015, item 996). The following are the results of tests at a location adjoining the Task location, compared to the limit values in accordance with Appendix 1 to the Regulation of the Council of Ministers on the recovery of waste outside plants and equipment (Journal of Laws of 2015, item 996).

[1] Musierowicz A. 1961. Mapa gleb Polski [A Map of Polish soils]. Wydawnictwa Geologiczne, Warsaw.

[2] Marcinek J., Komisarek J., Bednarek R., Mocek A., Skiba S., Wiatrowska K. Systematyka Gleb Pol. [Systematics of Polish Soils]. Roczniki Gleboznawcze, 62(3). Warsaw.

[3] Research carried out in preparation for implementation under Task 1B.3/2 - Stage II - Construction of mooring facilities of the lower and border Odra and new waterway signage at planned mooring facilities for icebreakers. The tests were carried out in accordance with the methodology specified in the Regulation of the Council of Ministers on the recovery of waste outside plants and equipment (Journal of Laws of 2015, item 996). A summary of the research results for all 5 tested locations is available in the Environmental Management Plan for Task 1B.3/2 on the OVFMP PCU website http://odrapcu2019.odrapcu.pl/popdow_dokumenty/

Polycyclic aromatic hydrocarbons (PAH) and PCB [mg/kg of dry mass]

Table 4 Polycyclic aromatic hydrocarbons (PAH) and PCB [mg/kg of dry mass]

Sample no.	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Benzo(a)pyrene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	PCB(7)
Norm	<1.5	<1.5	<1.5	<1.5	<1.0	<1.0	<1.0	<3.0
Osinów Dolny – 663.1 km of the Odra								
290/19/S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
291/19/S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
292/19/S	0.04	<0.03	<0.02	0.02	0.01	<0.01	0.02	<0.01
293/19/S	0.04	<0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01

Table 5 Heavy Metals [mg/kg of dry mass]

Sample no.	Arsenic	General chro-mium	Zinc	Cadmium	Copper	Nickel	Lead	Mercury
Norm	<30	<200	<1000	<7.5	<150	<75	<200	<1.0
Osinów Dolny – 663.1 km of the Odra								
290/19/S	<7	<3.35	28.22	<0.5	<5.0	<6.3	<9.37	0.02
291/19/S	<7	<3.3	25.33	<0.5	<5.0	<6.3	<9.37	0.02
292/19/S	<7	<3.3	10.74	<0.5	<5.0	<6.3	<9.37	0.03
293/19/S	<7	<3.3	<10	<0.5	<5.0	<6.3	<9.37	0.02

Source: Report on the tests of samples of spoil to be extracted as part of dredging works within the task entitled "Construction of mooring facilities on the lower and border Odra – a harbour for icebreakers", National Feed Laboratory in Szczecin, Institute of Zootechnics, State Research Institute, Szczecin, April 2019

4.5 SURFACE WATERS

The Odra is a controlled river. As a result of extensive control works in the 19th and 20th centuries, the banks were strengthened, the course of the river was shortened due to the bends being straightened, barrages were built (the last one was put into operation in 2018 in Malczyce). On the 186 km-long section from Kędzierzyn-Koźle to Brzeg Dolny, the Odra is a canalised river with 24 barrages. The difference in the level of the water table between the beginning and the end of the canalised section is about 64 m. In the middle section, below the Malczyce barrage, the Odra flows freely. The banks are strengthened with groynes. Construction of barrages caused a significant change in the hydrological regime and affected water relations throughout the valley. The Odra is characterised by significant fluctuations in flow rate. The

river is characterised by frequent low flows and at the same time has a high tendency to flood. This is confirmed by frequent floods. The largest floods in the Odra (since the beginning of water level measurements) happened in: 1813, 1854 and 1855, 1879, 1888 and 1889, 1903, 1909, 1910, 1915, 1922, 1926, 1930, 1940, 1946, 1958, 1965, 1970, 1972, 1977, 1981, 1985, 1997, 2001, 2002, 2006 and 2009, 2010. During the low-water period 2015-2018, the water level in the Odra riverbed decreased significantly, exposing the bottom zone.

The morphology of the section of the Odra covered by the Task indicates a strong transformation of the course of the riverbed and the shape of its banks, while maintaining some of the riverside habitats and transverse communication within the floodplain between the embankments. The course of the river has been shortened over the years, meanders have been cut off, and numerous technical structures have been used to direct the Odra current. Because of these works the JCWP should be classified as a strongly modified water body. Flood embankments are located from several dozen to several hundred meters away from the river. This enables the existence of floodplains, where habitats associated with frequent flooding develop. Highly valuable natural oxbow lakes are also found in the inter-embankment. In the groyne fields, artificial habitats are created, such as sand deposits, marginal lakes, as well as riffles created by the degradation of the riprap laid on groynes. These areas may provide convenient spawning grounds for lithophilic fish species. Slow-current groyne fields are also a safe place for the development of the fry of protected fish species, the spined loach, weatherfish, and amur bitterling. Therefore, maintaining such a structure of riverbank control in a regulated river is necessary in order to maintain its natural functions. If modernisation work on existing river control structures were to be abandoned, spontaneous habitat restoration would still occur, which in the near future (10-30 years) would result in maintaining or increasing habitat diversity and diversity of aquatic organism communities. However, further progressive degradation of these strengthening structures in the perspective of a few decades - or a few hundred years - would lead to their gradual disappearance and progressive depletion of morphological diversity in the regulated Odra riverbed. This would result in long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. It should be pointed out that such an effect is clearly visible on sections of the Odra within which an almost complete degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap.

On the section covered by the Task, the current hydrological regime of the Odra is largely conditioned by the past control works (in the 18th and 19th centuries).

The task will be implemented in the area of a single surface water body (JCWP):

- JCWP Name: the Odra from the Warta to the West Odra; JCWP code: PLRW60002119199

  JCW type: 21
  length of JCW: 87.13 km
  JCW catchment area: 211.41 km^2
  water region: Lower Odra and the Western Przymorze

This JCWP belongs to the abiotic type 21 (large lowland river) and is defined as a heavily modified water body, the main reason for which are the morphological changes of the riverbed resulting from it being adapted to the navigational function and flood protection of the areas adjacent to the riverbed. The condition of JCWP was assessed as bad.

As part of the environmental impact assessment, the JCWP in question was hydromorphologically assessed using both in-house and field methods.

The JCWP Odra from the Warta to the Western Odra was assessed as moderately natural and moderately transformed in terms of hydromorphology. The elements to the largest extent responsible for the transformation of the river habitat are the embankments and control structures, which include groynes. However, they are found on a shorter section of the JCWP compared to the Odra from the Nysa Łużycka to the Warta (analysed as part of Task 1B.2/1). A smaller number of groynes, and consequently groyne fields, also translates into a small number of deposits that are created in these places. Therefore, despite the smaller transformations, the JCWP exhibits a less natural riverbed. The higher value of the indicator results from the large area of wetlands within the analysed JCWP. On the basis of field studies, the hydromorphological status of the JCWP (after correction of the results from the in-house assessment) was classified as the 4th class of hydromorphological status (poor state).

The table below presents the results of the State Environmental Monitoring of water quality within the scope of basic physicochemical parameters.

Table 6 Summary of selected data for the classification of ecological capacity of rivers in the JCWP covered by diagnostic and operational monitoring – assessment for 2017 and 2018

Parameter	JCWP Odra from the Warta to the West Odra PLRW60002119199 (Odra - above the mouth of the Rurzyca (Krajnik Dolny)	
	Value (for 2017, in brackets for 2018)	Class* (for 2017, in brackets for 2018)
total suspension, mg/l	**18.1 (20.0)**	**1 (1)**
dissolved oxygen, mg O_2/l	**11.5 (11.7)**	**1 (1)**
BOD_5, mg O_2/l	**2.9 (3.0)**	**1 (1)**
COD – Mn, mg O_2/l	**9.2 (7.9)**	**1 (1)**
total nitrogen, mg N/l	**3.8 (2.9)**	**2 (1)**
total phosphorus mg P/l	**0.17 (0.16)**	**1 (1)**

Source: Chief Environment Inspectorate, http://www.gios.gov.pl/pl/stan-srodowiska/monitoring-wod

* quality classes from 1 (highest) to 5 (lowest)

4.6 GROUNDWATER

In accordance with the regional division of ordinary groundwater according to hydrogeological units (AHP), the Task area is located in the III Pomorski Region. According to the division into groundwater bodies (JCWPd), the area belongs to JCWPd PLGW600023 (water region of the Lower Odra and Pomorze Zachodnie).

According to the JCWPd status assessment, depending on groundwater impacts on groundwater dependent terrestrial ecosystems, JCWPd No 23 received a Good DW assessment (sufficient degree of reliability). Both the quantitative and chemical status was identified as good. The

JCWPd is not at risk of not achieving the environmental objectives (i.e. maintaining a good chemical and quantitative status).

In JCWPd 23 there are no cones of depression associated with groundwater abstraction, fossil drainage, the influence of agglomerations, there is no intrusion or ascension of salt water to groundwater. There is also no artificial restoration of resources. In 2011, water abstraction for water supply to the population, industry, and others was recorded at the level of 5,953.11 thousand m^3/year. The available water resources available equal 278 484 m^3/d and their use equals 5.9% of the resources.

The identified area sources of contamination are nitrate of agricultural origin, urbanised areas (town with 10 to 50 thousand inhabitants: Myślibórz, Dębno), and fertilisation of agricultural land (nitrogen fertilisers, liquid manure), or non-canalised areas of towns, estates, and villages.

Table 7 Quantitative and chemical status of JCWPd

JCWPd	Chemical status		Quantitative status	
	2012	2016	2012	2016
PLGW600023	good	good	good	good

Source: Map of the status of bodies of groundwater (JCWPd) acc. to the division into 172 areas (https://mjwp.gios.gov.pl/mapa/mapa,172.html)

4.7 ACOUSTIC CLIMATE

The main sources of noise in the area of Task implementation are primarily industrial noise and traffic noise. The Task section of the river is located outside significant noise sources (built-up areas with extensive road networks, industrial facilities).

The acoustic classification of areas in the vicinity of the Task was made on the basis of local zoning plans in individual communes and, in the absence of such plans, the actual development and destination of a given area and its neighbouring areas, in accordance with Article 115 of the Act of 27 April 2001. Environmental Law (consolidated text Journal of Laws of 2017, item 519). For this purpose, basic maps, cadastral maps, and orthophotomaps available on geoportals of individual communes were used.

No areas requiring acoustic protection were identified in the vicinity of the Task, i.e. single-family housing areas, homesteads, multi-family residential areas, or multi-apartment housing.

4.8 NATURE

4.8.1 FORMS OF NATURE CONSERVATION

The location of the Task against the locations of protected areas is shown on maps in Appendices 5a and 5b.

The reconstruction of the control structures of the Odra **on the section covered by the Task** is in spatial relations with three forms of nature conservation:

- Natura 2000 site Lower Odra PLH320037;
- Natura 2000 site Lower Odra Valley PLB320003;
- Cedynia Landscape Park;
- Environmental use area Kostrzyneckie Swamp.

Natura 2000 site Lower Odra PLH320037 covers a total area of 30,458.09 ha. It is elongated, connected with the river valley, and extends over an area of about 90 km. The landscape is dominated by wetlands and peatlands. In phytocenotic terms, meadows, alder, and riparian forests and flooded oxbows dominate. A large proportion of the area are natural floodplains, flooded annually in spring and occasionally in summer and autumn. The refuge also includes fragments of the bank zone of the Odra valley with patches of xerophilous vegetation, including xerothermic grasslands, broadleaved forests, and beech forests. The areas surrounding the refuge are largely used for agriculture, by way of meadow management and cattle grazing. This Natura 2000 site is characterised by well-preserved habitats, including 21 types of habitat from Appendix I to Council Directive 92/43/EEC. The key habitats in the refuge are dependent on flowing waters: oxbow lakes and natural eutrophic water reservoirs with *Nympheion* and *Potamion* (habitat code: 3150; area 397.81 ha), lowland and sub-mountain rivers with batrachium communities (habitat code: 3260; area 3.25 ha), flooded muddy riverbanks (habitat code: 3270, area 2.82 ha), *Molinion* meadows on calcareous, peaty or clayey-silt laden soils (habitat code: 6410; area 10.13), mountain herbs *Adenostylion alliariae* and riverside herbs *Convolvuletalia sepium* (habitat code: 6430; area 0.66 ha) and *Cnidion dubii* alluvial meadows (habitat code: 6440; area 22.23 ha). Huge areas are occupied by willow, poplar, alder, and ash riparian forests (habitat code 91E0; area 1966.1 ha).

Two reservoirs of Hard oligo-mesotrophic waters with benthic vegetation of Chara spp were found in the refuge (habitat code: 3140). *Salvinia natans* and *Nymphoides peltata* (species endangered in Poland) are among species found in the channels of Międzyodrze. Rare and endangered animal species are also numerous, including 17 species from Appendix II to Council Directive 92/43/EEC. The lesser ramshorn snail *Anisus vorticulus*, northern crested newt *Triturus cristatus*, fire-bellied toad *Bombina bombina* are associated with oxbow lakes. Ichthyofauna is represented by three species from the Habitats Directive: the white-finned gudgeon *Romanogobio albipinnatus (Gobio albipinantus*), asp *Aspius aspius*, and spined loach *Cobitis taenia*. The mammals under protection in the area include: the greater mouse-eared bat *Myotis*

myotis, pond bat *Myotis dasycneme*, beaver *Castor fiber*, otter *Lutra lutra*, and wolf *Canis lupus*[1].

The Lower Odra Valley Special Bird Protection Area PLB320003 covers a total area of 61 648.30 ha and stretches over 150 km. The area of the refuge includes the Odra valley, between Kostrzyn and the Szczecin Lagoon along with Lake Dąbie. The area below Cedynia is called the Oderbruch, within which the so-called Kostrzyneckie swamp has a special significance for birds. The entire area is a European Important Bird Area. The area is particularly important for wetland birds (during the breeding, migration, and wintering periods), which are found here in huge concentrations. During the breeding period, the area is inhabited by at least 1% of the national population of the following bird species: the Eurasian bittern *(Botaurus stellaris*), marsh harrier *(Circus pygargus*), and greylag goose *(Anser anser*). Species at relatively high density include: the black tern *(Chlidonias niger*), red-backed shrike *(Lanius collurio*), and aquatic warbler *(Acrocephalus paludicola*). During the migration period, at least 1% of the migratory route population of the following bird species are found: the taiga bean goose *(Anser fabalis*) and the white-fronted goose *(Anser albifrons*); at relatively high densities: the whooper swan *(Cygnus cygnus*), great crested grebe *(Podiceps cristatus*), gadwall *(Mareca strepera*), lapwing *(Vanellus vanellus*), and golden plover (Pluvialis apricaria); up to 5 000 cranes (*Grus grus*) can be found in autumn staging areas. In winter, the great crested grebe (*Podiceps cristatus*) is found in high numbers[2].

The Cedynia Landscape Park covers an area of 30850 ha and is located in the communes of: Cedynia (12790 ha), Chojna (10260 ha), Mieszkowice (5300 ha), and Moryń (2500 ha). It is protected due to its natural, historical, and cultural values. Its main objective is to preserve, promote, and disseminate these values in conditions of sustainable development. The park features uniquely structured physical composition. Examples of include: moraine upland, the Odra gorge intersecting with end moraines, Krzymowskie Hills, kame hills located north of Lubiechów Dolny and in the area of Orzechów, hills in the area of Osinów Dolny.

Environmental use area Kostrzyneckie Swamp - covers an area of 746.23 ha and is located in the commune of Cedynia in the Zachodniopomorskie Voivodeship. Created to protect the Odra swamp and oxbow, some of meadows and pastures that are a place of breeding and feeding for numerous species of birds, amphibians, reptiles, and mammals. Kostrzyneckie Swamo is part of the Cedynia Landscape Park.

[1] Natura 2000 – Standard Data Form (SDF) PLH320037, 2017

[2] Natura 2000 - Standard Data Form (SDF) PLH320003, 2017

4.8.2 PROTECTED SPECIES OF FUNGI, PLANTS, AND ANIMALS

Field work methodology for plant and fungi species and natural habitats

Field surveys were conducted in two ways. The first method consisted in marching along the inventoried section of the Odra and documenting the occurrence of protected and rare flora and protected natural habitats located in the area of planned activities, in collision with or at risk of destruction in connection with the proposed river control measures. The width of the inventoried strip depended on the local specificity of the area. The surveys were carried out in the area between the riverbed and the flood embankment. The area was usually about 50 to 100 m wide. The second method was to swim in a canoe or pontoon along these sections in order to carry out an inventory of the flora and habitats from the water and also to perform a macrophyte assessment of the river. Part of the area, i.e. sections of the river in the area of the Kostrzyneckie Swamp, was inventoried only from the water due to the inaccessibility of the area.

The inventory concerned the occurrence of:

- plant species legally protected in accordance with the Regulation of the Minister of Environment of 9 October 2014 on plant species protection (Journal of Laws of 2014, item 1409),
- fungi species legally protected in accordance with the Regulation of the Minister of Environment of 9 October 2014 on fungi species protection (Journal of Laws of 2014, item 1408),
- natural habitats listed in Appendix I to the Habitats Directive – types of natural habitats of Community interest whose conservation requires the designation of special conservation areas (92/43/EEC),
- natural habitats listed in Appendix 1 to the Regulation of the Minister of Environment of 13 April 2010 on natural habitats, species of Community interest and selection criteria for areas qualifying for being classified or designated as Natura 2000 areas (Journal of Laws of 2010, item 510),
- plant species listed in Appendix II to the Habitats Directive – plant and animal species of Community interest whose conservation requires the designation of special conservation areas (92/43/EEC),

The inventory was carried out on the banks of the Odra, at the sites of planned river control activities. Field surveys were conducted several times a year to capture various aspects of the growing season (May, June, October).

The populations of protected plants was estimated at the found sites and an overall assessment of the conservation status of habitats was made in accordance with the guidelines contained in the methodology manuals for natural habitats monitoring, part: I, II, III, IV (Mróz W. (ed.) 2010, 2012, 2012, 2015).

The nomenclature of vascular plants was adopted after Mirek et al. (2002). The phytosociological approach to plant communities is consistent with the study by Matuszkiewicz (2008).

Protected fungi species

No valuable species of fungi, including lichen, were found in the Task area. Due to the lack of suitable habitats, i.e. well-developed mesophilic deciduous forests or peatlands, this area is not suitable for this group of organisms.

Protected plant species

The Odra valley is an important refuge for valuable plant species. There are numerous sites with species that are not found or are rarely found in other regions of north-western Poland, which is due to the specificity of the habitats where they occur. Four plant species under legal protection were found in the Task area and its immediate vicinity. Plant species listed in the Appendices to the Habitats Directive (II, IV, V) were not found in the surveyed area.

Table 8 Protected plants inventoried within the Task implementation area

No.	Species name	Conservation status	Threat status in the region/in the country	Population resources (specimens or area)	Number of stations	Location
1	River strapwort *Corrigiola litoralis*	OS	CR	unknown	1	Site at approx. 660.0 km.
2	Broad-leaved helleborine *Epipactis helleborine*	OC	-	6 specimens	1	Broadleaved forest between Osinów Dolny and Stary Kostrzynek at approx. 661.4 km.
3	Salvinia natans *Salvinia natans*	OS	VU	unknown	unknown	Littoral waters of the Odra throughout the inventory section.
4	marsh spurge *Euphorbia palustris*	-	NT	unknown	many	Found in large numbers throughout the Task area.

Conservation status: OS – strict protection, OC – partial protection, NT – near threat species (Red Book of Endangered Species), VU – vulnerable species (Red Book of Endangered Species),
unknown – no data.

Protected animal species

Macrobenthos and aquatic malacofauna

The surveys of macrobenthos and malacofauna of the border Odra were conducted in 2017 at 16 survey stations. Two deadlines for monitoring work were foreseen: May-June (10 stations) and September-October (16 stations), i.e. during the period of the greatest taxonomic diversity of macrobenthos. At each of the survey stations, sampling points were established in accordance with the method of "Methodology of sampling multihabitat benthic macroinvertebrates (RIVECOmacro) in large rivers and rivers that are difficult to access for ecological monitoring

purposes, in accordance with the provisions of the Water Framework Directive"[1]. In the case of malacofauna sampling, samples were taken once from 17 stations, from 10 stations in June and from the remaining 7 in September. Samples were taken by a diver from sites of mass occurrence of Unionidae mussels.

No protected or rare taxa were recorded in the studied macrobenthos. Benthos of the border Odra was characterised by a high proportion of taxa alien to our native fauna, 15 species were recorded in the group of molluscs and crustaceans. Alien species were often characterised by high densities, which was especially true of crustaceans.

Entomofauna and terrestrial malakofauna

The scope of the inventory of entomofauna and malacofauna included the identification of the area, species composition, and number of animals. The survey started in June and was completed in October 2017. Four inspections were carried out within the following periods: 26.06 – 28.06, 17.07 – 19.07, 14.08 – 17.08, 01.09 – 05.09.

A species from Appendix II to the Habitats Directive, the green snaketail *Ophiogomphus cecilia*, was found on the banks of the Odra. Dragonflies were found regularly, along the entire length of the Odra riverbank.

The other found species belong to the order *Hymenoptera*. These include bumblebees of the genus *Bombus*: buff-tailed bumblebee, red-tailed bumblebee, red-shanked carder bee, common carder bee, garden bumblebee, tree bumblebee, white-tailed bumblebee, early bumblebee, and shrill carder bee.

These species are not uncommon, in some places even numerous, or common. They are not in danger of extinction.

No molluscs were found in the 25 material samples collected during the inventory.

Ichthyofauna

Surveys of the species composition of ichthyofauna were carried out in the field, using the electro-fishing method.

The inventory was conducted on 16-29 September 2017. As a result of the inventory, 10 fish taxa were found, which were mainly widespread species. One fish species included in Appendix II to the Habitats Directive was found at the surveyed sites: amur bitterling (*Rhodeus amarus*). A list of inventoried protected fish species is presented in the table below.

[1] Bis B., Mikulec A. (ed.) 2013. Przewodnik do oceny stanu ekologicznego rzek na podstawie makrobezkręgowców bentosowych [Guide to assessing ecological status of rivers on the basis of benthic macroinvertebrates]. Biblioteka Monitoringu Środowiska, Warsaw, 61-68.

Table 9 List of protected fish species within the Task impact range

No.	Species name	Conservation status	Threat classification		Frequency of occurrence	Average abundance [spcs./m^2]
			in the Odra according to Witkowski et al. 2009 (IUCN categories)	IUCN categories 2018		
1	Amur bitterling *Rhodeus sericeus amarus*	OG, DS II	VU B2	LC	frequent	0.001-0.22
2	Ide *Leuciscus idus*	W	LC	LC	frequent	0.002-0.01
3	Dace *Leuciscus leuciscus*	W	NT	LC	frequent	0.001-0.05
4	Burbot *Lota lota*	W	VU A1	LC	frequent	0.002 – 0.06
Explanations: OG – species protection in Poland (partial); DS II – species from Appendix II to the Habitats Directive; DS V – species from Appendix V to the Habitats Directive; W – able size						

Herpetofauna

Herpetofauna inspections were carried out from mid-April 2017 to the end of July 2017. Within the section at 654.0-663.0 km, both day as well as evening and night inspections were carried out in order to monitor and check the activity of nocturnal amphibian species. The monitoring covered all native species of herpetofauna under strict or partial protection in accordance with the Regulation of the Minister of Environment on conservation of animal species of 16 December 2016. Among them, the species referred to in Appendix II to the Habitats Directive of the European Union (Council Directive 92/43/EEC, 1992) were particularly carefully searched for.

No specimens of the crested newt (*Triturus cristatus)*, protected in the Natura 2000 site Lower Odra (PLH320037), were found in the surveyed area. A large part of these areas are reservoirs with strong fish pressure, in which the crested newt does not survive, and due to frequent flooding, smaller reservoirs in the tested area do not have good habitats for this species.

A detailed list of species and their conservation status for individual areas of works is presented in the table below.

Table 10 Protected reptile and amphibian species inventoried within the Task area

No.	Species name	Conservation status	Abundance	Location
1	Green frog complex *Rana esculenta complex*	-	approx. 180 specimens	Along the entire section
2	Grass snake *Natrix natrix*	Ocz	16	15 specimens at 663 km
3	Sand Lizard *Lacerta agilis*	Ocz, DIV	1	approx. 662.9 km
4	pool frog *Pelophylax lessonae*	Ocz, DIV	9	approx. 660 km

No.	Species name	Conservation status	Abundance	Location
5	Marsh frog *Pelophylax ridibundus*	Ocz, DV	6	approx. 663 km
6	European fire-bellied toad *Bombina bombina*	OS, DII, DIV	2	approx. 662.5 km
7	Common toad *Bufo bufo*	Ocz	approx. 40 tadpoles	presence throughout the entire section is estimated
8	Green toad *Bufo viridis*	OS, DIV	approx. 50 tadpoles	approx. 658.0 km
9	Common frog *Rana temporaria*	Ocz, DV	approx. 20 specimens	at the Kostrzyneckie Swamp at approx. 658.0 - 659.0 km
Explanations: Ocz – partial protection; OS – strict protection; DIV – Appendix IV of the Habitats Directive; DV – Appendix V of the Habitats Directive; DII - Appendix II of the Habitats Directive				

The Kostrzyneckie Swamp is an important breeding site for the green toad and green frogs. It is certainly a breeding site for a much larger number of species, although the conditions in the year of the survey meant that amphibians used it rarely.

Mammals

Mammal surveys were carried out both from land and from water, which gave the opportunity to inventory all habitats associated with mammals. The inventory covered species under strict or partial protection in accordance with the Regulation of the Minister of Environment on conservation of animal species of 16 December 2016. Among them, the species referred to in Appendix II to the Habitats Directive of the European Union (Council Directive 92/43/EEC, 1992) were particularly carefully searched for. The following table shows the results of the inventory.

Table 11 List of protected terrestrial mammal species recorded in the Task area

No.	Species name	Conservation status	Inventory results, occurrence in the surveyed area
1	Beaver *Castor fiber*	OC, DSII	The beaver was found throughout the Task area, excluding areas completely devoid of woody vegetation. Due to the relatively strong current, there are no favourable conditions for building dams, and due to fluctuations in water levels, beavers prefer places at a distance from the banks. Permanent beaver populations were found in oxbows, near riparian forests. Beaver activity was found in the bank zone at 655 – 658.5 km, it should be assumed that beavers use this zone for feeding.
2	Otter *Lutra lutra*	OC, DSII	Species recorded fairly regularly along the Odra - predator faeces were mainly recorded on stony banks. There are also sandy banks along the Odra, which constitute a good place for otter hideouts and burrows. Oxbows and riparian forests, places with bends and tributaries are suitable for feeding for the species. Scaring these animals and local loss of refuge may apply in particular to such locations at 655-655.5 and 661.0 km.
3	Weasel *Mustela nivalis*	OC	It is found throughout the country, but it is not a common species. Traces of weasel near the bank were recorded along the entire length of the Task area.

No.	Species name	Conservation status	Inventory results, occurrence in the surveyed area
4	Pigmy shrew *Sorex minutus*	OC	One shrew specimen was inventoried. It can be considered widespread in the region. Along the banks of the Odra, there are many habitats potentially beneficial to the species.
5	European Mole *Talpa europaea*	OC	The mole is widespread in the region and in the entire country (except for the seacoast and high mountain areas). Reported near the riverbed and on flood embankments, it was not found on the banks of the Odra, as it avoids wetlands.
6	European water vole *Arvicola amphibius*	OC	Mound traces were found along the whole riverbank, the number of mounds in the survey area indicates a prevalence of the species in the region, although it is not a large population – mounds were not visible at regular intervals.
Explanations: OS – strict protection; OC – partial species protection; DSII – Appendix II of the Habitats Directive.			

Ornithofauna

Monitoring covered bird species listed in Appendix I to Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Particular attention was also paid to species that are subject to conservation in Natura 2000 sites within the survey area. The first inspections of ornithofauna were carried out in mid-April 2017 and the last ones at the end of July 2017. Day and night checks were carried out. The spring-summer ornithological inventory covered the entire Task section. The most common group of birds were geese, among which the greylag goose and taiga bean goose dominated. Water birds, such as ducks (especially mallards), cormorants, swans and coots, were represented in large numbers. Numerous flights of starlings and chaffinches along the thickets on the banks of the Odra were also recorded. The less numerous species, whose total number was not more than 1000 specimens, included the fairly common mergansers, rare duck species, but also crows, gulls and herons. It is also worth noting the fact that a few white-tailed eagles, the most widely recorded bird of prey, were recorded. They used the high concentrations of wetland birds as a potential source of food.

Below is a list of protected bird species.

Table 12 List of protected species of birds recorded within the Task area

No.	Polish name	Latin name	Conservation status	Number of breeding pairs/non-breeding specimens	Nature of the habitat
1	Little bittern	*Ixobrychus minutus*	OS, Dpl	1 pair	l
2	White-tailed eagle	*Haliaeetus albicilla*	OS, Dpl	2-7 specimens	ż, zi
3	Black stork	*Ciconia nigra*	OS, Dpl	2 specimens	ż
4	Common sandpiper	*Actitis hypoleucos*	OS	1 pair	l
5	Eurasian teal	*Anas crecca*	Ł	several hundred specimens	p, zi
6	Garganey	*Spatula querquedula*	OS	1 pair / several hundred specimens	l, p, zi

No.	Polish name	Latin name	Conservation status	Number of breeding pairs/non-breeding specimens	Nature of the habitat
7	Lapwing	*Vanellus vanellus*	OS	4 pairs / several hundred specimens	l, p, zi
8	Great white heron	*Ardea alba*	OS, Dpl	up to 20 specimens	p, zi
9	Grey heron	*Ardea cinerea*	OS	up to 30 specimens	p, zi
10	Tufted duck	*Aythya fuligula*	Ł	several hundred specimens	p, zi
11	Corncrake	*Crex crex*	OS, Dpl	6 breeding pairs	l
12	Black woodpecker	*Dryocopus martius*	OS, Dpl	1 specimen	zi
13	Green woodpecker	*Picus viridis*	OS	1 pair	l
14	Rook	*Corvus frugilegus*	OS	several hundred specimens	p
15	Common goldeneye	*Bucephala clangula*	OS	several dozen specimens	p, zi
16	Red-backed shrike	*Lanius collurio*	OS, Dpl	5-6 pairs	l
17	Greylag goose	*Anser anser*	Ł	thousands of specimens	p, zi
18	White-fronted goose	*Anser albifrons*	Ł	several hundred specimens	p, zi
19	Taiga bean goose	*Anser fabalis*	Ł	thousands of specimens	p, zi
20	Black kite	*Milvus migrans*	OS, Dpl	1 pair	ż
21	Jackdaw	*Corvus monedula*	OS	several dozen specimens	p
22	Black cormorant	*Phalacrocorax carbo*	OS	several hundred specimens	zi
23	Gadwall	*Mareca streper*	OS	several dozen specimens	p, zi
24	Sparrowhawk	*Accipiter nisus*	OS	3-5 specimens	p
25	Raven	*Corvus corax*	Ocz	4 specimens	ż
26	Mallard	*Anas platyrhynchos*	Ł	several hundred specimens	p, zi
27	Common snipe	*Gallinago gallinago*	Ł	8-12 pairs	l
28	Mute swan	*Cygnus olor*	OS	2-5 pairs / several hundred specimens	l, p, zi
29	Coot	*Fulica atra*	Ł	several hundred specimens	p, zi
30	Common gull	*Larus canus*	OS	several dozen specimens	p, zi
31	European herring gull	*Larus argentatus*	OS	several dozen specimens	p, zi
32	Rough-legged buzzard	*Buteo lagopus*	OS	2 specimens	p
33	Buzzard	*Buteo buteo*	OS	unknown	ż, p
34	Common merganser	*Mergus merganser*	OS	1 pair / several hundred specimens	l, p, zi
35	Great crested grebe	*Podiceps cristatus*	OS	several dozen specimens	p, zi

No.	Polish name	Latin name	Conservation status	Number of breeding pairs/non-breeding specimens	Nature of the habitat
36	Little grebe	*Tachybaptus ruficollis*	OS	several dozen specimens	p, zi
37	Northern shoveler	*Spatula clypeata*	OS	6 specimens	p, zi
38	Common kestrel	*Falco tinnunculus*	OS	1 specimen	p
39	Osprey	*Pandion haliaetus*	OS, Dpl	2 specimens	p
40	Lark	*Alauda arvensis*	OS	unknown	l
41	Thrush nightingale	*Luscinia luscinia*	OS	unknown	l
42	River warbler	*Locustella fluviatilis*	OS	unknown	l
43	Widgeon	*Anas penelope*	OS	5 specimens	p, zi
44	Bearded reedling	*Panurus biarmicus*	OS	unknown	p
45	Hooded crow	*Corvus corone*	Ocz	several hundred specimens	p, zi
46	Common chaffinch	*Fringilla coelebs*	OS	unknown	p
47	Common kingfisher	*Alcedo atthis*	OS, Dpl	unknown	l, zi
48	European bee-eater	*Merops apiaster*	OS	a few breeding pairs	ż
49	Crane	*Grus grus*	OS, Dpl	6-8 pairs / several hundred specimens	l, p, zi
Explanations: Conservation status: OS – strict species protection, Ocz – partial species protection, Ł – game species with a conservation period, Dp1 - species from Appendix I to the Birds Directive, Nature of the habitat: l – breeding species, p – migratory (flying) species, ż – feeding species, zi – wintering species.					

Chiropterofauna

All inventoried bat species are subject to strict protection in Poland under the Regulation of the Minister of the Environment of 6 October 2016 on conservation of animal species and require active protection (Journal of Laws of 2014, item 1348). Conservation statuses and inventory results for bats are presented in the table below.

Table 13 List of protected species and groups of bats in the Task area

No.	Name	Conservation status	Occurrence in the Task area
1.	Nathusius's pipistrelle *Pipistrellus nathusii*	OS	Potential areas that could constitute bat habitats: - 662 km - Osinów Dolny (buildings can be a day shelter for bats during the breeding period, unheated underground facilities with constant temperature can serve as wintering sites), - 659 km - willow thicket near Stary Kostrzynek (hollow trees can be a day shelter for bats during the breeding season),
2.	Common pipistrelle *Pipistrellus pipistrellus s. s.*	OS	
3.	Soprano pipistrelle *Pipistrellus pygmaeus*	OS	

No.	Name	Conser-vation status	Occurrence in the Task area
4.	Common noctule *Nyctalus noctula*	OS	- 655 km - near Stara Rudnica (hollow trees can be a day shelter for bats during the breeding season),
5.	Unmarked bat *Myotis sp*.	OS	
Explanations: • Conservation status: OS – strict species protection			

4.8.3 PROTECTED NATURAL HABITATS

As in the case of flora, the Odra bank areas create favourable conditions for the development of valuable natural habitats. Fragments of natural riparian forests representing natural habitats 91E0 - willow, poplar, alder, and ash riparian forests (*Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae,* spring alders) and 91F0 - riparian oak-elm-ash forests (*Ficario-Ulmetum*) have been preserved here. All control-related work should be carried out in such a way as to have the least possible impact on the natural processes taking place here.

The types of natural habitats found in the places of Task implementation and in its immediate vicinity and their approximate location are presented in the table below.

Table 14 Protected natural habitats inventoried within the Task area.

No.	Habitat type	Approximate kilometre of the river
1	**3270** - Flooded muddy riverbanks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	Numerous over the entire section
2	**6430** – Mountain herbs (*Adenostylion alliariae*) and riverside herbs (*O. Convolvuletalia sepium*)	655.2; 661.2
3	**91E0** - willow, poplar, alder, and ash riparian forests	654.1 – 654.4; 655.0 – 655.3; 657.9 – 661.0; 661.2 – 662.3

4.9 CULTURAL LANDSCAPE AND OBJECTS OF CULTURAL HERITAGE

The tasks will be carried out in the area of a typical cultural landscape of a partially regulated lowland river. Hydrotechnical equipment has constituted its element since the 19th century. In the immediate vicinity of the works, the presence of historical buildings was not identified.

4.10 POPULATION

Works related to the modernisation of control structures of the border Odra will be carried out in areas with varied spatial development. Some of the works will be carried out in the vicinity of forested areas, meadows and farmlands. The only works in the vicinity of built-up areas will be carried out near the village of Osinów Dolny.

5. ENVIRONMENTAL IMPACT CHARACTERISTICS BASED ON THE FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

5.1 LAND AND LANDSCAPE

Implementation phase

The scope of the Task within the planned modernisation works on the border Odra will be based on the existing river control structures, and changes will not extend beyond the existing riverbed. The scope of the Task covers primarily the reconstruction of existing groynes, which will reduce interference with the environment and landscape. Impact on land and landscape will also occur at the sites of temporary storage of materials. However, this will be a local impact.

Taking into account the need to carry out works from the water (where possible) and cooperation with environmental supervision, it is concluded that the execution of the planned works will not significantly affect the geological conditions. No exploitation of mineral resources or land exchange is foreseen.

Once the implementation phase, largely associated with earthworks, is completed, the site will be cleaned up. In order to limit the impact of the works on the ground and landscape during the implementation of the Task, mitigation measures described in Appendix 1 to the EMP should be implemented.

Operation stage

Analysis of the results of the Task's impact on the landscape showed a negligible impact. The Odra valley has been controlled since the 18th century, which is why the implementation of the Task after the completion of construction works will not lead to significant changes in the surface of the earth and in the landscape. Local changes in the location of existing bars and islands, which are an important part of the river valley landscape, may occur.

5.2 CLIMATE

Due to the nature of the Task, no negative impact of the Task on the climatic conditions of the Odra valley is expected, either during the implementation of the works or at the stage of Task operation.

Greenhouse gas emissions

During the construction phase, the combustion of fuels by vessels and construction machinery will emit exhaust gases, including carbon dioxide classified as a greenhouse gas. These impacts will not be significant and will cease once the works are completed. At the stage of Task operation, no greenhouse gases will be emitted. In particular, there is no need to supply electricity, the production of which in professional energy facilities is associated with CO_2 emissions.

Ensuring that the Task will not be affected by negative phenomena resulting from climate change

The task has been designed in accordance with the applicable hydrotechnical regulations, which take into account extreme environmental phenomena related to climate change (this is regulated by the relevant regulations on the design, construction, and operation of hydrotechnical structures). The implementation of the Task will, by improving the conditions for icebreakers, improve the flood protection of the villages located in the Odra valley and thus contribute to reducing the effects of adverse phenomena associated with climate change.

5.3 SANITARY CONDITION OF THE AIR

Implementation phase

During the execution of the Task, there will be short-term (only the implementation period), local emission of gaseous pollutants and particulate matter. The operation of construction machines and vessels used for the works will generate pollutants coming mainly from fuel combustion by engines (such as nitrogen oxides, sulphur dioxide, carbon monoxide or aliphatic hydrocarbons).

The pollutants will be emitted at a low height, so their spread, being limited, will not have any significant, lasting influence on air quality. However, due to the possibility of reaching maximum values of permissible nitrogen oxides, it is necessary to control emissions, comply with emission standards, use efficient equipment and plan works in such a way as to limit the impact, in particular the nitrogen oxide emissions to the atmosphere: shut down machines and devices during breaks, avoid using equipment in the so-called idle gear.

It was concluded that in order to limit the impact of the works on the sanitary condition of the air during the implementation of the Task, mitigation measures described in Appendix 1 to the EMP should be implemented.

Operation stage

The functioning of the control structures at the stage of operation does not involve emissions to the air.

5.4 SOILS AND EARTH

Implementation phase

At the stage of implementation, the negative impact on soils will be associated with earthworks and with the organisation of the construction site. There may be some changes in the way areas are used. The acquisition and use of the property will be carried out on the basis of the Project Operational Manual for the Odra-Vistula Flood Management Project and on the basis of the Land Acquisition and Resettlement Action Plan prepared for the Contract in accordance with the Operational Policy of the World Bank OP.4.12.

Due to the scale of works and exclusion of the biologically active area, these impacts will be local and will not significantly affect the deterioration of soils in this area.

Threats to soils are mainly associated with the occurrence of emergency situations, such as leakage of petroleum substances, which may result in local soil contamination. The impacts will be local.

Negative impacts associated with the temporary relocation of earth masses during earthworks will be temporary.

In order to limit the impact of the works on the state of soil and land during the implementation of the Task, mitigation measures described in Appendix 1 to the EMP should be implemented.

Operation stage

Limiting the flooding of the valley bottom during rises will result in reduced deposition of sediments and slower changes in the morphology of the valley bottom.

5.5 SURFACE WATERS

Implementation phase

ASSESSMENT OF THE IMPACT OF THE TASK ON INDIVIDUAL WATER QUALITY INDICATORS

As part of the environmental impact assessment carried out for the environmental permit (see Appendix 4a), an assessment of the impact on bodies of surface water was carried out. Below is a summary of the total impacts of the full scope of the investment which this Task is part of. The description of the impact applies only to the JCWP Odra from the Warta to the West Odra (JCWP code: PLRW60002119199), within which the Task will be carried out.

In accordance with the currently applicable Odra River Basin Management Plan, the Task is located within the surface water body Odra from the mouth of the Warta to the Western Odra, code PLRW60002119199. The abovementioned JCWP is a heavily modified body of water whose status has been identified as poor and the achievement of environmental objectives is at risk. The environmental objective is to achieve a good ecological capacity, the possibility of migration of aquatic life in the section of the important watercourse – the river Odra within the JCWP, and a good chemical status. The deadline for achieving good status was set for 2021, with the following justification: "Lack of technical possibilities". No pressure has been identified in the JCWP catchment area that may be the cause of exceeding quality indicators. It is necessary to make a detailed diagnosis of the causes in order to properly plan corrective actions. Identifying the causes of failure to achieve good status will be ensured by the implementation of actions at national level: the creation of a national database on hydromorphological changes, an in-depth analysis of pressure in terms of hydromorphological changes, the development of good practices in the field of hydrotechnical works and maintenance works and the establishment of rules for their implementation, and the development of a national programme for the renaturalisation of surface waters.

In addition, Appendix No. 3 to the ORBMP update indicates the following projects (taking into account the scope of work of the Task), the implementation of which may contribute to the failure to achieve the environmental objectives of the JCWP:

- 3_381_O Modernization works on boundary sections of Odra River to provide Good Condition for Ice-breaking,
- 3_392_O Reconstruction of River Control Infrastructure.

However, the abovementioned projects constitute an overriding public interest arising from the need to ensure flood protection. The ORBMP also discusses alternative ways of achieving the objective, with the assessment that there are no activities less invasive in relation to the natural environment – all proposed alternative actions that could improve the conditions for icebreaking affect the environment equally or more negatively.

For the Task, the above Plan indicates actions aimed at minimising the impact on the status of surface water bodies (see chapter 6.5 and 6.8.1.), which are included in Appendix 1 to the EMP.

Taking into account the planned scope of the Task, it should be assumed that the implementation may contribute to the local deterioration of habitats and living conditions of fish, including protected species, macroinvertebrates, and hydrophytes located, among others, in the bank zone of groynes and depressions in groyne fields.

All groynes have so-called "wings", located on the riverbank, and their average length is 11 m (few groynes will have wings longer than 30 m). The wings will, on average, occupy up to 20% of the bank of the groyne field. The total interference will cover approximately 6% of the total JCWP, which indicates a negligible impact on the biological and hydromorphological elements of the JCWP. The analysis of the impact on the JCWP was determined on the basis of the study "Ocena wsteczna stanu jednolitych części wód na potrzeby indywidualnej analizy zgodności z Ramową Dyrektywą Wodną projektów współfinansowanych z funduszy unijnych" ["Retrospective assessment of the status of water bodies for the purposes of individual analysis of compliance with the Water Framework Directive of projects co-financed from EU funds"] (Pchałek M. et al.), National Water Management Authority, Warsaw 2014, where the threshold value for a significant impact was determined as 20% of the length of the JCWP. The indicated values of the proportions of the JCWP bank sections subject to the changes will therefore be significantly lower than the threshold for the significant impact of the modernisation of hydrotechnical structures on the JCWP of great lowland rivers.

In order to minimise the impact of the works within the groynes on the existing fish habitats and hiding places, habitats of macrozoobenthos, submerged macrophytes and phytobenthos, many mitigating actions (see chapter 6.5 and 6.8. 1.), which are described in detail in Appendix 1 to the EMP, were introduced.

Periodic turbidity of the water may occur when the riprap is laid. The area of works is small in relation to the width of the river and the flow on this section of the Warta and the suspension will be dispersed rapidly. However, it is possible that increased concentrations of suspension may persist to in groyne fields in the work area, which may lead to local deterioration of habitats and living conditions of fish and macroinvertebrates, which is particularly dangerous during spawning, spawn incubation and hatching. In addition, from the point of view of the resources of the ichthyofauna inhabiting the bank zone and groyne fields, increased movement of construction equipment and, above all, vibrations associated with the placement of strengthening

elements may pose a significant threat to the abovementioned elements of the natural environment, as a result of which the local ichthyofauna will be scared away to neighbouring areas for the duration of the works. Nevertheless, it is to be expected that after the completion of the works, the affected sections of the river will be quickly recolonised by fish. In order to limit the impact of increased amount of suspensions and stress factors on fish, the earthworks in the riverbed will be carried out outside the period of spawning, growth and hatching, which for most Odra species occurs in the period from March to mid-July.

This time limit will not reduce potential spawn and fry losses of: burbot *(Lota lota)*, which prefers deep stream pools in groyne fields, where the spawning grounds of this species are located (parts of sandy-muddy bottoms, often overgrown with vegetation, 1-3 m deep), spawning in winter (December-February) and whitefish *(Coregonus lavaretus)*, spawning also in winter (spawning in December, incubation until March-April). Hence the minimisation measures indicated in chapter 6.8.1., including the restocking of the Odra with these fish species. In addition, due to the fact that the Odra is a migration route for many species of diadromous fish, including eels, measures have been put in place to reduce the impact of the Task on these species. They are described in Appendix 1 to the EMP. The planned Task will not have a significant negative impact on the passability of the Odra for fish migration.

Interference with the structure of the riverbank will contribute to the local destruction of microhabitats of plants, invertebrates, and ichthyofauna. However, in view of the controlled JCWP, the impact of these works, which will be conducted on short sections, will be negligible. At the same time, the use of natural materials, i.e. stone, will create the right conditions for the creation of habitats for rheophilic groups of invertebrates (mayflies, caddisflies, gammarus), settled mussels of the *Dreissenidae* family and fish which prefer hard bottoms with hiding places - e.g. the burbot, barbel, stone loach. River walls, like dams, are planned on stretches of previously strengthened banks, unattractive for aquatic organisms, therefore, no significant depletion of habitats in connection with the implementation of this Task element is expected. Additionally, the construction works, including laying geotextile, sinking mattresses, and laying riprap, will be carried out in a manner limiting the negative impact of the Task on the submerged and floating-leaved vegetation located in the littoral zone, by way of replanting them to places where the works have already been completed (e.g. the places at the base of the modernised groynes or behind the dam). Moreover, in order to minimise the effects of the bank unification in the sections covered by the works, plans were made to construct the wall with an undulating line, i.e. to construct the wall in accordance with the existing terrain, without straightening the bank.

The potential impact of the Task on the protection objectives of the following Natura 2000 sites located in the place of works and the potential impact zone was also analysed in detail: Lower Odra PLH320037, Lower Odra Valley PLB320003 Cedynia Landscape Park, Environmental use area Kostrzyneckie Swamp, also in the context of individual defined conservation objectives, including those for natural habitats and species dependent on waters.

Taking into account factors such as: the section-by-section performance of works, the technology of conducting the works with floating equipment, conducting the works in the riverbed in

the autumn-winter season, and possible impacts being spread out over time (no accumulation of the effects of the reconstruction of river control structures and the effects of possible dredging at the stage of maintenance works), no cumulation with the works on the German bank, implementation of additional measures minimising the impact on the environment and the results of the assessment of investment impact on the abovementioned protected areas presented in this permit, it was concluded that the implementation of the task is not associated with any risk of significant negative impacts on Natura 2000 sites.

The analysis of the results of the conducted tests and models indicates that the functioning of the reconstructed and new groynes will not affect the current hydrological system of the Odra. The planned activities will not affect the way in which the river is fed, the volume of flows and the nature and course of lows or highs, and slight increases in the level of the water table can be expected in the long term. The results of the analyses carried out for the Update of the concept of the border Odra watercourse showed that the functioning of the reconstructed river control structures will not affect the volume of flows and the dynamics of highs and lows, or the lowering of the level of groundwater in the inter-embankment, which is also confirmed by the results of modelling carried out on the section of the free-flowing Odra, which were also taken into account in the project's environmental impact assessment.

With regard to the physical-chemical parameters of the JCWP, according to the document prepared for the EIA Report entitled „Wpływ modernizacji ostróg na Odrze granicznej na transport osadów dennych i potencjalne uwolnienie zanieczyszczeń" ["The impact of the modernisation of groynes in the border Odra on the transport of bottom sediments and potential release of contaminants"] (Kolerski and Mateja-Lukowicz 2019), sediments from the bottom of the Odra are not contaminated or are only slightly contaminated. Therefore, it should be concluded that the planned works will not cause a risk of an increased inflow of contaminants to waters.

Operation stage

The Odra River Basin Management Plan does not predict any adverse impact of the Task on the achievement of the environmental objectives set for the JCWP. The environmental impact assessment of the Task shows that the Task will not generate permanent changes affecting the state of hydromorphological elements or the biological and hydromorphological continuity of the JCWP, which was confirmed by the environmental permit issued on 18 March 2020. The Task poses no threat to the achievement of the environmental objectives of other nearby water bodies.

Due to the nature of the Task, the manner of its implementation, including the adopted design assumptions, as well as the planned implementation conditions preventing contamination of the groundwater environment, it was assessed that the implementation of the Task will not negatively affect the state of the JCWP.

5.6 GROUNDWATER

Implementation phase

Due to the fact that the implementation of the Task will not require deep excavations or maintaining a cone of depression in adjacent areas, no negative impact on water relations in the areas surrounding the Task is expected. If efficient construction equipment is used and appropriate construction practices are maintained, no contaminants should pass to the ground or groundwater at the stage of works. The construction site facilities will be located on vessels, which will further reduce the impact of the Task on the quality of groundwater at the stage of works.

Operation stage

The operation of the structures will cause the inflow of contaminants to the groundwater, and thus it will not deteriorate the chemical status of that groundwater body. The planned Task will also not have a negative impact on the environmental objectives regarding groundwater quantitative status, nor will it have a negative impact on water-dependent habitats due to the lack of lowering of the water table in the Odra as a result of the operation of control structures.

In conclusion, it is not expected that the implementation of the Task will cause permanent changes in groundwater relations during the implementation and operation of the Task. Risks associated with possible accidents (leakage of fuel and petroleum substances into groundwater) will be eliminated by complying with the conditions set out in the environmental permit. The implementation of the Task will not adversely affect the status of bodies of groundwater, including the fact that it will not lead to deterioration of the status of waters and ecosystems dependent on waters, and thus will not jeopardise the achievement of environmental objectives determined in accordance with the currently applicable Odra River Basin Management Plan.

5.7 ACOUSTIC CLIMATE

Implementation phase

The execution stage will cause a short noise and vibration emission during the temporary use of the machinery and equipment required to carry out the works. The emitted noise and vibrations will be intermittent, and their intensity will vary at different stages of works, depending on their course and the use of specific machines and equipment. The works will be carried out in the riverbed and directly on the bank, which means that they will not pose a threat to the health of people living in built-up areas located in the area of the Task implementation sites. In addition, conducting work during the daytime will further limit the negative impact of noise emissions on the nearest built-up areas. Due to the above, the noise and vibrations generated during the implementation of the Task will be local and limited to the area of the works.

The application of organisational solutions such as only starting machines and devices during the works and reducing the number of devices working simultaneously, will limit the range of noise emitted to the acoustically protected areas. In addition, it should be pointed out that most of the planned works will be carried out outside built-up areas.

The lack of impact of the Task implementation on the residential buildings located in the vicinity, but outside the Task implementation area, with the application of measures minimising the

negative impact, is also confirmed by the opinions of the sanitary inspection authorities participating in the environmental impact assessment proceedings.

5.8 NATURE

5.8.1 NATURA 2000 SITES

In order to carry out an assessment of impact on Natura 2000 sites, a preliminary analysis of conditions was conducted:

- identification and analysis of the most important issues related to the implementation and functioning of the Task, which generate a potentially significant negative impact on the natural environment;
- Natura 2000 sites that may be affected by the Task were indicated, along with the identification of existing and potential threats, conservation objectives, and factors determining the existence of protected natural values.

Furthermore, the impacts on individual areas were identified, with an assessment of the significance of a given impact and its consequences.

The task is located within the following Natura 2000 sites:

- Lower Odra PLH320037 (habitat refuge),
- Lower Odra Valley PLB320003 (bird refuge).

Lower Odra PLH320037

The following objects of protection of the site were inventoried within the range of the impact of the Task:

- **3270 -** Flooded muddy riverbanks with *Chenopodion rubri p.p*. and *Bidention p.p*. vegetation, location – numerous along the entire section,
- **6430** Mountain herbs (*Adenostylion alliariae*) and riverside herbs (*Convolvuletalia sepium*), location: 655.2-661.2 km;
- **91E0** Willow, poplar, alder and ash forests (*Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae*) and spring alders, at the following locations: 654.2 - 654.4; 655.0 - 655.3; 657.9 - 661.0; 661.2 - 662.3 km.

Assessment of impact on the natural habitat 3270 Flooded muddy riverbanks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation

The habitat was the subject of field inventory conducted in the growing season in 2017 and was repeated in full in 2018. Diametrically different weather conditions in the two seasons allowed to obtain an image of the state of the habitat that was representative of its high variability of resources in different years depending on meteorological conditions (Nobis 2015).

Implementation phase

In the controlled Odra, it is not possible to differentiate the shape of the watercourse bed in the bank zone – there are no active processes of erosion and accumulation that shape the mosaic morphology of the bank zone (Adamski 2007), which would naturally create silt habitats (Borysiak 2004).

It is crucial to maintain ecological conditions that allow the habitat to develop in an undisturbed way (maintaining summer drops in the water level and exposure of fragments of the bed which is flooded in the remaining part of the year). In the controlled river, optimal conditions for the formation of silts occur in groyne fields, in which the processes of load accumulation will be improved as a result of the planned Task.

The scale of the direct interference of the planned Tasks with habitats is negligible, as it concerns a small part of the least developed sites (with smallest surface and least species variation) registered during the abundant appearance of the habitat in 2018. In terms of the best developed patches in 2018, which formed large surface bars, the interference with the constructed structures would in most cases concern small parts of such patches, not their entire area.

In addition to the enormous natural fluctuations in resources and the state of the habitat, it is important to emphasise the short-term direct impacts associated with the construction of structures. In the longer term, it is to be expected that the rebuilt groynes will again become a substitute habitat for indicator vegetation for silts. The patches of habitat which are most important due to their good condition, diversity and area, are located in groyne fields and do not interfere with the planned works. The created groyne fields, on the other hand, constitute an optimal substitute habitat for the formation of protected silts in a controlled river.

In view of the dominance of annual species with a short development cycle among those forming silt communities, the fact that construction works take place outside the period of habitat formation excludes a significant impact on populations of species typical of the habitat.

The task will not significantly affect the availability and spread of diasporas in the river – the impact of covering up, which prevents development, will affect a few % of the bed area with seed deposit, while the natural variability of seed production in populations of typical species in annual cycles varies by orders of magnitude due to the variability of habitat conditions and population size in different years.

One of the values of habitat 3270 riverside silts in the Task area is the presence of river strapwort. It is under strict protection, listed as a critically endangered species in the Polish Red Book of Plants and in the Red List of Plants and Fungi of Poland (2016). The species is very rarely and irregularly encountered, only on the riverside silts. Given that this species develops from April to September, after which it ceases to exist and appears in various sites in the following years, the execution of works in the riverbed outside this period and the lack of interference in key bars for the species in groyne fields will not pose a significant threat to its resources. In order to minimise the risk, in the case the Contractor's environmental supervision team registers this species, the site should be protected against accidental destruction and, if possible, seeds should be obtained to maintain the species in conservation cultivation during

the works. The plant produces significant quantities of germinating seeds, is easy to cultivate and has a negligible genetic diversity; therefore, it is possible to rebuild the population even from a small area of cultivation (i.e. several m^2). Due to the status of one of the species (river strapwort), appropriate obligatory mitigation measures have been determined to eliminate the risk of adverse impact on the population (Appendix 1 to the EMP).

Operation stage

A key factor influencing the formation of habitat 3270 is the occurrence of seasonal water level rises and drops in the river. The best substitute habitats in which the patches of the habitat are formed are related to the processes of accumulation of transported bed load in groyne fields.

The functioning of the reconstructed control structures will not result in the removal of shallows in groyne fields. On the other hand, it is to be expected that these shallows will shift within the groyne fields into areas with similar flow rates.

During the operation of the river control structures, habitats associated with bars and silts will develop in similar conditions as at present. The difference will occur on the sections where groynes will be rebuilt or built on the sections where previously there were none – the frequency of accumulation and erosion phenomena along the banks will increase, but their scale will be smaller, in other words – instead of rarely formed but extensive bars and silts, frequent deposits and silts will be formed, but with smaller surfaces. This has an impact on the indicator - the spatial structure of the habitat patches, on the one hand increasing the fragmentation of the habitat, on the other stabilising, disseminating, and increasing the frequency of habitat occurrence. The impact is therefore both unfavourable and beneficial for this indicator (ultimately it is neutral), and due to the high dispersion and low habitat resources in the period preceding the Task, this impact will not be significant.

Within the boundaries of the Lower Odra site there are also national forms of nature protection, such as: The Cedynia Landscape Park and the environmental use area Kostrzyneckie Swamp, where the natural habitat 3270 is also under protection.

6430 Mountain herbs *Adenostylion alliariae* and riverside herbs *Convolvuletalia sepium*

Assessment of impact on habitat 6430 Mountain herbs *Adenostylion alliariae* and riverside herbs *Convolvuletalia sepium*

Implementation phase

At the implementation stage there will be no interference with the habitat patches and its area shall be visibly marked in the field by the Contractor's environmental supervision team (e.g. by means of an information board). The works planned to be carried out (reconstruction of the body and head of groyne, dams, or revetments) will be carried out from the water, which significantly reduces the possibility of any impact on the habitat in question. The herbs grow from the side of the land, behind the rushes.

Due to the above and due to the specificity of the works and the manner of their execution, no significant interference in the inventoried patch of this natural habitat is expected.

Operation stage

The assessed Task will not affect the current hydrological regime of the river, i.e. it will not change the nature of the watercourse, the size of the riverbed supply, or the volume of flows in the river. The impact conducive to the formation of herb habitats will be a slight increase in water levels at medium and high flows and the dynamics of water levels increased by 3 ÷ 5%. Compared to the current situation, this will have a slight impact on the dynamics of the processes of shaping of the mosaic of habitats in the immediate vicinity of the riverbed, and thus will be conductive to the occurrence of herbs, at the expense of homogeneous rush or riparian complexes. On the other hand, a milder course of ice phenomena in the floe and frazil run-off phase is expected, manifested by a lower jam-forming tendency in the riverbed, which will reduce damage to the vegetation along the banks, conductive to the formation of herbaceous habitats (developing in place of damaged vegetation).

Potential indirect impacts related to the effects of the Task in the operation phase also include the so-called maintenance works. On the one hand, they involve the risk of damaging or destroying the plants also in places where herbaceous habitats form, but on the other hand, they may also shape the conditions for their formation if dense patches of rushes or scrub vegetation are disturbed. These works also involve the risk of the spread of invasive alien species, the proportion of which is one of the indicators of the state of the habitat and one of the main issues of habitat conservation (Pawlaczyk 2017, Mróz et al. 2012).

All the described impacts in the operation phase have slightly beneficial and slightly negative effects – overall, neutral - on the parameter of habitat area, in terms of shaping ecological conditions for the occurrence of the natural habitat. There is a potential risk of deterioration of the indicator - invasive alien species. Maintenance works that shape unnatural conditions for the development of vegetation within the bank zone and the existing and planned control structures may have a negative impact on the indicator - the naturalness of the riverbed, which, however, has been and will have to be assessed as being in a bad condition (U2) before the operation stage.

Information on other inventoried objects of protection within the Task area is included in the individual groups of fauna and flora described in chapter 5.8.2010.

91E0 Willow, poplar, alder, and ash riparian forests (*Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae*) and spring alders

Assessment of the impact on habitat 91E0 Willow, poplar, alder, and ash riparian forests *(Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae)* and spring alders

Implementation stage

The modernisation of groynes, construction of new groynes, walls, and revetments will require profiling of the bank slopes and laying riprap on geotextile. High vegetation will not develop on a bank strengthened in this way. On the analysed section of the Odra, natural habitats are found on the strip of land along the bank on the water-land border, within which logging will be possible:

- habitat at 654.2 - 654.4 km 18 trees were inventoried at the abovementioned km, few of which may need to be removed.

Less than 1% of the habitat in the area will be destroyed due to the planned logging.

Operation stage

The most valuable patches of willow riparian forests inventoried in the Report – riparian forests by the Kostrzyneckie Swamp and near Raduń and Piasek – are in a good conservation state with respect to the possibility of being flooded by the river waters, the habitat area, and natural re-generation of the stand. The remaining patches of willow riparian forests inventoried in the Task area are small, heavily depleted trees at a relatively young age. Given the possibility of periodic flooding by the river, their conservation status is usually favourable. On the other hand, their overall conservation status and conservation prospects are unsatisfactory or poor due to the adverse impact of human activities.

The riparian forests on the section of the Odra covered by the planned Task lie on a low flood-plain and are not cut off from the river by embankments, and the valorisation of the most valuable willow riparian forests complexes near Stara Rudnica showed that, taking into account the possibility of flooding by the Odra waters, there is no risk of transformation into a broadleaved forest – their conservation status is favourable. Riverbank riparian forests are therefore performing well in the conditions of the river valley, which has been transformed as a result of regulatory works. A loss of periodic flooding by river waters combined with the lowering of the groundwater table leads to the drying of the riparian forest habitat.

The planned Task consists in the modernisation of the existing hydrotechnical structures of the border section of the Odra. It has been assessed whether the natural habitat of riverside riparian forests may suffer damage due to changes in hydrological conditions resulting from the planned works.

Existing hydro-technical structures do not affect high (including catastrophic) flows or the frequency, extent or duration of flooding by high waters of river-dependent habitats, and the planned modernisation will not change this – the infrastructure will continue to regulate the river at its low and medium levels, without affecting high (including catastrophic) flows or the possibility of the inter-embankment area flooding. Initially a slight increase in the water level can be expected (due to the refocusing of the current by rebuilt groynes), which will, in time, return to the state from before the modernisation works (Magnuszewki 2018). The riparian forest habitat will therefore not be deprived of periodic flooding by high waters, which is a necessary factor for the maintenance of its good conservation status in the long term.

Components of ecosystems of large river valleys depend on periodic rises (Rood et al. 2005). Willow-poplar riparian forests, which are among the most valuable components of river valley ecosystems, are particularly dependent on flooding by rises, both at the stage of stand renewal and its survival (Olden et al. 2014). In terms of humidity ratios, the habitat of riverside willow and poplar riparian forests is shaped by frequent flooding (in the case of willow riparian forests, annual flooding) by the high river waters (Borysiak and Pawlaczyk 2004; Pawlaczyk 2010).

The habitat is formed along the bank zone of the riverbed. In the Odra valley, the natural dynamics of the processes shaping the mosaic of habitats typical of the river valley have been limited as a result of river control in past centuries. The functioning of the modernised structures will not affect the current hydrological regime of the river, i.e. it will not change the nature of the watercourse, the size of the riverbed supply, or the volume of flows in the river. The impact conducive to the formation of riparian forest habitats will be a slight increase in water levels at medium and high flows and the dynamics of water levels increased by 3 ÷ 5%. In relation to the current situation, this will slightly affect the dynamics of the processes of shaping the mosaic of habitats in the immediate vicinity of the riverbed, and thus will be conductive to the appearance of diverse patches of scrubland and willow riparian forest, limiting the development of homogeneous rush complexes and, to some extent, limiting the succession towards alder riparian forests (black alder has lower tolerance of long-lasting floods (Adamski et al. 2007) and poplar, which are the next stage of succession in the case of reduction of rises and accumulation of sands and silts (Matuszkiewicz et al. 2013). The development of scrubs and willow trees along the banks of the river will be facilitated by milder ice phenomena, expected as a result of the executed works, in the floe and frazil run-off phase, manifested by a lower jam-forming tendency in the riverbed. The stabilisation of the banks, which is the result of adding groynes to the control structures, will also promote the succession of permanent riparian vegetation (Duszyński 2007, Robakiewicz 2006). As a result, an increase in the number and area of patches of habitat should be expected in the operation phase. On a regulated river carrying large amounts of load, sandy deposits are formed mainly within groyne fields and within them there is a primary succession leading to scrubs and willow riparian forests. The origin of sand deposits (anthropogenic or resulting from natural dynamic processes of the river) does not affect the formation of communities typical of the habitat (Matuszkiewicz 2001, p. 280).

Negative phenomena will include the use of the effects of works stabilising the bank and mitigating ice phenomena by an invasive species – boxelder maple, effectively competing with native species of trees and shrubs in riparian habitats in the Odra valley. However, it is relatively rare in the sections covered by the study, but a significant increase in its presence and impact should be expected in the long term.

Changes in the levels of the water table in the river, which, after the completion of the planned projects, will increase by several to several dozen centimetres at medium and high flows, are not significant for the functioning of the habitat. Similarly, there will be no significant effects on the habitat in the long term due to the spontaneous deepening of the riverbed. For this habitat, the characteristic feature is the presence of significantly diversified groundwater levels (Matuszkiewicz 2001). As a result, only stabilisation of the water level and cessation of flooding would have significant effects on the habitat.

The described impacts will have slightly beneficial effects on the parameter - habitat area in the operation phase, in terms of improving the conditions for the formation and occurrence of natural habitats. There is a real risk of deterioration of the indicator - geographically alien species in the stand, which will already be an indirect effect of bank stabilisation, while both this indicator and - alien invasive species in the undergrowth will deteriorate mainly due to the spread of invasive species and lack of prospects for effective containment. Maintenance works that

shape unnatural conditions for the development of vegetation in the bank zone and the existing and planned control structures may have a negative impact on the indicator - the naturalness of the riverbed, which, however, has been and will have to be assessed as being in a bad condition (U2) before the operation stage due to the controlled nature of the riverbed.

Lower Odra Valley PLB320003

A very important area especially for wetland birds during the breeding, migration, and wintering periods. During the breeding season, the area is inhabited by at least 1% of the national population of the following bird species: the Eurasian bittern, Montagu's harrier, and greylag goose; relatively high density of: the black tern, red-backed shrike, and aquatic warbler. During the migratory period, at least 1% of the population of the migratory route of the following species of birds occur: taiga bean goose and white-fronted goose; at a relatively high density: whooper swan, great crested grebe, gadwall, lapwing and European golden plover; in the autumn staging area, cranes are present in the number of up to 5,000 specimens. In winter, the great crested grebe occurs in high numbers.

Implementation phase

The inventory carried out for the needs of the Task and the assessment of impact on ornithofauna did not show any material negative impact of the Task during its implementation on the abovementioned objects of protection. Considering the fact that the works on the modernisation of the groynes will focus on shorter sections and after their completion the front of the works will move on as the works progress, the spatial range of disturbances that may occur in the riverbed will be limited. In addition, the adopted deadline for the works, i.e. outside the period March - mid-July (due to the spawning season of the fish), will prevent the negative impact of the Task on this object of protection, as well as other objects that may potentially be found there, within the area of the planned works.

Taking into account the scope of works and numerous minimisation activities, no significant impact of the Task on the Natura 2000 Lower Odra Valley PLB320003 is expected during the implementation stage.

Operation stage

The main pressure factors for birds associated with valley habitats that may arise as a result of river control are:

1. Changes in hydrological conditions, and consequently hydromorphological conditions, causing the transformation of riverbank and valley habitats and reduction of their range as a result of the cessation of natural processes conditioning their duration. The main potential threats include: lowering of the bottom in the longitudinal profile, intensification of the drainage of floodplains and decrease of the groundwater table, drying of the valley habitats dependent on water, e.g. oxbows, floodplains, swamps.

2. Depletion of food resources of fish-eating species.

With regard to the first group of factors, in the light of the results of hydrodynamic modelling, it was found that there will be no deterioration of the conditions thanks to which valuable natural habitats providing a living environment for numerous species of waterfowl and meadow birds are maintained in the Odra valley. Thus, groundwater levels are not expected to decrease, but to increase slightly in the littoral zone. During lows, the areas adjacent to the river will be subject to slightly less drought than under the current state of river control structures, which should be considered as a positive effect for the preservation of river habitats.

In the long term, the negative effects of the work carried out will not be cumulative but should subside. Spontaneous restoration of riverbank and aquatic vegetation communities will take place.

With regard to the potential loss of the bird feed base, it should be emphasised that the expected deterioration of fish and invertebrate habitats as a result of the planned works will be reversible, and the planned minimising actions will reduce the regeneration time of habitats to 3-5 years. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will affect the proportion of species and not the overall size of the community and will not significantly affect the availability of food for birds feeding on fish and aquatic invertebrates.

It is also not expected that there will be any significant decrease in the quality of food for terns resulting from the destruction of microhabitats between groynes in connection with the implementation of the Task.

It should be noted that the valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. Further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. The expected deterioration in the quality of fish habitats as a result of the planned works will be reversible, and the minimisation measures will reduce the regeneration time of habitats to 3-5 years.

After the planned modernisation, the sandy banks of the river and the riverbanks will be destroyed, which will periodically decrease the area of potential breeding grounds and feeding grounds for plovers and terns. However, this should not have a negative impact on the conservation status of these groups of birds. The sandy banks of the river are used mainly during the flight period. What is more, the Task will be carried out on a relatively small section of the river and the floodplains in the vicinity of the river offer much richer sources of food. The loss of habitats during the migration period will be further reduced due to the fact that the modernisation of groynes will be carried out section after section.

During the operation phase, the riverbed will gradually deepen, but it is forecast that this should not drain water from around the riverbed. As a result, natural fluctuations in the water level in the vicinity of the river will be preserved and the habitats associated with it will not be endangered. Shallows between the groynes, which are the habitat of invertebrates and fish associated

with standing or free-flowing waters, will be left undisturbed. In the immediate vicinity of re-constructed groynes, such habitats will gradually recover, and this process will be accelerated thanks to the minimising actions (replanting plants, transferring mussels of the family Unionidae).

SUMMARY of the Natura 2000 site impact assessment – impact on the integrity of sites

Analysis of habitat requirements and key structures and processes conditioning the favourable state of natural habitats and plant species clearly indicates that the vast majority of objects of protection is associated with hydrogenic areas, typical for extensively used natural valleys of large lowland rivers. When identifying and forecasting the scope and scale of impacts of the planned Task at the stage of implementation and operation, the main conditions ensuring the integrity and coherence of Natura 2000 sites should be taken into account:

- maintaining the hydrological regime of the Odra, thereby ensuring the maintenance of current dynamics of water levels, including annual and extreme lows, as well as annual and extreme rises, and maintaining the current groundwater level,
- stabilisation of the transformation processes of semi- and hydrogenic soils, especially in terms of moorshification and maintenance of accumulation and balance processes in peatlands,
- preservation of the mosaic of habitats, which is conditioned by a complex fluvial system and geomorphologically diverse valley bottoms (sandy riverbed and riverside deposits, variable, non-linear hydrographic system formed by meanders and oxbow lakes, extensive use of meadows on floodplains with permanent fluviogenic recharge),
- containment of overgrowth of open areas by expansive herbaceous species, shrubs, and trees,
- supporting extensive agriculture and limiting its intensification,
- reducing anthropogenic pressure.

It should be noted that the valuable fish habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. Should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity.

The natural structure of the Odra valley area deserves attention due to the role of these areas for waterfowl, wading birds and large predators, which is why it is necessary to preserve the processes conditioning the maintenance of this rich natural structure. It is therefore important that the implementation of the Task has no impact on the seasonality of the rises (which depends on climatic factors), and will not cause modification of their range, as it is adapted to medium flows and in a way does not “work” during high flows. Therefore, it was assessed that there

will be no intensified drainage within the floodplain, as the water levels (especially at low and medium flows) will not change significantly, and therefore there is no risk of deterioration of water relations within the hydrogenic habitats.

The planned minimisation measures will enable the achievement of the technical assumptions of the project while limiting the negative environmental impact and keeping it at a moderate level, including the impact on species and habitats protected under national regulations and under the Natura 2000 network and also on biological elements of ecological capacity.

5.8.2 NATIONAL PARKS

Negative impacts on the objectives and objects of protection of national parks are not expected, neither at the stage of implementation nor operation of the Task. The planned works are located outside national parks.

5.8.3 NATURE RESERVES

Negative impacts on the objectives and objects of protection of nature reserves are not expected, neither at the stage of implementation nor operation of the Task. The planned works are located outside nature reserves.

5.8.4 NATURAL LANDSCAPE PARKS

Implementation phase

The following natural habitats and protected and endangered vascular plant species have been identified within the Cedynia Landscape Park:

- 3270 Flooded muddy riverbanks with *Chenopodion rubri p.p.* and *Bidention p.p.* vegetation

The impact of Task implementation on the habitat was defined as weak. During the implementation phase, there will be a periodically increased inflow of suspensions and a periodic increase in ripples.

- 6430 Mountain herbs *Adenostylion alliariae* and riverside herbs *Convolvuletalia sepium*

There is no impact of the Task on the natural habitat because there are no patches of this habitat within the range of the planned works.

- 91E0 Willow, poplar, alder, and ash riparian forests (*Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae*) and spring alders

The impact of Task implementation on the habitat was defined as moderate. The scope of the Task includes fragments of the habitat, but the planned felling will concern only a small part of trees, it applies mainly to the patch of habitat at km 661.2 – 662.3.

Operation stage

The impact of the Task on individual natural habitats at the operation stage is discussed in detail in chapter 5.8.1.

5.8.5 LANDSCAPE CONSERVATION AREAS

Negative impacts on the objectives and objects of protection of landscape conservation areas are not expected, neither at the stage of implementation nor operation of the Task. The planned works are located outside landscape conservation areas.

5.8.6 ENVIRONMENTAL USE AREAS

Implementation phase

The following natural habitat was found within the ecological use area Kostrzyneckie Swamp:

- 3270 Flooded muddy riverbanks with Chenopodion rubri p.p. and *Bidention* p.p. vegetation

The impact of Task implementation on the habitat was defined as weak. In the implementation phase, there will be an impact on the parameter: specific structure and functions, indicator: water transparency. During the course of works, there will be a periodic increase in the inflow of suspensions. A number of mitigation measures and appropriate work technology will prevent significant impacts on the habitat.

The impact of the Task on natural habitats at the implementation and operation stage is discussed in detail in chapter 5.8.1.

5.8.7 DOCUMENTATION STATIONS

Negative impacts on stations are not expected, neither at the stage of implementation nor operation of the Task. The planned works are located outside documentation stations.

5.8.8 LANDSCAPE-NATURE PROTECTED COMPLEXES

Negative impacts on landscape-nature protected complexes are not expected, neither at the stage of implementation nor operation of the Task. The planned works are located outside landscape-nature protected complexes.

5.8.9 WILDLIFE CORRIDORS

Due to the importance of the continuity of wildlife corridors for the preservation of biodiversity, the location of the designated area of the planned Task in relation to wildlife corridors was analysed during the environmental impact assessment for the project. The whole planned Task will be implemented within main wildlife corridors of national importance – i.e. the "Central Odra Valley" GKZ-19 and the "Warta River Mouth Swamps" GKPn-22.

Implementation of the planned works may hinder animals' penetration of the banks of the Odra during the construction works. Noise and the presence of people and construction machinery will act as a deterrent. However, this will be a short-term impact, and after the completion of the works on a given section, it can be expected that these areas will be recolonised. The implementation of the planned measures will not require felling of trees on large areas, and therefore will not lower the forestation rate within the corridors. Although the construction phase

will be a source of nuisance such as noise and will involve the presence of workers and construction machinery in the area, which is normally rarely penetrated by people, it can be expected that these disturbances will mainly affect the bank zone and will not disturb the functioning on the entire width of the corridors. Carrying out the works only during the day should minimise the negative impact on the functionality of the corridor and migration of nocturnal animals.

5.8.10 PROTECTED SPECIES OF FUNGI, PLANTS, AND ANIMALS

Protected fungi species

No protected species of fungi, including lichen, were found in the Task implementation area and its vicinity.

Protected plant species

Implementation stage

The following protected species were found within the Task area, for which an impact assessment was carried out:

- River strapwort *Corrigiola litoralis*

The impact of the Task at the implementation and operation stage on the species in question was discussed in detail in the discussion of habitat 3270 - flooded muddy river banks with vegetation *Chenopodion rubri p.p. and Bidention p.p.* in chapter 5.7.1.

- Broad-leaved helleborine *Epipactis helleborine*

No direct conflict with the Task – outside the range of the investment works there will be no interference in the site of the helleborine, riparian forests, or herbs. The scale of impact was defined as weak.

- Salvinia *Salvinia natans* – right-bank waters of the Odra along the whole of the inventoried section from 654.0-663.0 km

The Task will affect the population of the species through the deliberate destruction or displacement of habitats, which will be carried out on the basis of the obtained decision to derogate from the bans applicable to the protected species. The population of the *Salvinia natans* is very large throughout the river valley, and the implementation of the Task involves the risk of destroying a small part of it, therefore the scale of the impact was defined as weak.

- Marsh spurge *Euphorbia palustris*

This species is numerous and not endangered within the area of the planned Task, or in the entire river valley, and the implementation of the Task involves the risk of destruction of a small number of its sites. The scale of impact was defined as weak.

Operation stage

No significant change in the hydrological regime of the river is expected in connection with the implementation of the Task, including changes in the extent and duration of floods that could cause the transformation of habitats of the abovementioned species.

Invertebrates

Implementation phase

A key impact on macrobenthos will occur as a result of the reconstruction of groynes. Less-mobile species of mussels and snails, whose key habitat in the Odra is associated with groyne fields, will be particularly vulnerable.

A minimising action is provided for, i.e. moving mussels from this group to safe places. One week before the works begin, the mussels will be collected from the bottom along the sides of groynes and transported in water containers to safe places. This will significantly reduce losses in the mussel population and speed up the recovery of their population to 3-5 years.

Operation stage

The analysis of the presented scope of work indicates the possibility of adverse factors for macroinvertebrates at the operation stage, requiring the use of minimising measures presented in Appendix 1 to the EMP.

At the same time, it should be pointed out that groynes are beneficial for increasing the diversity of habitats and biodiversity of macrobenthofauna in the river. The longer and taller they are, the larger the area and diversity of marginal lake habitats. Modernising the groynes made of stone and finer rock material is beneficial. Within a few years, sand and organic sediments will be deposited on the stones. Only then will mussels be able to repopulate the site. The relocation of Unionidae mussels from the work area to safe areas will reduce the regeneration period of habitats and benthic organism complexes to 3-5 years.

Fish and lampreys

Implementation phase

The analysis of the presented scope of work indicates the possibility of adverse factors for ichthyofauna at the implementation stage, requiring the use of minimising measures. The scope of these impacts for the protected fish species found in the section of the Odra covered by the Task, i.e. the amur bitterling *Rhodeus amarus.*

Disruption of the living conditions of the population by mechanical destruction of habitats (removal of vegetation from the area of work), increase in the amount of suspensions, and scaring, possible direct destruction of fish and Unionidae mussels necessary for their life cycle during works on the river bottom. Potentially significant impact – minimisation measures are necessary to reduce it to a moderate level.

Operation stage

The analysis of the scope of work indicates the possibility of adverse factors for ichthyofauna at the operation stage, requiring the application of minimising measures.

The scope of these impacts for the protected fish species found in the section of the Odra covered by the Task, i.e. the amur bitterling *Rhodeus amarus.*

Potentially significant impact, requires minimisation. The application of minimisation measures will limit the impact level to moderate.

Entomofauna

Implementation phase

Assuming that the Task is implemented from the water, there is no risk of habitat destruction. Possible collisions related, for example, to the foundation of storage yards will only occur at certain points and will be temporary, and thus will not significantly affect the state of insect populations.

Operation stage

During the operation phase, the task will not have a negative impact on terrestrial invertebrate habitats. No fundamental change in water relations, which could affect the reconstruction of plant communities that are currently habitats of entomofauna, is foreseen.

Herpetofauna

However, the implementation of the Task may lead to a temporary deterioration of the living conditions of herpetofauna. The vast majority of the planned works will be carried out from the water. However, the possible construction of access roads and material storage yards for the implementation of the Task and the adoption of the precautionary principle indicate that there is a risk of local loss of amphibian and reptile habitats.

Implementation phase

Below is a list of inventoried species protected within the Task implementation area together with impact assessments:

- European fire-bellied toad *Bombina bomb*ina

The habitat of the European fire-bellied toad will not be destroyed as a result of the construction works. The European fire-bellied toad occupies sites distant from the main river stream, in small, even some temporary reservoirs. Activities in the river side will not affect its population.

- Common toad *Bufo bufo*

The conducted works will not destroy the existing bays by the groynes, there will be no loss of habitats of this species.

- Green toad *Bufotes Viridis*

The loss of habitats of this species is rather unlikely. No impact on the identified site and habitat (657.0 km) of the green toad is expected. However, due to the presence of potential habitats of this species in other locations, measures are foreseen to minimise the potential negative impact.

- Pool frog *Pelophylax lessonae*

The works carried out in the direct stream of the river is unlikely to significantly affect the loss of its habitats or their quality.

- Common frog *(Rana temporaria)*

The works carried out directly in the current of the river is unlikely to affect the loss of this species' habitats, their quality, or the status of its population because its breeding reservoirs will not be destroyed. As they are located quite far from the banks of the Odra, they are only exposed to damage during the transport of building materials, etc. Therefore, appropriate minimisation measures must be applied.

- Marsh frog *Pelophylax ridibundus*

Water reservoirs extending along the Odra, which are of particular importance for this species, will not be destroyed in connection with the planned works. It does not seem necessary to minimise the loss of habitats, because once the Task is completed, these frogs will be able to use the places with calm current behind groynes, especially when they are colonised by aquatic vegetation. The impact is defined as weak.

- Crested newt *Triturus cristatus*

The common newt was found in floodplains on both sides of the embankment north of Osinów Dolny (663.5 km). The site will not be directly at risk during the planned works. No potential habitats of the species are expected to be destroyed during the construction works.

- Grass snake *Natrix natrix*

During the works, the grass snake, as a fast-moving and timid animal, will avoid the presence of humans and due to the lack of optimal habitats for this species in the area of the Task, it will probably not be necessary to take action to minimise the mortality of this species.

- Sand lizard *Lacerta agilis*

Sand lizard is unlikely to exist in the immediate vicinity of the banks of the Odra. No impact on the identified sites and habitats of the sand lizard is expected. During the works, the lizard, as a fast-moving and timid animal, will avoid the presence of humans and due to the lack of optimal habitats for this species in the area of the Task, it will probably not be necessary to take action to minimise the mortality of this species.

Operation stage

The potential risk for herpetofauna associated with river control is a change in the habitat structure within the valley, in particular the disappearance of periodic floodplains and reservoirs as a result of the lowering of the level of water in the river and intensified drainage of groundwater.

The planned regulatory works will not lead to the excessive drying of habitats within the floodplain and the loss of water reservoirs, which are potential amphibian habitats.

The construction and modernisation of groynes on the river will not have a negative impact in the case of reptiles, while in the case of amphibians, in the long term, it may contribute to the creation of breeding sites.

In the long term, the negative effects of the work carried out will not be cumulative but should subside. There will be a slow restoration of habitats along the Odra due to a spontaneous emergence of aquatic vegetation. Since water relations will not be significantly disturbed and wetland habitats will not be destroyed, long-term impacts will be negligible for herpetofauna.

Ornithofauna

The assessment of impact on bird species protected by the Natura 2000 site Lower Odra Valley PLB320003 and other bird species subject to species protection at the implementation and operation stages is presented in chapter 5.8.1.

Mammals

Implementation phase

A list of inventoried species protected within the Task implementation area together with impact assessments:

- Eurasian otter *Lutra lutra*

Construction work carried out on the bank may lead to the scaring of these animals and local loss of shelter. Assuming that the minimising measures are applied, the Task impact is defined as weak.

- Eurasian beaver *Castor fiber*

Beaver dams are built in water reservoirs located behind the embankment, and only traces of beaver feeding were recorded on the banks of the Odra. Due to the fact that the banks of the Odra are not a convenient place to build dams or burrows, it is not expected that modernisation works on the structures along the banks will have a negative impact on the population of this species in the Odra valley. The impact was defined as weak.

- Least weasel *Mustela nivalis*

The area of the planned works – the riverbank – is not a convenient habitat for the weasel. The species does not avoid humans and will be able to find suitable shelter at a greater distance from

the bank and planned works. Therefore, no significant impact on the weasel population is expected.

- Pigmy shrew *Sorex minutus*

During the execution of the works, no large-scale felling of trees or riverside scrubs is expected, but only local removal of (selected) trees that interfere with the works. This can cause local destruction of shelters – the pigmy shrew is a short-lived animal (approx. 1.5 years) and is sensitive to lack of food, so the destruction of the shrew habitat constitutes a threat to the survival of a given specimen. However, catches have shown its prevalence on the banks of the Odra, so colonisation of the bank zone can be expected after the completion of works. The impact was defined as weak.

- European mole *Talpa europaea*

The area of the planned works – the riverbank – is not a convenient habitat for this species. Therefore, no significant impact on the mole population is expected.

- European water vole *Arvicola amphibius*

Earthworks on the riverbank may result in the destruction of shelters, and noise and the presence of people and construction machinery will cause the scaring of the species. Due to the regular occurrence of this species throughout the surveyed area, it is not expected that the planned works will constitute significant threats to the species in the Odra valley. After the completion of the works, sections between groynes can be repopulated by the vole. The impact was defined as weak.

Operation stage

During the Task operation phase, negative impacts on land mammals will be less intense and will gradually decrease as a result of spontaneous, slow restoration of aquatic and land habitats. After the "ecosystem stabilisation" the Task will not result in an increase in mammal mortality, as the majority of the activities involve the reconstruction of existing infrastructure around which convenient animal habitats are preserved. The implementation of the Task will not create significant barriers to the free migration of large mammals through regional corridors or, for small and medium-sized mammals, through local ones, nor will it create obstacles to the free migration of terrestrial-aquatic mammals.

Taking into account the implementation of the Task from the water, in the autumn-winter season, as well as the temporary foundation of storage yards in a few spots, no significant negative impact of the Task on the abovementioned animals is expected.

Chiropterofauna

Implementation phase

The conducted inventory works showed that the Odra is an important feeding ground for bats, which is consistent with the knowledge that water-related habitats are characterised by the highest bat activity. The highest activity of bats was reported for the genus (*Pipistrellus)*, approx. 150 specimens, (*Nyctalus)*, estimated at approx. 40 specimens, and mouse-eared bats – approx. 30. Bat populations are very dynamic and the location and size of colonies in daytime shelters changes from year to year, resulting in changes in feeding patterns.

Interference with the structure of the river's bank zone will entail changes in the quality of entomofauna habitats, which may affect how attractive the feeding grounds along the Odra are. Existing potential breeding, feeding, and wintering sites will be maintained.

Potential areas that could constitute bat habitats have been identified. If it is confirmed that bats are found in the abovementioned places or in other places, appropriate measures should be taken, including obtaining permits in accordance with the provisions of the Act on Nature Conservation, which should fully protect the abovementioned group of animals against possible threats resulting from the Task.

Within the scope of the planned works, there are individual trees and bushes – it is not necessary to cut down a large number of trees and shrubs within the Task area. Noise during the execution of the works may cause the scaring of animals. However, this will be a short-term impact, it is expected that after the disturbances cease, the bank zone will be again used by bats – mainly as a feeding ground. The impact of the Task on bat species was defined as weak.

Operation stage

At the stage of Task operation, no significant threats to bats inhabiting the Odra valley are expected. Existing potential breeding, feeding, and wintering sites will be maintained. No fundamental changes in the use of the Odra valley areas are expected, in particular there will be no felling of riparian stands, which provide daytime shelters during the bat activity period. The modernisation of the control structures along the Odra will not change the position of the water table in the riverbed or the groundwater level in the valley, which could negatively affect the maintenance of the forests and riparian forests, which constitute bat shelters.

The modernised infrastructure along the riverbanks will not hinder the movement of these animals along the valley in search of food – there will be no significant new barriers. No significant negative impact of the Task on chiropterofauna is expected.

5.9 CULTURAL LANDSCAPE AND OBJECTS OF CULTURAL HERITAGE

Implementation phase

The tasks will be carried out in the area of a typical cultural landscape of a partially regulated lowland river. The reconstruction of hydrotechnical equipment, which has been part since the 19th century, will not cause changes in the cultural landscape. Taking into account the scope of construction works and the manner of carrying them out (from the water, significant part of works carried out manually, no significant emission of vibrations, minimal range of earthworks outside the riverbed) and the location of historical buildings, no possibility of potentially unfavourable impacts on objects of cultural heritage was found at the stage of construction.

Operation stage

Flood safety will be improved in the operation phase of the modernised control structures, as they will enable effective ice breaking. Thus, the risk of destruction of sites and landscape of cultural significance located both along the border Odra and in the area below will be reduced.

No loss of landscape values of the Odra valley is expected as a result of the reconstruction of groynes and other control structures. The implementation of the Task itself will have a positive impact on the protection of cultural goods and objects due to the improvement of flood safety and the reduction of the risk of flooding caused by jam-related floods.

5.10 POPULATION

Implementation phase

The works planned as part of the Task will be carried out in the riverbed and directly on the bank. This location translates into a lack of any direct contact, and thus no impact on the population and material goods in the area of work. The works carried out as part of the Task will be carried out in areas of varied spatial development. Some of the works will be carried out in the vicinity of forested areas, meadows and farmlands. Taking into account the scope of construction works and the way they are carried out (from the water), no possibility of potential adverse effects on the population and material goods located in the built-up area was found. In particular, as part of the Task implementation, no activities related to significant emission of vibrations into the environment are planned outside the direct place of work. Therefore, no vibrations threatening residential buildings and public infrastructure facilities are expected during the works.

Operation stage

Flood safety will be improved in the operation phase of the modernised control structures, as they will enable effective ice breaking. Thus, the risk of destruction of material goods located both along the border Odra and in the area below will be reduced.

In terms of protection of the population and material goods, the implementation of the Task will improve flood protection in the areas covered by the Task. No negative impact on material goods was found in the areas of groyne modernisation works.

5.11 HUMAN HEALTH AND SAFETY

Implementation phase

The impact on the health and safety of people during the implementation of the Task may be related, among others, to the following factors:

- increased noise emission,
- contamination with petroleum-type substances,
- entry of unauthorised persons into the area of construction works,

- elevated water levels and ice jams in the Odra posing a threat to the area of works and adjacent areas,
- transport of material and earth masses by water,
- carrying out works related to the construction and reconstruction of groynes, revetment, and lead-in pier (longitudinal dam) with the use of floating equipment and from areas of bank slopes in the immediate vicinity of water,
- carrying out works related to the construction and reconstruction of groynes, revetment, and lead-in pier (longitudinal dam) with the use of floating equipment in autumn and winter, in difficult weather conditions.

During the implementation of the Task, the emission of pollutants into the air and emission of noise will be local, limited to the area of works. The works will be carried out in the riverbed and directly on the bank, which means that they will not pose a threat to the health of people living in built-up areas located in the area of the Task implementation sites. It should be emphasized that most of the planned works will be carried out outside built-up areas.

The detailed selection of equipment units for the execution of the works covered by this Task shall be left to the discretion of the Contractor, after prior agreement with the Engineer. Equipment, machines or tools that do not guarantee the observance of the quality requirements for the Works, OHS and OSH regulations and safety rules on the waterway, and that may cause damage to the existing infrastructure and elements of buildings and land development will not be approved for the Works by the Engineer. In the event of an epidemic, there may be threats to both the health and life of the Contractor's employees, the Employer's and the Engineer's personnel, as well as to the construction process. The Regulation of the Minister of Health of 20 March 2020 on *declaring the state of epidemic on the territory of the Republic of Poland* (Journal of Laws, item 491, as amended), introduced in the period from 20 March 2020 until further notice the state of epidemic in the Republic of Poland in connection with SARS-CoV-2 virus infections.

Operation stage

After the Task is implemented, its long-term indirect impact will be an increased level of safety of the people living in the areas along the banks of the border Odra. The Task will allow for effective breaking and removal of ice, which will allow for mitigating the risk of flooding caused by jams and will contribute to the prevention of natural disasters that may endanger not only people's health, but also lives.

5.12 EXTRAORDINARY THREATS

Implementation phase

Elevated water levels and jam-related floods during the period of works related to the reconstruction of river control structures (the works will be carried out in autumn-winter) may be considered equivalent to an industrial failure in relation to the discussed Task. During the period of high water levels or jam-related floods, the Contractor's floating equipment (e.g. barges, excavators on pontoons) may be located within the riverbed.

Rises of this kind can be predicted with a high probability and preventive measures can be applied in advance – i.e. evacuating people and equipment from danger zones.

Another extraordinary threat is the spillage of petroleum-type substances into water or soil. To this end, however, precautionary measures concerning the proper organisation of the construction sites and facilities and to the continuous control of the construction equipment used shall be applied. The contractor must also have appropriate knowledge and equipment to prevent the spread of pollutants and to eliminate it.

Another potential threat resulting from conducting a significant part of the works from the water and transporting materials to the work areas by water is the flooding of floating equipment or construction equipment performing works within the riverbank slopes. The operation of floating equipment, the execution of works using it, as well as the movement of workers in the immediate vicinity of the riverbed (including works within the groynes), including in particular in the autumn-winter period (work in the conditions of icing, snowfalls, low air and water temperatures) also pose a risk to the health and life of persons performing these works. Therefore, it is important to ensure that workers have adequate equipment to protect their health and life during the execution of works (including appropriate safety equipment) and to develop and implement appropriate safety procedures for carrying out works.

Another type of extraordinary threat to the environment, as well as to human health and safety, is the possibility of encountering unexploded ordnance.

Operation stage

The Task implementation will allow for effective breaking and removal of ice, which will mitigate the risk of flooding caused by ice jams. Therefore, the Task will help prevent natural disasters.

5.13 CUMULATIVE AND TRANSBOUNDARY IMPACTS

The environmental permit procedure (Appendix 4a) analysed the issue of cumulative and transboundary impacts. The issue of cumulative impacts was considered with particular attention to the projects carried out on the German side resulting from the Polish-German agreement and taking into account the cumulative impacts of the implementation of the full set of tasks included in the environmental permit.

In accordance with the Polish-German concept, achieving the planned navigation objective for icebreakers is possible only by carrying out the scope of works indicated in the concept on both sides of the river. Taking into account the anticipated schedule of works on the German side, i.e. at least 3 years after the completion of works on the Polish side, no accumulated negative impacts on the environment are expected. The period between the completion of the works on the Polish side and their commencement on the German side will allow for partial regeneration of aquatic vegetation complexes and fish and invertebrate habitats, which will be inhabited by organisms that use refugia on the German side. During later operations on the German bank, the role of refuges will be taken over by the habitats on the Polish bank, which will be to some

extent rebuilt. In addition, the remaining Tasks carried out on the Odra, including the tasks planned as part of the Odra-Vistula Flood Management Project, were analysed:

- Task 1B.5/3. Reconstruction of a bridge to ensure minimum clearance – a railway bridge at 615.1 km of the Odra in Kostrzyn nad Odrą;
- reconstruction of the road bridge over the Odra in Kostrzyn nad Odrą at 614.9 km, at the extension of the German road B1 and the Polish National Road 22;
- reconstruction of the railway bridge on the Odra in Siekierki at 653.9 km, Cedynia commune,
- Task 1B.3/2 Stage II – Construction of mooring facilities of the lower and border Odra and new waterway signage.
- Task 1B.1/1 (a). Reconstruction of river control infrastructure on the Odra – adaptation to the conditions of Class III waterway from Ścinawa to the mouth of Nysa Łużycka – Stage II.

Taking into account the nature of the individual works and their scope, as well as the minimisation measures introduced as part of the Task, no significant cumulation of the impact of the Task with other activities carried out on the Odra is expected. Moreover, the results of the BAW concept modelling analysed as part of the environmental impact assessment do not predict negative impacts during the functioning of the abovementioned Tasks.

The cumulative impact of the Task with dredging, which is foreseen as part of fairway maintenance in case of excessive sediment deposition, was also analysed. Taking into account the fact that these works, generating long-term water turbidity, will be carried out after the execution of the Task in question, no significant accumulation of the impact of the Task with the aforementioned works is expected. In addition, the low floating islands constructed as part of minimisation measures will limit the possible negative impact of any later dredging works on the potential habitats of breeding gulls and plovers, i.e. sandy bars.

As regards the transboundary impact, it was found that the implementation of the Task will result in impacts, for which the possibility of transboundary impact cannot be ruled out, especially since the Task concerns the Odra, which is the border between the Republic of Poland and the Federal Republic of Germany. Areas on the German side potentially exposed to noise and air pollution emissions in relation to the implementation of the full scope of the modernisation of the Odra control structures, included in the environmental permit, are the town of Frankfurt (Oder) and the villages of: Hohensaaten, Hohenwutzen, Rudnitzer Ausbau, Güstebieser Loose, Bleyen, and Küstrin Kietz. Due to the nature of the Task and its scope, the Task is not expected to have a negative impact on the residential buildings located on the German side.

In the context of protected areas, the following Natura 2000 sites are located in the vicinity of the implementation of the full scope of modernisation of the Odra control structures, included in the environmental permit: Mittlere Oderniederung DE3453422, Unteres Odertal DE2951302, and Unteres Odertal DE2951401, Oderinsel Kietz DE3453301, Oder-Neiße

Ergänzung DE3553308 Oderwiesen Neurüdnitz (DE3151301), and the area of the German Lower Odra National Park (Nationalpark Unteres Odertal). Modernisation of river control structures on both sides of the border Odra is planned in accordance with the assumptions of the Polish-German BAW Concept and the Polish-German Agreement. According to the initial version of the consolidated schedule of modernisation of control structures in the border Odra on the Polish and German side, the first commencement of modernisation works on the German side is planned for 2027, while on the Polish side – for 2020. This will prevent the accumulation of negative impacts at the implementation stage (e.g. in terms of inflow of sediment to water, noise, destruction of habitats and aquatic organisms). Moreover, water habitats left on the German bank without interference will be a refugium for fish and macroinvertebrates migrating from the sections of the Polish bank where works are conducted. The accumulated impact at the operation stage will also be reduced if works on the two banks commence at different times – the period between the completion of the works on the Polish side and their commencement on the German side will allow for partial regeneration of aquatic vegetation complexes and fish and invertebrate habitats, which will be inhabited by organisms that use refugia on the German side. During later operations on the German bank, this will be repeated, and the role of refugias will be taken over by the habitats on the Polish bank, which will be to some extent rebuilt.

Noise will be emitted during the Task implementation phase, due to the presence of people and moving equipment, resulting in the scaring of avifauna, which may also be of a transboundary nature due to the proximity of the neighbouring country. Due to the large number of environmentally valuable habitats in the vicinity of the area of the works, birds will move to neighbouring areas for the duration of the investment works and return after the implementation stage is completed. Nevertheless, during the Task implementation period, continuous environmental supervision will be carried out, the task of which will be to minimise the risk associated with negative impacts.

In view of the above, taking into account the findings of the environmental impact assessment, it was concluded that the Task implementation phase will not result in any significant negative impact on the objects of protection in Natura 2000 sites in the Federal Republic of Germany.

The issue of the long-term impact of the modernisation of the border Odra control structures, in particular on elements of the natural environment, including objects of protection in the Natura 2000 site, was thoroughly analysed as part of the environmental impact assessment and cross-border assessment carried out within its framework.

A detailed description of the cumulative and transboundary impact arrangements is contained in the environmental permit attached to the EMP (Appendix 4a to the EMP).

6. DESCRIPTION OF MITIGATION MEASURES

In order to limit the negative impacts of the planned Task on the environment, Appendix 1 of the EMP provides a set of mitigation measures to be applied by the Contractor. The agreed contract price shall cover all costs associated with the implementation of the EMP, and the Contractor shall cover all related costs under the contract. The EMP, which is part of the Bidding Documentation. After signing it (on each page), the Tenderer (Contractor) shall submit it together with the tender. They therefore acknowledge the need to apply the requirements during each phase of the contract. In the work schedule, the Contractor takes into account the conditions of implementation of the Task arising from the EMP. These activities were prepared on the basis of the conditions contained in the applicable administrative decisions on environmental protection issued for the Task, in addition to the additional conditions established at the stage of EMP preparation. The applied mitigation actions ensure that the Task is implemented in accordance with the World Bank's Environmental, Health, and Safety (EHS) Guidelines. The requirements for the construction phase are set out in the General EHS Guidelines[1], in particular in item 4 (*Construction and Decommissioning*).

Temporary and permanent occupation of land in connection with the implementation of the Task take place according to the rules specified in the Land Acquisition and Resettlement Action Plan (LA&RAP) and the Operational Policy of the World Bank OP. 4.12.

In order to supervise and monitor the mitigation measures included in the EMP, a dedicated position of the EMP coordinator will be established in the Contractor's structures (see item 135 cat. 14 - Requirements concerning the Contractor's personnel involved in the implementation of the EMP) [2].

Presented below are selected, characteristic mitigation measures, broken down into individual environmental components discussed in chapter 5 of the EMP.

6.1 LAND AND LANDSCAPE

Mitigation measures have been provided for in order to limit the negative impact of the Task on land and landscape, to be implemented during and before the construction works. The basic assumption of the Task implementation concerns the execution of works from the water with the use of, among others, pontoons equipped with anchor piles, barges with appropriate load capacity, etc. Only in cases when this is impossible due to environmental conditions, i.e. dynamic water level, will it be possible to conduct some of the works from the land. The construction facilities will also be organised primarily on vessels.

[1] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

[2] In Appendix 1 to the EMP, mitigation measures are assigned to 16 thematic categories (from cat. 01 to cat. 16).

Materials will be transported to the work areas on water. Stone will be delivered to the temporary storage sites by route barges. The transport of stone from the temporary storage sites (storage yards) will be carried out with pontoons and barges with a small draught, once the stone from the temporary storage yard is loaded on the vessel in appropriate quantity that allows for free manoeuvring. At the implementation stage, modernisation works on the border Odra may involve the use of the land for material storage sites. Taking into account the type of works covered by the Task, variability of the natural environment and hydrological conditions of the area, as well as the technology adopted by the Contractor, it is relatively difficult to indicate specific and final locations for material storage sites. The location and organisation of storage yards is part of the construction technology to be adopted by the Works Contractor. Storage yards will be located outside wetlands and outside areas of natural value, i.e. outside forest areas, sites of natural habitats listed in Appendix I of the Habitats Directive, sites of protected plant, animal, or fungi species.

Prior to the commencement of the works, due to the dynamic level of water and, consequently, the varying settlement of the area by species of fauna and flora, the choice of place for storage sites for building materials or access roads will be consulted with and accepted by the environmental supervision. At the same time, any access roads should also be located outside of natural habitat patches and sites of valuable plant species. Nature inventories were a basis for selecting potentially acceptable locations for the abovementioned purposes, as well as designating areas of particular natural value, which will be excluded as potential locations for storage yards or access roads.

The method of conducting the works will ensure that interference with the bank zone is limited, the groyne wings will be built in the narrowest possible strip of the bank line, the construction will be carried out from the furthest point of the wing towards the groyne to allow the construction equipment to move along the bank, which will eventually be occupied by the structure.

Temporary and permanent occupation of land in connection with the implementation of the Task will take place according to the rules specified in the Land Acquisition and Resettlement Action Plan (LA&RAP) and the Operational Policy of the World Bank OP. 4.12.

The main mitigation measures aimed at reducing the impact on land and landscape include in particular the following items in the table in Appendix 1 of the EMP:

- items 1 - 10 (cat. 01 - land acquisition principles),
- items 23, 45-46 (cat. 02 - requirements for securing protected natural resources),
- item 101 (cat. 09 - guidelines for reducing the environmental nuisance through the use of appropriate materials and technologies),
- items 106-110 (10 - guidelines for limiting the spread of alien species),
- items 111-112 (11 - requirements for the reclamation of temporarily occupied sites).

6.2 CLIMATE

No mitigation measures were found necessary to protect local climatic conditions in the case of this Task. The task mitigates the effects of extreme weather phenomena.

6.3 CONDITION OF THE AIR

In order to protect the sanitary condition of the air, including minimising the risk of additional, currently unidentified impacts, appropriate mitigation measures must be implemented. The contractor will primarily implement mitigation measures to reduce/eliminate the emission of gaseous and particulate pollutants into the air by:

- using fully operational equipment that meets current legal requirements for protection against dust and gas emissions into the air;
- limiting the working time of internal combustion engines of construction machines and equipment or parked means of transport (limiting emissions during the so-called idling);
- applying the necessary safeguards to reduce dust emission during transport.

The mitigation measures aimed at reducing the impact on air quality include in particular the following items in the table in Appendix 1 of the EMP:

- items 95, 99, 100 (cat. 08 - requirements for the prevention of environmental pollution).

6.4 SOILS AND EARTH

During the works phase it is necessary to implement measures to mitigate negative impacts on soils, in particular those relating to the reduction of the area of temporary occupation sites and the prevention of soil and earth contamination.

The humus layer will be removed and used in the reclamation of the sites after the construction is completed. In order to minimise the negative impact on the ground surface during the construction phase, the slope surfaces modelled during the construction phase will be strengthened and the surface of the material bases will be sealed. The mechanical equipment used for construction works will be in good technical condition and the transport units used to carry out the Task will be equipped with safeguards against leakage of substances harmful to the environment, in particular petroleum-type substances, and appropriate sorbents to neutralise them.

In the event of a spillage of chemical or oil-derived substances, the spills will have to be immediately removed by the Contractor, and contaminated soil layers will have to be removed and managed in accordance with applicable regulations. The contaminated sites will be restored to their original state. The Contractor is obliged to develop procedures for dealing with spillage of chemical and petroleum-type substances.

The mitigation measures aimed at reducing the impact on soils and earth include in particular the following items in the table in Appendix 1 of the EMP:

- items 50-54 (cat. 03 – requirements for handling earth masses obtained during works),
- items 75 - 77 (cat. 05 - organisation of the construction site, construction site facilities, storage yards),
- items 89 - 98 (cat. 08 - requirements for the prevention of environmental pollution),
- items 101 - 102 (cat. 09 - guidelines for reducing the environmental nuisance through the use of appropriate materials and technologies),

- items 111 - 112 (cat. 11 - requirements for the reclamation of temporarily occupied sites).

6.5 SURFACE WATERS

The works planned under the Task will affect the hydromorphological conditions of the river and biological elements of water status/capacity assessment. Therefore, the planned activities include minimisation measures and measures aimed to differentiate the habitats existing in the bank zone in order to accelerate natural settlement of characteristic groups of aquatic organisms that limit the impact on biological and hydromorphological elements of JCWP to a moderate level in the river sections under works.

The minimisation measures programmed in relation to the environmental objectives set for water protection largely overlap with those set for the protection of animate nature. In order to minimise the impact, the scope of earthworks will be limited as much as possible – allowing to reduce the inflow of suspensions to waters at the stage of works and reduce the scale of permanent habitat transformation. Time constraints will be applied, excluding the possibility of carrying out particularly invasive works, including those resulting in a significant inflow of suspensions into the waters (earthworks in the riverbed for the modernisation/construction of groynes) during periods of particular sensitivity of biological elements: exclusion of any works interfering with the riverbed during the period of spawning and growth of fish hatching in this section of the Odra and the spring migration of the sturgeon and river lamprey (from the beginning of March to July 15) and limiting the inflow of suspensions through breaks in works or the use of suspension curtains, depending on the results of the monitoring of the measurements of suspension concentration and dissolved oxygen concentration in water. 6.8.1. In particular, in order to protect diadromous fish during their migration, it is planned to carry out monitoring tests of the concentration of suspended solids and dissolved oxygen during the works carried out in the period from October to December, interfering with the bottom of the Odra (e.g. demolition of damaged groynes, foundation of new structures in the bottom) and introducing breaks in work in accordance with the results of the concentration of suspension and dissolved oxygen. Suspended solid concentrations of 200 mg/l and 400 mg/l have been set as threshold values for the introduction of two-hour and 24-hour rest periods, respectively. These are values reported in the literature[1] and taken as a high risk for fish (> 200 mg/l) and an unacceptable risk for fish (> 400 mg/l). The distance from the place of works to the measuring location will be 200 m downstream, in order to determine the conditions for ichthyofauna in the section of the river affected by the works, but outside the direct place of their execution.

[1] WWF-UK, Review of UKTAG Proposed Standard For Suspended Solids, August 2007, APEM REF: 410242 WWF-UK, Final Report (https://www.deq.idaho.gov/media/903180-review-uktag-proposed-standard-suspended-solids-2007.pdf)

The spaces in groyne fields will remain intact, e.g. there will be no interference with the deposits located in the fields, except for places directly colliding with the designed structures. The contractor will be prohibited from moving earth masses in the riverbed by pushing the material.

Large woody debris located in places that do not hinder the execution of the works, as well as tree trunks and stumps that are located in the area of the works (and do not interfere with their execution) will be left in place. In addition, minimising activities related to the restoration of riffle habitats on the downstream side of the tops of the modernised groynes were planned for implementation, as well as activities consisting not only in leaving the habitat-forming elements described above undisturbed, but also supplementing them (oversized boulders placed behind dams and in deeper groyne fields cutting deep into the banks). These activities will ultimately contribute to maintaining the habitat potential of the section of the Odra under works in a state not significantly different from the current one.

Measures for the protection of surface waters against contamination shall, in turn, be consistent with those for protection of soil and land and shall include, in particular, the implementation of measures and procedures to minimise the risk of water contamination and to remove contamination if it enters the environment.

Deliveries of fuel to the construction site should be carried out using bunkering barges, refuelled in designated places with properly equipped quays, and after the bunkering barge arrives at the construction site, fuel will be refuelled on pushers and transportable temporary petrol stations located on pontoons with excavators. A transportable service station will be installed in a sealed tank in order to avoid spillage of fuel on the deck of the pontoon, and materials and equipment will be organised on the vessels to eliminate spillages, such as flexible dams, pneumatic or sorbent dams and sorbents (mats, rolls, pillows, booms).

In the event of a leakage of petroleum-type substances into surface waters, the Contractor is obliged to ensure immediate limitation of the spread of contamination and mechanical collection of petroleum-type substances from the water surface.

The mitigation measures aimed at reducing the impact on surface waters include in particular the following items in the table in Appendix 1 of the EMP:

- items 26 - 40 (cat. 02 - requirements for securing protected natural resources),
- items 52, 53 (cat. 03 – requirements for handling earth masses obtained during works),
- items 89 - 98 (cat. 08 - requirements for the prevention of environmental pollution),
- item 102 (cat. 09 - guidelines for reducing the environmental nuisance through the use of appropriate materials and technologies).

6.6 GROUNDWATER

The task does not generate negative impacts on the state of groundwater. On the other hand, the Contractor is obliged to implement measures to protect the ground in emergency situations, e.g. leakage of petroleum-type substances. The mitigation measures aimed at reducing the impact on groundwater include in particular the following items in the table in Appendix 1 of the EMP:

- items 75 - 77 (cat. 05 - organisation of the construction site, construction site facilities, storage yards),
- items 79 - 83 (cat. 06 - waste treatment requirements),
- items 89 - 98 (cat. 08 - requirements for the prevention of environmental pollution).

6.7 ACOUSTIC CLIMATE

Works planned as part of the Task will not cause any significant negative impacts on acoustically protected areas. Impacts will be periodic and limited to the immediate vicinity of worksites. Mitigation measures will be implemented to reduce the intensity of impacts during the execution phase, including: carrying out the works in the daytime (6:00 a.m. to 10:00 p.m.), using efficient equipment, turning off machinery and equipment during breaks.

The mitigation measures aimed at reducing the impact on acoustic climate include in particular the following items in the table in Appendix 1 of the EMP:

- item 73 (cat. 04 - requirements for transport services in the task area),
- items 95, 99 (cat. 08 - requirements for the prevention of environmental pollution).

6.8 NATURE

6.8.1 NATURAL HABITATS, FLORA AND FAUNA

In order to prevent and reduce negative impacts on nature, a number of mitigation measures have been proposed and will be implemented during the execution phase. A complete list of mitigation measures for the protection of natural habitats and flora and fauna is contained in Appendix 1 to the EMP. The implementation of the Task generates impacts in particular on water-related habitats and species, and therefore the mitigation measures for nature overlap to a large extent with those identified in relation to the environmental objectives for surface waters protection (see item 6.5.). In order to minimise the impact on biological and hydromorphological elements of water status, mitigation measures have been provided for: limiting the interference with groyne fields to the necessary minimum, leaving the sand deposits, water vegetation, and rushes undisturbed in the groyne fields, replanting vegetation patches (especially nymphaeids, including all identified endangered sites of the fringed water lily *Nymphoides peltata*), and not removing woody debris (tree trunks, logs, stumps) located in groyne fields, provided that they do not interfere with the works. In addition, the conditions for carrying out the works that minimise interference in groyne fields and in the bank were clearly defined, and habitat-forming activities were planned (restoration of riffles from loose stone of varying granulation, introduction of groups of oversized boulders), which will ultimately contribute to maintaining the habitat potential of the section of the Odra under works in a state not significantly different from the current one – detailed in Appendix 1 to the EMP.

The Contractor shall ensure that the schedule of works is such that the dates and location of the individual stages of construction works are adapted to the requirements of the environmental permit and the EMP, and do not affect the protected species found in and around the Task area. The time limits for the performance of works, indicated in Appendix 1 to the EMP, concern

both the performance of the entire Task and of specific types of works. In particular, in order to limit the impact of increased amount of suspensions and stress factors on fish, the works will be carried out outside the spawning period and the period of increase in fish hatching, which for most Odra species occurs in spring and early summer: March to mid-July.

The Contractor will provide their own environmental supervision team, which will be involved in the proper implementation of the requirements of the EMP during the works. The Contractor's team of naturalists will include specialists in fields such as botany/phytosociology, entomology, ichthyology, ornithology, herpetology, chiropterology, and mammalogy. The implementation of the Task will be subject to constant environmental supervision in the scope of compliance with environmental protection standards, compliance of the implementation of the Task with the arrangements contained in the environmental permit and in subsequent decisions, including in the scope of species protection, as well as in the scope of ongoing identification of the occurrence of a possible threat to the environment and taking actions aimed at preventing such a threat. The Contractor's environmental supervision team shall prepare the necessary materials and applications and shall obtain permits for derogations from the bans on the protection of species of plants, fungi, or animals in accordance with the rules and procedures specified in the Act on Nature Conservation. Monitoring of suspension concentration in the waters will also be carried out in the vicinity of the work areas in order to prevent the occurrence of concentrations posing a hazard to fish and molluscs that inhabit the riverbed in the vicinity of the work areas.

In order to minimise possible negative impacts on animal species, mitigation measures will be implemented in relation to ichthyofauna, avifauna, herpetofauna, mammal fauna, chiropterofauna.

Ichthyofauna: mitigation measures include primarily limiting interference with groyne fields to the necessary minimum: not removing deposits, leaving shallows and submerged vegetation undisturbed, limiting works in water during the spawning season, which for most Odra species happens in spring, from March-June (except for the burbot and whitefish, which spawn in winter), introducing additional stocking with burbot and whitefish of sections of the Odra during the work period (approx. 3 years) and 3 years after the completion of the works, which will be continued by the Investor, monitoring the level of suspension concentration and oxygenation of waters (at values dangerous to aquatic organisms the works will be temporarily suspended), application of additional safeguards (suspension curtains) during the invasive construction works interfering with the bottom of the riverbed (e.g. dismantling of damaged groynes, founding new structures at the bottom) in order to protect diadromous species of ichthyofauna during migration from October to December.

Herpetofauna: mitigation mainly consists of preventive measures involving the training of workers carrying out the Task in identifying snakes found in the country or securing possible access roads in the event of large migrations of amphibians during their migration period.

Avifauna: mitigation measures include, above all, removing trees and shrubs and cleaning groynes, the area of the river wall, and the sites of planned revetment from lichen, outside the breeding season.

Mammals: the mitigation measures consist primarily of reducing work in the vicinity of wooded areas, as they are of protective value to mammals; carrying out investment work during the daytime when the animals remain in shelters; on sections where mammals, i.e. otters and beavers, have been reported, carrying out work outside the breeding period of the above species.

Chiropterofauna: mitigation measures primarily consist of carrying out work only during the daytime, eliminating potential impact on bats; carrying out work during the period of reduced activity and wintering of bats, i.e. September-March, which will minimise potential disruption to bat populations in the area of the planned task; before felling, each tree within the bat habitat area will each time be inspected for bat activity.

Appendix 1 to the EMP also lists the sections of works and locations which are subject to restrictions on the performance of selected activities (e.g. ban on locating temporary material storage sites, ban on using roads outside the designated period, absolute ban on carrying out works from the land, order to carry out works only during the daytime, orders to limit the lighting of the works area).

The Contractor will also conduct training on the terms and conditions of the EMP for the Contractor's management and engineering-technical staff.

The mitigation measures aimed at reducing the impact on animate nature include in particular the following items in the table in Appendix 1 of the EMP:

- items 2 - 10 (cat. 01 land acquisition principles),
- items 11 - 49 (cat. 02 - requirements for securing protected natural resources),
- items 84 - 88 (cat. 07 - requirements for the removal and protection of trees and shrubs),
- items 101 - 105 (cat. 09 - guidelines for reducing the environmental nuisance through the use of appropriate materials and technologies),
- items 106 - 110 (cat. 10 - guidelines for limiting the spread of alien species).

6.8.2 PROTECTED SITES

During the execution of the works, the Contractor is obliged to observe the standards, prohibitions, and indications and to respect the restrictions resulting from the existence of sites and objects established on the basis of the Nature Conservation Act.

Minimisation measures were introduced to protect natural habitats and protected species of fauna and flora. Providing ongoing guidelines for the methods of performing the works, taking into account the need to protect natural values of the forms of nature protection, including protected plant and animal species with particular emphasis on amphibians, reptiles, birds, bats, fish, and taking into account minimising the impact of the works on species and natural habitats for the protection of which the Natura 2000 sites were established, will be the task of the Contractor’s environmental supervision.

The mitigation measures indicated in section 6.8.1 adopted for natural habitats and protected species also apply to the protection of natural values of protected sites. A complete list of mitigation measures in this respect is contained in Appendix 1 to the EMP.

6.9 CULTURAL LANDSCAPE AND OBJECTS OF CULTURAL HERITAGE

The accumulated knowledge and materials on the planned Task indicate that it does not cause direct, negative impacts on objects of cultural heritage or the cultural landscape. However, the Contractor is obliged to implement preventive measures in case of negative impacts that may appear at the stage of works.

According to the Act of 23 July 2003 on protection and care of monuments (Journal of Laws of 2014, item 1446 as amended) anyone who, during construction or earth works, discovered an object which may be expected to be a monument, shall suspend all works which may damage or destroy such object; secure the object and the place of its discovery using available measures; notify forthwith the competent Voivodeship Heritage Conservation Officer, and if this is impossible, notify the competent head of commune (city mayor). The Contractor shall also notify the Engineer about this. In order to implement the above mentioned provisions of the EMP related to the Protection of Cultural Heritage and Monuments, the Contractor will also obtain, if necessary, the permission of the Voivodeship Heritage Conservation Officer (WKZ) to conduct archaeological rescue research and will conduct such research.

Throughout the entire Task implementation period the Contractor will ensure the participation of a team of archaeological experts (archaeological supervision).

Mitigation measures for the protection of cultural landscape and objects of cultural heritage are included in Appendix 1 to the EMP in items: 113 - 116 (cat. 12 - requirements concerning the protection of objects of cultural heritage).

6.10 POPULATION

Temporary and permanent occupation of land in connection with the implementation of the Task takes place according to the rules specified in the Land Acquisition and Resettlement Action Plan (LA&RAP). When acquiring real estate, the Contractor will be obliged to apply the World Bank Policy as expressed in the Operating Manual for the Odra-Vistula Flood Management Project (OVFMP) and to apply the LA&RAP. Negotiations and agreements between the Contractor and the real estate owner on temporary occupation shall be supervised by the Engineer in order to ensure the fairness of the agreement and its beneficial character for the landowner.

The works planned as part of the Task will be carried out in the riverbed and directly on the bank. This location translates into a lack of any direct contact, and thus no impact on the population and material goods in the area of work. No residential, agricultural, or service and commercial buildings will be demolished as part of the Task.

In order to limit the impact on human health in the area of the Task implementation and in the vicinity of the Task implementation area, in Appendix 1 of the EMP, mitigation measures were introduced in other categories, including:

- limiting the impact of the implementation of the planned Task on the sanitary state of atmospheric air (see chapter 6.3);

- limiting the impact of the implementation of the planned Task on the acoustic climate (see chapter 6.7).

The works will generally be carried out from the water and any transport related to the implementation of the Task will be carried out mainly by water. In order to eliminate the risk of collision with other vessels during the execution of works, the Contractor shall be responsible for observing the navigational regulations on inland waterways, contained, in particular, in the regulations on navigation rules and orders on local law on waterways. This applies to both the Contractor's own units and those of Subcontractors. Minimisation measures therefore focus on ensuring safe navigation conditions on the waterway during the execution of the works and on preventing shipping accidents. In addition, in case of using land access roads, the Contractor shall be responsible for any damage to structures and buildings, roads, etc., caused by them or their Subcontractors during the execution of works. The Contractor shall immediately repair any damage caused at their own expense and, if necessary, carry out other works ordered by the Engineer.

The mitigation measures aimed at protecting material goods include in particular the following items in the table in Appendix 1 of the EMP:

- items 55 - 74 (cat. 04 - requirements for transport services in the task area);
- items 94, 98, 99 (cat. 08 - requirements for the prevention of environmental pollution);
- items 113-115 (cat. 12 - requirements concerning the protection of objects of cultural heritage).

6.11 HUMAN HEALTH AND SAFETY

Measures were defined for the protection of human health and safety, relating to the appropriate organisation of work, technical measures, fire protection, storage yards, the condition and use of vehicles and machines, and training on the subject of the spread of HIV-AIDS, COVID-19.

When ensuring appropriate conditions for the protection of human health and safety, it should be taken into account that a significant part of the works is carried out from water (i.e. with the use of floating equipment) and in the immediate vicinity of water, from the bank slopes, in difficult weather conditions of autumn-winter. Due to the above, the Contractor should implement measures in the scope of ensuring personal safety of the persons performing hydrotechnical works, with special attention paid to the works performed on board floating units and on platforms connecting floating units with groynes, the autumn-winter period of the works and the expected water temperatures.

In order to guarantee safe working conditions, the Contractor ensures constant supervision of OSH services during Task implementation. The scope of duties, qualifications and composition of Contractor's OSH services shall conform to Polish labour law. The Contractor should implement measures in the scope of ensuring personal safety of the persons performing hydrotechnical works, with special attention paid to the works performed on board floating units and on platforms connecting floating units with groynes, the autumn-winter period of the works and the expected water temperatures.

The Contractor will develop a Safety and Health Protection Plan (OSH plan) containing information relevant to occupational safety during construction, as well as guidelines and rules of conduct for persons working on the construction site. When preparing the OSH plan, the Contractor is obliged to put particular emphasis on the issues of safety of works with the use of floating equipment and in the immediate vicinity of running water (the Contractor must specify the procedures of work and the provision of employees with adequate personal protective equipment).

Due to the nature of the Task, which includes carrying out works and transport works in the Odra, conditions have been set out in the EMP in order to minimise the risk of collision of vessels, taking into account the conditions on the waterway (including the occurrence of low levels and the risk of unfavourable navigation conditions). In particular, the following guidelines should also be applied to transport by water and work carried out on the waterway:

- transport equipment (floating sets) must be in accordance with relevant inland navigation regulations applicable in the Republic of Poland,
- the parameters of transport equipment (floating sets) must suit the conditions arising from the current class of waterway and to the water level,
- the use of vessels during the works must be agreed with the waterway manager and the competent Director of the Inland Waterways Authority,
- prior to the works, it is required to prepare a Safe Navigation Plan (Instructions for Operation and Circulation of Vessels during Works), which must be approved by the Director of the Inland Waterways Authority,
- the work site and waterway must be marked to warn about any existing hazards and restrictions in water traffic. The method and location of the marking shall be agreed with the Director of the Inland Waterways Authority.

In order to minimise the risk related to finding unexploded ordnance in the area of task implementation, in particular in connection with the significant intensity of battle in the task area during the Second World War, the Contractor shall ensure sapper's supervision over the works (carried out by an authorized sapper's supervision team) during the works, including sappers' reconnaissance before the works and ongoing checks and clearing of the area during earthworks, removal of dangerous objects of military origin (including unexploded ordnance) and their disposal.

The mitigation measures aimed at protecting human health and safety include in particular the following items in the table in Appendix 1 of the EMP:

- items 55 - 74 (cat. 04 - requirements for transport services in the task area),
- items 116 - 133 (cat. 13 - requirements for ensuring human health and safety),
- items 138 - 146 (cat. 15 - specific requirements of ES policies of the World Bank).

6.12 EXTRAORDINARY THREATS

Emergency

In the event of an emergency, the competent services must be notified first:

Service	Phone number
Mobile phone emergency number	112
Police	997
Fire brigade	998
Emergency ambulance	999
Municipal police	986

The obligation to notify the relevant services is contained in items 130 and 132 in Appendix 1 to the EMP (cat. 13 - requirements for ensuring human health and safety).

The procedure of cooperation and informing the parties to the Contract will be described in the Instructions for the Contractor, provided by the Contractor Engineer before the commencement of works. The instruction will include contact details (including e-mail) taking into account the personal condition of the Engineer, Contractor and PIU structure assigned to the implementation of the Contract.

It is the Contractor's obligation to counteract threats first and, in the event of their occurrence, limit their consequences. The basic threats are described below, but the list is open and not exhaustive with respect to the risk of other hazards not listed in the EMP.

Flood

Before the works commence, the Contractor shall prepare an appropriate flood protection plan (Flood Protection Plan for the Duration of Works) and obtain the Engineer's approval for its contents. This document will describe, among other things, the procedures to be followed in the event of a flood (see chapter 6.14). In the event of flooding, the Contractor shall follow the procedures described in the aforementioned document. In particular, in the case of anticipated high water levels, the Contractor shall secure the construction site against negative effects of surface water flow and shall evacuate people, equipment, and materials accordingly, and shall prevent the contamination of water with substances and materials originating from the construction site, including hazardous ones. Due to the execution of works within the riverbed, including during the winter period, the Flood Protection Plan for the duration of the works will also take into account the hazards and protocol in the event of ice phenomena occurring in the Odra.

The obligation to prepare the abovementioned plan is contained in item 120 in Appendix 1 to the EMP (cat. 13 - requirements for ensuring human health and safety).

Leakage of chemical and petroleum-type substances

Another extraordinary threat is the leakage of chemical or petroleum-type substances into water. In order to reduce the risk of environmental pollution, appropriate preventive measures

relating to, e.g., appropriate organisation and equipment shall be implemented, including spill barriers and ongoing monitoring of the condition of equipment and vessels in use.

In the event of possible spillages of chemical and petroleum-type substances, measures must be taken to contain the spread, neutralise the contaminants with sorbent, and dispose of them immediately. Moreover, prior to Task implementation, the Contractor will develop a spillage procedure concerning procedures and steps to be taken in case of possible spillage of chemical and petroleum-type substances.

Mitigation measures specified in Appendix 1 to the EMP for the protection of the aquatic environment are included in particular in the following items:

- items 75 - 77 (cat. 05 - organisation of the construction site, construction site facilities, storage yards),
- items 89 - 98 (cat. 08 - requirements for the prevention of environmental pollution).

Finding unexploded ordnance

If unexploded ordnance is found during construction works, e.g.: fuses, missiles, aerial bombs, artillery and rifle bullets, bazookas, grenades, any mines, explosives, etc., the Contractor should immediately stop work, evacuate the employees, notify the sapper's supervision team of the Contractor and the police and then follow the obtained instructions. The Contractor shall also notify the Engineer and the PIU.

Under no circumstances (except the sapper's supervision team of the Contractor and a specialised sapper's unit) may the found unexploded ordnance be lifted, dug up, buried, moved, or thrown into fire or into places such as rivers, canals, oxbows, ditches, etc. The Employer did not inspect the work site for the presence of unexploded ordnance – this is the responsibility of the Contractor.

The Contractor is obliged to provide a sapper's supervision team, which is described in point 6.11.

The conditions for proceeding in the event of finding unexploded ordnance and for the provision of sappers' supervision are set out in the following items in Appendix 1 to the EMP:

- items 130 - 131 (cat. 13 - requirements for ensuring human health and safety).

Shipping accident

The Contractor shall be responsible for the proper marking of the Task implementation area and vessel signalling (ships and floating equipment and objects) in accordance with the applicable law, including in particular the Regulation of the Minister of Infrastructure of April 28th 2003 *on navigational regulations on inland waterways* (Journal of Laws No. 212 of 2003, item 2072) and the Ordinance on the provisions of local law on waterways. In the event of a shipping accident, the locally competent director of the inland navigation authority shall be notified.

The relevant requirements are set out in the following items in Appendix 1 to the EMP:

- items 67 - 72 (cat. 04 - requirements for transport services in the task area).

Fire

The Contractor is responsible for fire protection in the area of Task implementation. The detailed procedure in case of fire will be included in the OSH Plan prepared by the Contractor (see chapter 6.14). The requirement for the Contractor to prepare an OSH plan and obtain content approval from the Engineer is specified in item 118 (cat. 13 - requirements for ensuring human health and safety) in the table in Appendix 1 to the EMP.

The Epidemic risk

If a state of epidemiological threat or epidemic is in force during the execution of works, the Contractor shall be obliged to act in accordance with legal requirements, in particular the Act of 5 December 2008 *on preventing and combating infections and infectious diseases in humans* (consolidated text: Journal of Laws of 2019, item 1239, as amended), all obligations resulting from the announcement of epidemics or a state of epidemic risk, and relevant World Bank guidelines[1]. The Contractor's actions should reduce the risk of spreading the infection, with respect to the personnel of Contractor as well as the Employer and Engineer and the local community. Guidelines on the course of action in the event of a state of epidemiological threat or epidemic are contained in item 147 (cat. 16 - Guidelines on the course of action in the event of a state of epidemiological threat or epidemic being announced in the course of works) in Appendix 1 to the EMP Notwithstanding the above, in accordance with item 129 (cat. 13 - requirements for ensuring human health and safety), the Contractor will implement an awareness-raising programme on the spread of infectious diseases (e.g. COVID 19).

6.13 WASTE AND WASTEWATER

The implementation of the Task will involve the generation of waste, therefore the amount of waste and its negative impact on the environment must be minimised in the course of work. The principle of minimising the amount of waste generated should be followed. The generated waste must be properly sorted and successively collected. Waste management should be conducted in accordance with the provisions of the Waste Management Act, the Inland Navigation Act and the Waste Management Plan referred to in item 119 (cat. 13 - requirements for ensuring human health and safety) Appendix 1 to the EMP

Ship waste containing oils or greases, cargo waste and municipal waste from ships and other floating equipment shall be collected on board the vessel in such a way as to prevent the entry of contaminants into the environment. Ship waste should be transferred to ship waste collection points in accordance with the Regulation of the Minister of Infrastructure of 21 May 2003 *on the conditions for collection, storage and disposal of waste and waste water from inland waterway vessels* (Journal of Laws of 2003, No. 104, item 973).

Hazardous waste should be handled in the following way: until it is handed over to the entities authorised to dispose of it, it should be stored in a way that prevents hazardous substances from

[1] Interim Guidance on COVID-19: ESF/safeguards interim note: COVID-19 considerations in construction/civil works projects, Version 1: April 7, 2020

entering the environment and is protected against access by third parties. Due to the fact that welfare facilities will be located on vessels, dangerous waste storage areas will also be on these vessels.

The management of the spoil generated during the works in the riverbed and bank zone will be included by the Contractor in the Land Management Plan (see p. 6.14), which will be developed taking into account the World Bank's Environmental, Health, and Safety Guidelines for Ports, Harbors, and Terminals[1].

The mitigation measures for waste and wastewater management include in particular the following items in the table in Appendix 1 of the EMP:

- items 50 - 54 (cat. 03 – requirements for handling earth masses obtained during works),
- items 79 - 83 (cat. 06 - waste treatment requirements),
- item 110 (cat. 11 - requirements for the reclamation of temporarily occupied sites).

6.14 REQUIREMENTS FOR THE IMPLEMENTATION OF ACTION PLANS DURING THE CONSTRUCTION PHASE

In order to ensure proper organisation of the execution of the works, as well as in order to properly implement the conditions specified in Appendices 1 and 2 to the Environmental Management Plan, the Contractor, prior to the commencement of the works, is obliged to develop, obtain the Engineer's approval to, and then implement the following documents as elements of the **Contractor's Environmental and Social Management Plan (C-ESMP)**:

- ***The Work Organisation and Construction Site Management Plan***, which should include such elements as:
  - organisation of work execution, including information on:
    - equipment involved in the execution of works and transport services, taking into account the conditions resulting from the navigational regulations for the waterway and with particular focus on the adjustment of the parameters of the floating equipment to the conditions prevailing on the waterway during the implementation of the Task, such as the occurrence of low levels and the risk of unfavourable sailing conditions,
    - deadline for the works,
    - the parameters of the front of the works and the method of marking,
    - restrictions for the capacity of the fairway resulting from the planned works,
    - conditions for conducting and location of bunkering (refuelling) operations on vessels.
  - organisation of construction site, including information on:
    - securing the construction facilities,

[1] https://www.ifc.org/wps/wcm/connect/ddfac751-6220-48e1-9f1b-465654445c18/20170201-FINAL_EHS+Guidelines+for+Ports+Harbors+and+Terminals.pdf?MOD=AJPERES&CVID=lD.CzO9

- securing the media,
- provision of sanitary facilities and living facilities,
- ensuring access to construction sites,
- environmental protection at the construction facilities,
- ensuring environmental protection measures for the duration of the works,
- transport service,
- the maintenance condition of machines, equipment, and devices,
- organisation of communication on the construction site and facilities,
- use of the harbour facilities.

- ***The Safe Shipping Project*** *(instructions for the work and movement of vessels during works)*, which should include, among other things:
  - indication of the boundaries of the water body occupied during the works,
  - information on the type of floating equipment authorised to conduct the works,
  - information about working hours during the daytime,
  - data on navigation lighting and signage,
  - temporary parking spaces for floating equipment and mooring points,
  - space to park equipment after work,
  - data on employee qualifications and employee supervision,
  - radio communication data,
  - information about existing navigation signage and measuring devices and their protection.

The Safe Shipping Project (instructions for the work and movement of vessels during works) shall ensure the safety of the passing and working vessels and contain the information required by the approving authorities, in particular from the locally competent Director of the Inland Navigation Authority.

- ***The OSH Plan*** should include, among others, such elements as:
  - information on risks expected to arise in the course of works, with the scale, time, and location of their occurrence specified.
  - information on the designation and marking of the worksite according to the type of threat,
  - information on how to instruct workers before commencing particularly dangerous works.
  - determination of the method for storing and handling dangerous materials, articles, substances, and preparations on the worksite,
  - determination of engineering and organisation controls that prevent risks when working in zones of high risk to health or near such zones, including controls that ensure secure and efficient communication which allows for fast evacuation in the case of fire, failure, or other dangers,
  - determination of the place where the documentation for conducted works and documents necessary for proper operation of machines and other technical devices are stored,

- information on addressing epidemiological threats, including COVID-19.

The OSH Plan will be prepared for the purpose of Task implementation in accordance with the applicable law. When preparing the OSH plan, the Contractor is obliged to put particular emphasis on the issues of safety of works with the use of floating equipment. The works will also be carried out in atmospheric conditions typical of the autumn and winter period. When preparing the OSH plan, the nature of the works on the riverbed and the date of the works should be taken into account (including the winter season), which is important when establishing safety procedures for carrying out works and providing employees with appropriate personal protective equipment.

The OSH plan will include information on how to solve problems related to the epidemiological threat, including COVID-19, taking into account the provisions indicated in item 147 (cat. 16 - Guidelines on the course of action in the event of a state of epidemiological threat or epidemic being announced in the course of works) in Appendix 1 to the EMP.

- **Quality assurance plans for** particular categories of works and other activities of the Contractor (depending on the needs, including the Engineer's requirements), which should include, among others:
  - Organisation of work execution,
  - Organisation of traffic on the construction site and the marking of works,
  - OHS and environmental protection,
  - List of working teams,
  - Responsibilities of key personnel,
  - Quality control,
  - Laboratory tests.

The contractor will also prepare:

- ***The Waste Management Plan***, which should include, among others, such elements as:
  - anticipated types and amount of waste,
  - ways to prevent the negative impact of waste on the environment,
  - method of waste management, including collection, transport, recovery, and neutralisation of waste,
  - the type of waste generated and the way it is stored, with particular emphasis on hazardous waste.
- ***Land Management Plan,*** which should include, inter alia:
  - determination of the scope of works related to the extraction of sediments from the riverbed,
  - determination of the methodology of soil and sediment tests,
  - technology and method of planned extraction of sediments from the riverbed,
  - description of possible ways of disposing of the extracted material and its temporary storage locations,
  - description of the environmental effects potentially associated with the extraction of sediments,

- determination of the manner of handling the extracted sediments within the construction site, taking into account the minimisation of environmental impact,
- identification of areas which, for environmental reasons (e.g. areas of presence of protected species, natural habitats), cannot be occupied as temporary occupation sites for the management of extracted sediments, e.g. reloading sites, etc., and other key environmental conditions related to sediment extraction, such as an increase in suspended solids concentration,
- determination of methods of permissible further management of excavated soil, in accordance with the classification of soils and sediments made on the basis of the conducted study of their quality.

The **Land Management Plan** will be developed taking into account the World Bank's Environmental, Health, and Safety Guidelines for Ports, Harbors, and Terminals.

The management of land classified as waste should also be presented in the Waste Management Plan.

- ***The Flood Protection Plan for the Duration of Works***, which should include, among others, such elements as:
  - monitoring of the hydrological and meteorological situation,
  - principles of the Contractor's team's work during the flood hazard period,
  - basic responsibilities of key members of the Flood Protection Team,
  - a list of officers at the time of flood risk,
  - list of equipment and means of transport needed to carry out rescue operations.

Due to the execution of the works within the riverbed, including during the winter period, the Flood Protection Plan for the duration of the works will also take into account the risks and the manner of proceeding in the event of ice phenomena and the flow of ice floe on the Odra.

- ***The spillage procedure***, which should include, among others, information on the procedure to follow in the event of spills of chemical or petroleum-type substances, i.e:
  - mode of equipping individual units with appropriate materials in relation to anticipated hazards and substances,
  - mode of alarming and notifying services,
  - spillage containment procedure,
  - sorption materials handling procedure.
- ***ES Management Strategies and Implementation Plans*** (management strategies and implementation plans for environmental and social risks, including the risks of sexual exploitation, sexual abuse, and sexual harassment), which include, among others, elements such as:
  - description of actions taken to manage risks,
  - description of used materials, equipment, description of management processes, etc., which will be carried out by the Contractor and their Subcontractors in order to minimise risk.

The Contractor is obliged to submit for the approval of the Engineer and then to implement the Contractor's Environmental and Social Management Plan (C-ESMP), in accordance with the Terms and Conditions of the Sub-Clause 4.1 SW, including, among others, the agreed ES Management Strategies and Implementation Plans and the Code of Conduct for Contractor's Personnel (ES). The Environmental Management Plan (EMP) will constitute a binding part of the C-ESMP. The Contractor is not authorised to modify the provisions and conditions set forth in the EMP. The Contractor shall periodically review the C-ESMP and update it in accordance with the requirements of the Contract to ensure that it includes the appropriate actions for the Works. The updated C-ESMP is submitted to the Engineer for inspection. The procedures for reviewing the C-ESMP and updating it are described in Subclause 4.4.1 SW. Reports on the progress of work, as required by the Contract, shall include information on the environmental and social indicators (ES) as specified in the Special Conditions - Part D.

While preparing the abovementioned documents, the Contractor shall take into account the relevant operational policies of the World Bank concerning health, environment, and safety rules, including the EHS Guidelines[1]. Before implementation, these documents must be approved by the Engineer, who then also monitors their correct implementation.

ES Code of Conduct for Contractor Personnel (Code of Conduct ensuring the implementation of measures to address environmental and social risks associated with the implementation of the Task, including the risk of sexual abuse, sexual exploitation, and sexual harassment).

The Contractor shall submit the ES Code of Conduct containing provisions defining the obligations of the Contractor who was selected as a result of a contract award procedure, in particular with respect to environmental protection, social, health, and safety issues, in accordance with the template, after was signed (on each page) together with the tender. They therefore acknowledge the need to apply the requirements during each phase of the contract.

The Code of Conduct is among the measures which aim to address the environmental and social risks associated with the implementation of the Task, including the risks of sexual harassment and mobbing, as well as discrimination on the basis of gender. It applies to all personnel of the Contractor, workers, and other employees in the area of Task implementation. It also applies to the personnel of each Subcontractor and any other personnel assisting the Contractor in the implementation of the Task.

[1] https://policies.worldbank.org/sites/PPF3/Pages/Manuals/Operational Manual.aspx#S3-2 (in the section entitled Investment Project Financing / Environmental and Social Safeguard Policies)
https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines
https://www.ifc.org/wps/wcm/connect/29f5137d-6e17-4660-b1f9-02bf561935e5/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES&CVID=jOWim3p

The Contractor will also conduct a training on the terms and conditions of EMP implementation for the Contractor's management and engineering and technical staff responsible for the implementation of the Task, as well as regular OSH training for Employees, raising awareness on the issue of preventing sexual harassment and mobbing.

The requirement to prepare and obtain acceptance of the content of the abovementioned documents, to ensure compliance with the ES policy and the ES Code of Conduct, and to conduct training on the terms and conditions of the EMP, as well as OHS training and awareness-raising on combating sexual harassment and mobbing is indicated in particular in the table in Appendix 1 to the EMP in items:

- items 118 - 123 (cat. 13 - requirements for ensuring human health and safety),
- item 134 (cat. 14 - requirements concerning the Contractor's personnel involved in the implementation of the EMP),
- items 138, 140, 145, 146 (cat. 15 - specific requirements of ES policies of the World Bank).

6.15 REQUIREMENTS WITH RESPECT TO THE WORLD BANK ES POLICIES

The implementation of the Task brings about the need to meet a number of ES requirements (environmental, social, OSH aspects), which are regulated by national provisions governing environmental protection, occupational safety and health, and labour law. State institutions and authorities supervise compliance with those provisions. In particular, as regards compliance with occupational safety and health regulations and labour law, the state sanitary inspection and labour inspection authorities are authorised to control the activities of entrepreneurs, including on construction sites. However, given the high priority given by the World Bank to ES requirements, the terms and conditions of contracts co-financed by the World Bank loan impose obligations to ensure the implementation of applicable regulations. Special attention is given to issues such as:

- Protection of adolescents employed to execute the Contract.
- Elimination of inappropriate behaviour of persons employed to execute the Contract (including sexual harassment and mobbing).
- Ensuring the safety and protection of health of the persons employed to execute the Contract, including the provision of OSH services required by law.
- Ensuring proper social conditions and employment conditions for persons employed to execute the Contract (including fair pay conditions).

Below is a list of issues in the form of requirements for the Contractor, related to the ES policies of the World Bank. It should be emphasized that the ES requirements and conditions specified for the Contractor and their employees also apply to the Contractor's Subcontractors and their employees or Subcontractors.

- The contractor shall conduct training and implement an awareness-raising programme to prevent sexual harassment and mobbing. These activities will be carried out during the entire term of the Contract, including the period for reporting defects, at least once

every other month. They will take the form of information, education, and awareness-raising campaigns.

- The Contractor shall immediately inform the Consultant of all reported cases and suspicions of sexual harassment and mobbing.
- The contractor shall inform all persons employed on the construction site about the possibility of lodging complaints about working and pay conditions and shall provide an information leaflet with the necessary information on lodging complaints and requests, assuring that there are no repercussions for the person lodging the problem. The content of the leaflet will be agreed with the Consultant.
- The Contractor shall inform the Consultant about all accidents involving employees and bystanders in accordance with the procedure submitted by the Consultant. In the event of an accident, the Contractor shall take all actions that they are obliged to take under applicable laws, such as the Construction Law and the Labour Code.
- The Contractor shall ensure equal pay for employees performing the same work regardless of their gender, sexual orientation, or age, and the Contractor shall not persecute or discriminate against persons employed under the Contract on the basis of gender, sexual orientation, or age.
- The Contractor shall, in accordance with the possibilities and conditions as well as Polish Labour Code regulations, meet the living and social needs of employees at the workplace.
- The Contractor is obliged to facilitate the improvement of professional qualifications of employees.
- The Contractor may only employ an adolescent worker who is at least 15 years old, has completed at least the eight years of primary school and has presented a medical certificate stating that the work of a given type does not endanger their health. The Contractor shall ensure that juveniles (persons under the age of 18) will not perform works prohibited to juveniles[1], including in particular works posing accident hazards, including works on the construction and demolition of construction structures.
- The Contractor shall employ an OSH specialist with qualifications and professional experience in accordance with Polish labour law.

Therefore, the table of mitigation measures in Appendix 1 to the EMP (items 138 - 146, cat. 15 – specific requirements of the World Bank's ES policies) contains detailed terms and conditions for the Contractor, covered by the monitoring and reporting obligation during the Task implementation period. It should be stressed, however, that the Contractor is obliged to apply and observe all provisions of the Labour Code and shall act in accordance with the ES Code of Conduct.

[1] i.e. specified in the Regulation of the Council of Ministers of 24 August 2004 on the list of works prohibited for juveniles and the conditions of their employment for some of these works (consolidated text: Journal of Laws of 2016, item 1509).

7. DESCRIPTION OF MONITORING ACTIVITIES

7.1 ENVIRONMENTAL MONITORING DURING THE WORKS PHASE

Appendix 2 to the EMP sets out a series of monitoring activities the Task Contractors are obliged to undertake. These activities were prepared on the basis of the conditions contained in the applicable administrative decisions issued for the Task, in addition to the additional conditions established at the stage of EMP preparation.

The monitoring activities listed in Appendix 2 to the EMP include monitoring of the implementation of mitigation measures listed in Appendix 1 to the EMP, monitoring of suspension concentration in the waters of the Odra, control of the tightness of containers in which fuels and oils will be stored, inspections of the technical condition of equipment, vehicles, machinery, devices and vessels, visual and organoleptic assessment of earth masses, and nature monitoring in accordance with the conditions specified in the environmental permit, with respect to:

- the conservation status of natural habitats within the range of Task impact, such as: 3270, 91E0 and the abundance and distribution of species subject to protection in Natura 2000 sites and of interest to the European Community.

In addition, the Contractor is obliged to prepare a bathymetric plan of the Odra, on the section of 500 m down the river from the place of completion of the works to establish the initial situation in order to monitor the condition of the bottom after the completion of the Task.

7.2 ENVIRONMENTAL MONITORING DURING THE OPERATION PHASE

Once the Task is completed, the functioning of the border Odra control structures will require the implementation of monitoring in accordance with the provisions of the environmental permit.

8. PUBLIC CONSULTATION

8.1 PUBLIC CONSULTATION ON THE SUBJECT OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK FOR OVFMP (2015)

The draft document entitled *Environmental and Social Management Framework (ESMF)* for the OVFM Project (including Component 1, covering this Task) was subject to a public consultation procedure, conducted in accordance with the World Bank's operational policy *OP 4.01*. Its aim was to enable the public to learn about the content of this document and to provide an opportunity for the public to make any comments, enquiries, and requests regarding its content.

Documentation from the public consultation process regarding the abovementioned document is available on the website of the Odra-Vistula Flood Management Project Coordination Unit[1].

8.2 PUBLIC CONSULTATION AT THE STAGE OF ENVIRONMENTAL PROCEDURES FOR THE TASK

8.2.1 CONSULTATION WITHIN THE FRAMEWORK OF THE ENVIRONMENTAL IMPACT ASSESSMENT

Consultations with the public were conducted by the competent local authority issuing the permit, i.e. the Regional Director for Environment Protection (RDOŚ) in Szczecin, as part of the Environmental Impact Assessment (EIA).

On 14.11.2017, the Director of the Regional Water Management Authority in Szczecin submitted an application for the issue of an environmental permit for the project entitled "1B.2 Stage I and Stage II Modernisation works on boundary sections of Odra River as part of the Odra-Vistula Flood Management Project".

The number of parties in the administrative proceedings exceeded 20 persons, therefore, and in accordance with the statutory disposition specified in Art. 74 section 3 of the EIA Act, the parties to the proceedings were notified of all the activities of the authority conducting the proceedings by notices. Given the territorial range of the project impact, RDOŚ in Szczecin published its notices (in addition to the notification on the notice board and in the BIP [Public Information Bulletin] of the office) through the following offices:

Regional Directorate for Environmental Protection in Gorzów Wlkp., Chojna Commune Office, Cedynia Municipal Office, Mieszkowice Municipal Office, Kostrzyn nad Odrą Municipal Office, Górzyce Commune Office, Słubice Municipal Office, and the Boleszkowice Commune Office.

[1] Website: http://www.odrapcu.pl/popdow_dokumenty_RPZSiSS.html.

On 11.12.2017, under the ref. no.: WONS-OŚ.4233.1.2017.KK.3, the RDOŚ in Szczecin issued a decision on the necessity to conduct proceedings on the transboundary environmental impact of the project in question; in the decision of 29.03.2018 ref. no.: WONS-OŚ.4233.1.2017.KK.13, the RDOŚ imposed an obligation to conduct an EIA.

In the course of the administrative proceedings, the Stepnica Tourist Organisation Nie Tylko Dla Orłów [Not Only For Eagles], EKO-UNIA, the Association for the Development of Inland Navigation and Waterways "Rada Kapitanów Żeglugi Śródlądowej" ["Council of Inland Navigation Captains"] were allowed to participate as parties in the proceedings.

One of the elements of the proceedings conducted on the basis of the submitted environmental impact report was conducting public consultations in the proceedings.

The procedure included three rounds of public consultations. Each time, as part of public consultations, the RDOŚ in Szczecin issued a notice, making public information about the ongoing environmental impact assessment proceedings for the project in question. The notice included information on the possibility of submitting comments and requests, and indicated the place and 30-day deadline for their submission. The information was made public on the website of the Public Information Bulletin of the Regional Director for Environment Protection in Szczecin and announced in the usual way, i.e. on the notice board, in the seat of the Regional Director for Environment Protection in Szczecin and the following offices: Regional Directorate for Environmental Protection in Gorzów Wlkp., Chojna Commune Office, Cedynia Municipal Office, Mieszkowice Municipal Office, Kostrzyn nad Odrą Municipal Office, Górzyce Commune Office and Słubice Municipal Office.

Therefore, consultations were held on:

- from 12.09.2018 to 11.10.2018
- from 25.07.2019 to 23.08.2019
- from 18.11.2019 to 17.12.2019

During the ongoing public consultations, comments and requests were made by NGOs and private individuals. Detailed information on the nature of the submitted comments and requests and on how they were used during the proceedings by the RDOŚ in Szczecin are included in the justification of the environmental permit (Appendix 4a to the EMP).

With regard to transboundary consultations, the procedure was as follows. Having received the German translation of the documents, the General Director for Environment Protection provided the affected party, i.e. the German side, with the abovementioned materials with a request to define its position on the matter within 30 days from the date of submitting the documentation to the public, and to provide information on the date and method of its submission for public inspection in accordance with the provisions of Article 4(1) of the agreement between the Government of Poland and the Government of Germany, signed in Neuhardenberg on 11.04.2006. After public consultations conducted on the German side, by letter dated 18.12.2018, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.2, he forwarded the opinions of German authorities, as well as comments and requests of the public regarding the report, which had been provided by the German side. Furthermore, having received the documentation translated into German from the

RDOŚ in Szczecin, the GDOŚ, by letter of 2 July 2019, ref. no: DOOŚ-TSOOŚ.440.3.2018.PR.5, sent it to the German side together with a request for it to submit its position in the case in question, as a potentially affected party, and to make the documentation public. Based on the letter of the GDOŚ of 07.08.2019, ref.: DOOŚ-TSOOŚ.440.3.2018.PR.8, the materials provided were made public on the German side from 31 July 2019 to 29 August 2019. During the ongoing public consultation, comments and requests were received from German authorities as well as from the public. Detailed information on the nature of the submitted comments and requests are included in the justification of the environmental permit (Appendix 4a to the EMP).

On 17.01.2020, transboundary consultations took place at the headquarters of the Zachodniopomorskie Voivodeship Office in Szczecin. The consultation meeting was organised in accordance with Article 7(2) of the Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany in the field of environmental impact assessments and strategic environmental impact assessments in a transboundary context, drawn up and signed in Neuhardenberg on 10 October 2018, and Article 5 of the Convention on Environmental Impact Assessments in a Transboundary Context, drawn up in Espoo, on 25 February 1991. Pursuant to the cited regulation, the subject of the consultation was the possible material transboundary impact of the planned Task and the measures to reduce or eliminate that impact. The consultation did not constitute an administrative hearing and was therefore not available to the general public. Minutes of the consultations were prepared and included in the case file, which, after translation into German, was approved by signature by the heads of delegation of the two Parties.

In order to verify discrepancies in the positions of the parties, the Polish side proposed to agree on a monitoring process after the completion of the project, which would allow for a retrospective examination of the actual impact on the environment. The German side declared its willingness to discuss with the Polish side the guidelines for such monitoring in relevant expert bodies (e.g. the Polish-German Border Water Commission, the International Commission for the Protection of the Odra and the Polish-German Programme Council of the Lower Odra Valley Network of Protected Areas under the aegis of the Polish-German Environmental Protection Council). In the environmental permit, the Regional Director for Environment Protection in Szczecin took into account the provisions on the implementation of monitoring and on agreeing its provisions with the German side.

After collecting the evidence which gave the possibility to issue the requested permit in accordance with Article 10 § 1 of the CAP, before issuing the environmental permit, by the notice of 18.02.2020, ref. no.: WONS-OŚ.4233.1.2017.KK.66 the RDOŚ in Szczecin informed the parties about the possibility to read the case files within the prescribed period. No comments were received within the deadline. Therefore, the RDOŚ in Szczecin issued the environmental permit of 18 March 2020. (ref. no.: WONS-OŚ.4233.1.2017.KK.68) No. 5/2020 for the project entitled "1B.2 Stage I and Stage II Modernisation works on boundary sections of Odra River as part of the Odra-Vistula Flood Management Project".

Full description of the proceedings was included in the justification for the abovementioned permit and in Appendix 3 to the permit entitled "Responses to comments submitted in the public consultation conducted during the procedure" (Appendix 4a to the EMP).

8.2.2 CONSULTATIONS WITHIN THE FRAMEWORK OF THE COMMUNICATION STRATEGY WITH PROJECT STAKEHOLDERS

According to the World Bank policies, engaging citizens in activities carried out within the framework of the Project should be implemented throughout the Project implementation period, at multiple levels. At the investment task level, the location and design of the investments should also be subject to public information and consultation carried out within the framework of proceedings for the issued permits by authorities of corresponding municipalities. In order to ensure a transparent flow of information on the Project to the stakeholders, the Consultant has prepared a strategy for communication with the Project's stakeholders. As part of its implementation:

- the Project's website www.bs.rzgw.szczecin.pl is maintained. All updates concerning the Project are posted on the website. Additionally, documents related to the preparation of individual investments for implementation, scientific opinions and expert opinions on technical, design and environmental issues, including an environmental impact report, are made available on the website;
- a promotional video promoting the OVFMP was published on the Project's website and YouTube platform in September 2019. The film presents the issue of jam-related floods, drawing attention to the need to carry out works enabling safe and effective ice-breaking operations;
- the total of 22 consultative and information meetings of various kinds were organised and held until September 2019, presenting issues related to the works carried out on the border Odra. Their participants, apart from the Investor's representative and the Consultant's team, were, among others, representatives of local communities, members of NGOs, representatives of the World Bank and invited experts. In particular, open meetings were organised for local communities at the site of the Project in the following locations: Kostrzyn nad Odrą, Górzyca, Słubice, Bielinek, Osinów Dolny, Stare Łysogórki, Mieszkowice, Cedynia. A meeting was also organised in Frankfurt (Oder), Germany, in response to signals from stakeholders in Germany (including mainly German NGOs).

8.3 PZŚ PUBLIC CONSULTATIONS

This draft document shall be subject to a public consultation procedure carried out in line with the World Bank's Operational Policy (*OP 4.01*).

After the draft EMP document has been prepared, its electronic version is published on publicly available websites and the paper version can be reviewed by interested parties. Detailed information on the possibility to review the document and to file requests and comments, along with specific contact details (e-mail and address of the place where the draft may be reviewed, office

hours, phone number) shall be published in local press and on the website of the entity implementing the Task which is the subject of the EMP. After a period of 17 working days, when the document is made public, a meeting for interested persons is organised, during which a presentation of the EMP draft takes place, followed by a discussion of all environmental issues related to the Task implementation.

In the event of an epidemic or epidemiological emergency status during public consultations of the EMP, the recommendations of the World Bank Technical Note "Public consultations and stakeholder involvement in activities supported by the World Bank in the event of restrictions in conducting public meetings" and rules for conducting electronic consultation of the EMP documentation implemented as part of the OVFM Project will be taken into account.

The meetings associated with making the document public, organised previously as an open debate, will be replaced by webinars, i.e. an internet seminar conducted and implemented with the use of webcast technology, which enables two-way communication between the meeting chair and participants, using virtual tools. Participants only need internet access and a web browser – no other program needs to be installed to join the webinar. Due to the above, the announcement of the publication of the EMP document will contain information about the date and time of the webinar, and information that a link to the webinar will be provided on the Project website. A helpline will be launched in order to allow interested parties to ask questions during the period of EMP publication. Information about the helpline will also be included in the announcement of the publication of the EMP.

Comments given by the public, which must be taken into account, shall be introduced to the EMP, and then the final version of the EMP shall be prepared. In this form, the EMP shall also be sent to the WB to obtain the 'no objection' clause.

The chapter will be completed once the procedure of making the document public has been completed.

9. EMP IMPLEMENTATION STRUCTURE

The task which is the subject of this EMP is implemented as part of the Odra-Vistula Flood Management Project (see chapter 2.1), co-financed by the Council of Europe Development Bank, the Cohesion Fund, and the State Budget. Therefore, the structure of supervision over the implementation of the EMP must comply with both the Polish law and the World Bank requirements.

9.1 ODRA-VISTULA FLOOD MANAGEMENT PROJECT COORDINATION UNIT (OVFM PCU)

The overall coordination of the implementation of individual EMPs of the Project is the responsibility of the Project Coordination Unit (PCU), which functions as an organisational unit within the structures of the National Water Management Authority (KZGW), which is an organisational unit of the State Water Holding Polish Waters.

The scope of OVFM PCU's tasks includes, among others:

- Management of tasks of Project Implementation Offices and Units (PIUs) in the scope of implementation of tasks in Projects,
- Technical assistance and support of PIUs in the implementation of the tasks in Projects, including the application of World Bank procedures on procurement, environmental protection, and social issues,
- Preparation of annual works programmes for Projects and assessment of their progress,
- Supervising the works in Projects and assessment of their progress,
- Ongoing control and monitoring of funds allocated for the implementation of Projects and participation in the management of funds for Projects,
- Reporting, including preparation and submission of quarterly reports on the implementation of the Projects to the World Bank, the CEB, and the Steering Committee,
- Ongoing cooperation with the World Bank and the CEB, including, among other things, correspondence relating to the Projects, organisation of visits by representatives of the World Bank and CEB and monitoring missions, participation in these visits and missions.

9.2 PROJECT IMPLEMENTATION UNIT (PIU) AND PROJECT IMPLEMENTATION OFFICE

The entity directly responsible for the implementation of the EMP for the Task and monitoring of implementation progress will be the Project Implementation Unit (PIU), i.e. the State Water Holding Polish Waters Regional Water Management Authority in Szczecin

In connection with the implementation of the OVFMP Project, the Project Implementation Office was designated within the PIU structure; it is a separate organisational unit supervised by the President of the State Water Holding Polish Waters. This structure is transparent and its

decision-making level is very high, which increases the efficiency of Project implementation. Positions of specialists in environmental issues, technical public procurement, legal, financial, real estate and resettlement issues, and international cooperation were established within the organisational structure. As part of the supervision over the implementation of the EMP, the Office performs the following tasks:

- monitoring of EMP implementation progress;
- financial management and accounting;
- drawing up the reports necessary for the monitoring of the EMP and coordination of its implementation by all services involved in the implementation.

The scope of duties of Office employees related to supervision over the implementation of the EMP is as follows:

- managing, coordinating, and supervising the implementation of the EMP by the Consultant and the Contractor;
- direct supervision over the correct implementation of the Task;
- cooperation with PCU;
- administrative and legal supervision over the implementation of the EMP;
- verification of reports on the implementation of the EMP prepared by the Consultant and the Contractor;
- financial supervision over the implementation of the EMP;
- supervision over the correctness of the application of formal procedures in the implementation of the EMP, resulting from, among others, the requirements of the Contract, *Construction Law*, *Environmental Protection Law,* and other relevant administrative decisions and legal acts.

9.3 CONSULTANT/ENGINEER

The role of the Consultant/Investigator is to support the PIU (RZGW in Szczecin) in effective execution of the entire investment process – from the preparation of the project to its settlement.

The Consultant/Engineer was selected using the QCBS method (Quality- and Cost-Based Selection), in accordance with the *"Guidelines for the Selection and Employment of Consultants by World Bank Borrowers"*.

In accordance with the planned structure of the Engineer - Technical Support Consultant team, at the stage of works implementation, the Engineer's Team (supervision inspectors in cooperation with the environmental team, coordinated by the Key Environmental Expert) will supervise the proper performance of construction works and the compliance with and implementation of the provisions of the EMP. Apart from the Key Expert, three experts are to be involved in the environmental team, including two who will be involved in the ongoing monitoring of the implementation of the EMP by the Contractor, including reporting and documenting activities related to the supervision of the implementation of the EMP, and one expert who will provide substantive support to the Key Expert during the implementation of the construction contract,

especially in situations related to, e.g., the need to resolve differences in the opinions of the Contractor's and the Engineer's team.

Social issues will be monitored during the execution stage by the Consultant's real estate team, coordinated by the key real estate expert, who will work closely with the team of construction supervision inspectors.

In accordance with the scope of activities specified in the Contract for the Technical Support Consultant, the Engineer – Consultant will be obliged to ensure that the team composition is such that it can properly supervise the implementation of the EMP through, among other things:

- monitoring of the EMP implemented by the Contractor;
- monitoring the activities of the Contractor;
- checking the quality of construction works performed by the Contractor and construction products, and, in particular, preventing the use of defective and inadmissible construction products;
- representing the RZGW in Szczecin on the construction site by controlling the compliance of implementation with the design and construction permit, environmental protection regulations, and principles of technical knowledge;
- supervision of all environmental issues by experienced environmental specialists and other members of the Engineer's personnel;
- continuous monitoring of the correct implementation of measures mitigating negative environmental impacts;
- carrying out additional tests if it is necessary to verify the Contractor's reports;
- identifying problems resulting from the adverse environmental impact of construction works and presenting proposals to solve these problems;
- checking and acceptance of construction works that are covered or are disappearing, participation in tests and technical acceptance of technical installations and devices, as well as preparation and participation in the acceptance of finished construction works and their commissioning;
- confirming actually performed works and removal of defects, and, at the request of the Investor, controlling construction settlement.

9.4 CONTRACTOR

A Contractor will be selected to carry out the construction works. They will be responsible for implementing the EMP.

In the Contractor's team, an EMP Coordinator should be designated – a person coordinating and monitoring the measures involved in EMP implementation. Throughout the duration of the Contract, the Contractor will ensure the participation of environmental experts as required. Contractor's team of naturalists shall consist of specialists in the fields of biology, nature conservation, ecology of flowing water (botanist/phytosociologist, entomologist, ichthyologist, herpetologist, ornithologist, teriologist and chiropterologist) and a hydrologist. The work of the team of experts will be coordinated by the EMP Contractor's Coordinator.

The Contractor will also have in his Team, available throughout the duration of the Contract, an OSH Specialist responsible for implementing OSH and ES issues.

The Contractor's obligations in this respect include:

- conducting construction works in accordance with the rules set out in the EMP, contract terms, and project documentation, in accordance with applicable laws and requirements of administrative decisions issued for the Task;
- implementation of the Engineer's recommendations (including specialists in environmental supervision and the investor's supervision inspector) concerning the implementation of the EMP;
- ensuring that a OSH Plan, a Waste Management Plan, a Quality Assurance Plan, a Flood Protection Plan of the construction site for the duration of the works, and other documents indicated in the EMP and contract terms are drawn up before the construction works commence;
- submitting the ES Code of Conduct and Management Strategy and Implementation Plans (ES -MSIP) described in the tender documentation and prepared at the bidding stage for the Contract Engineer's approval, and verifying these documents following the Contract Engineer's periodic recommendations;
- keeping construction documentation;
- preparing monthly reports and review reports;
- preparing environmental protection reports;
- applying to the Investor for changes in design solutions, if it is justified by the necessity to increase the safety of the construction works or to improve the construction process as far as the implementation of the EMP is concerned.

10. EMP IMPLEMENTATION SCHEDULE AND REPORTING PROCEDURES

The implementation of the EMP allows parties involved in the preparation, implementation, and supervision of the Task to:

- identify the various environmental aspects that have a significant impact on the state of the environment, so that they can be controlled, corrected, reduced, and which consequently have an economic impact;
- correct adverse consequences of works in progress for the benefit of the environment and financial results;
- define the objectives and tasks to be implemented within the framework of the adopted environmental policy, covered by the EMP, which require investment and bring measurable effects;
- identify and eliminate potential threats and breakdowns, prevent and remove environmental effects that may be associated with them and entail losses disproportionately larger than the costs of prevention;
- rationally use natural resources, with minimal environmental losses and optimal cost generation.

Moreover, the implementation of recommendations and actions resulting from the EMP may reduce or even eliminate risk in the Contract, in particular:

- the risk of the Contractor omitting environmental protection issues in the process of Task implementation;
- the risk of escalation of local protests as a result of the Contractor's failure to comply with the technologies and environmental procedures approved by the Engineer;
- the risk of additional environmental penalties;
- the risk of additional environmental losses.

Bearing in mind the importance of issues determining the environmental and social conditions, the following procedures for the implementation of the EMP are planned:

- before selecting the Contractor, the Employer shall submit a draft of this EMP to the PCU in order to secure an opinion;
- after the PCU expresses no objection with regard to the submitted documentation of the EMP, the document will be included in the tender documentation for the selection of the Contractor;
- the EMP will then be subject to public consultation according to the procedure currently in force;
- at the same time, the Employer shall submit to the World Bank a draft of this EMP in order to inform about the ongoing procedure and, if possible, to secure an opinion;
- following the public consultation, the EMP will be supplemented with the results of the consultation and the final version will be submitted for approval by the World Bank (issuance of “no objection”);

- after the issuance of "no objection" by the World Bank for this EMP, it will be published in the final version applicable in the Contract and included in the tender documentation for the selection of the Contractor;
- this inclusion will take place no later than before selecting the Contractor and signing the Works Contract with them, in such a way that the final price of the Contractor's offer relates to and takes into account all the conditions contained in the EMP;
- all activities of the Contractor shall be reported at regular intervals (monthly), in the Polish language and, if necessary, in the English language, in paper and electronic form, with regard to the obligations arising from the EMP and other contract documents. These reports will be subject to approval by the Engineer and the Employer;
- in the work schedule, the Contractor will take into account the conditions of implementation of the Task arising from the EMP, including in particular time constraints for the implementation of selected works due to the requirements in the field of nature and local society protection.

At the stage of works implementation, the Contractor will prepare aggregated reports on nature monitoring, confirmed by specialists of the Contractor's nature monitoring team, approved by the Engineer's environmental supervision team. The detailed scope of the report will be determined by the Engineer (start report, periodic report – monthly, quarterly, ad-hoc, closing). The Engineer will also specify the dates of their execution. The Contractor's environmental supervision team also prepares periodic reports, submitted to the environmental protection authorities in writing, in accordance with the requirements of administrative decisions issued in connection with the implementation of the Task by the above authorities. These reports are submitted to the Engineer (in advance, 30 days before the date of submission to the authority).

The Task implementation reporting system will be based on monthly reports submitted by Contractors to the PIU via the Engineer and the Engineer's monthly reports. Monthly reports on the implementation of the EMP (by the Contractor and the Engineer) will also be prepared, either as part of the monthly reports or as a separate document. On this basis, PIU will develop aggregated, quarterly reports.

PIU will submit quarterly reports to the PCU, in the part concerning the performance of their tasks. Reports will contain the required set of information and records to enable the preparation of the quarterly report of the Project by PCU. Moreover, especially in case of problems with the implementation of the Task, PCU will expect the PIU to forward statements and data on a monthly basis.

The following reporting procedures were established:

1) Reporting:
    a) reports (monthly, quarterly, ad-hoc, final) will be prepared by the Contractor and/or Engineer;
    b) review of the report by the Engineer;
    c) submitting the report to the Employer (for information);

d) submitting reports to the RDOŚ and/or GDOŚ and the Marshals of the Lubuskie and Zachodniopomorskie Provinces (within the scope resulting from administrative decisions issued for the Task implementation, in which the necessity of reporting the activities in question was specified);
e) submission of the PIU quarterly report to the PCU;
f) final report on the implementation of the EMP prepared by the Engineer (after verification by PIU and PCU, submitted to the World Bank no later than 3 months after the completion of works).

2) Archiving:
   a) Contractor: 1 copy of each report in an electronic version for 5 years from the date of Contract completion and no less than 3 years from the date of closure of a given European Union Operational Programme under which the Task was co-financed,
   b) Engineer: 1 copy of each report in an electronic version for 5 years from the date of Contract completion and no less than 3 years from the date of closure of a given European Union Operational Programme under which the Task was co-financed,
   c) Employer: 1 copy of each report in an electronic version for 5 years from the date of Contract completion and no less than 3 years from the date of closure of a given European Union Operational Programme under which the Task was co-financed.
3) Evaluation – ongoing assessment of the results of the implementation of the planned activities resulting from the EMP. Ongoing analysis of the documentation (Contractor's Reports) by the Engineer. Providing the Employer with reliable information on the course of the construction process, with particular emphasis on the implementation of measures to reduce the negative environmental impact and recommendations resulting from environmental permits.

PCU also prepares quarterly reports submitted to the World Bank.

The following evaluation is planned:

- *ex-ante*: Report before the commencement of the Contract (Engineer's Report),
- ongoing evaluation: Engineer's quarterly reports,
- *ex-post*:
  - ✓ Report after the completion of the Contract (Final Report from the EMP prepared by the Contractor and Engineer),
  - ✓ Report from the EMP after the period for reporting defects, prepared by the Engineer.

11. LIST OF SOURCE MATERIALS

1) Environmental Impact Report 1B.2 Stage I and Stage II Modernisation works on boundary sections of Odra River as part of the Odra-Vistula Flood Management Project, Sweco Consulting Sp. z o. o., April 2019.

2) Nature data for the area of the Border Odra Task: resulting nature maps (location of natural habitats and sites of fauna and flora species) for nature inventories conducted in 2017-2018 and analyses of the existing documentation (Consultant's working materials).

3) Environmental Permit No. 5/2020 (Case No. WONS- OŚ.4233.1.2017.KK.68).

4) Odra-Vistula Flood Management Project Operations Manual. OVFM Project Coordination Unit. Wrocław, July 2017.

5) Construction plans. 1B.2 Modernization works on boundary sections of Odra River, Stage I to provide Good Condition for Ice-breaking. Sweco Consulting Sp. z o. o. Szczecin, 2017.

6) Environmental and Social Management Framework for the Odra-Vistula Flood Management Project – final document. RZGW in Szczecin, RZGW in Wrocław, RZGW in Kraków, Lubuskie ZMiUW in Zielona Góra, Zachodniopomorskie ZMiUW in Szczecin, Świętokrzyskie ZMiUW in Kielce, Dolnośląskie ZMiUW in Wrocław, Małopolskie ZMiUW in Kraków, Podkarpackie ZMiUW in Rzeszów, IMiGW – National Research Institute. April 2015.

7) Ordinance of the Regional Director for Environment Protection in Szczecin of 31 March 2014, published in the Official Journal of the Zachodniopomorskie Voivodeship, item 1661 on establishing a plan of conservation tasks for the Natura 2000 site Lower Odra PLH320037.

8) Order of the Regional Director for Environment Protection in Szczecin of 30 April 2014, published in the Official Journal of the Zachodniopomorskie Voivodeship, item 1934 on establishing a plan of conservation tasks for the Natura 2000 site Lower Odra valley PLB320003.

9) Pawlaczyk P., 2017." Ekologiczne Problemy ochrony rzek w polskich obszarach natura 2000. [Ecological problems of river protection in Polish Natura 2000 sites.] Przegląd Przyrodniczy [Nature Review] XXVIII.

10) Matuszkiewicz W. 2008. Przewodnik do oznaczania zbiorowisk roślinnych Polski. [Guide to identifying plant communities in Poland.] Wydawnictwo Naukowe PWN, Warsaw.

11) Kaźmierczakowa R. (ed.) 2016. Polska czerwona lista paprotników i roślin kwiatowych. [Polish red list of ferns and flowering plants.] Instytut Ochrony Przyrody Polskiej Akademii Nauk [Institute of Nature Conservation of the Polish Academy of Sciences], Kraków.

12) Kaźmierczakowa R., Zarzycki K., Mirek Z. (ed.) 2014. Polska Czerwona Księga Roślin. Paprotniki i rośliny kwiatowe. [Polish Red Book of Plants. Ferns and flowering plants.] III ed., updated and expanded. Instytut Ochrony Przyrody Polskiej Akademii Nauk [Institute of Nature Conservation of the Polish Academy of Sciences], Kraków.

13) Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król; W., Baran P., Zięcik A. 2012. Opracowanie tekstów przewodników metodycznych dla gatunków i siedlisk przyrodniczych [Study of texts of methodological guides for species and natural habitats]. Vol 1/3. Instytut Ochrony Przyrody PAN [Institute of Nature Conservation of the PAS], Kraków.

14) Mróz W. (ed.). 2010. Monitoring siedlisk przyrodniczych. Przewodnik metodyczny, część IV. Inspekcja Ochrony środowiska. [Monitoring of natural habitats. Methodological guide, part I. Environmental Protection Inspection]. Biblioteka Monitoringu Środowiska, Warsaw.

15) Mróz W. (ed.). 2012. Monitoring siedlisk przyrodniczych. Przewodnik metodyczny, część IV. Inspekcja Ochrony środowiska. [Monitoring of natural habitats. Methodological guide, part II. Environmental Protection Inspection]. Biblioteka Monitoringu Środowiska, Warsaw.

16) Mróz W. (ed.). Monitoring siedlisk przyrodniczych. Przewodnik metodyczny, część III. Inspekcja Ochrony środowiska. [Monitoring of natural habitats. Methodological guide, part III. Environmental Protection Inspection]. Biblioteka Monitoringu Środowiska, Warsaw.

17) Mróz W. (ed.). 2015. Monitoring siedlisk przyrodniczych. Przewodnik metodyczny, część IV. Inspekcja Ochrony środowiska. [Monitoring of natural habitats. Methodological guide, part IV. Environmental Protection Inspection]. Biblioteka Monitoringu Środowiska, Warsaw.

12. LIST OF APPENDICES

Appendix 1 Mitigation measures plan.

Appendix 2 Monitoring activities plan.

Appendix 3 List of national legal acts related to environmental protection.

Appendix 4 Administrative decisions.

- 4a) Environmental Permit No. 5/2020 (Case No. WONS-OŚ.4233.1.2017.KK.68)
- 4b) Decision of RDOŚ in Szczecin of 20 July 2020 (Case No. WOPN-OG-6401.00.03.2020.KA) on permitting certain activities banned for protected animal species.
- 4c) Decision of RDOŚ in Szczecin of 28 May 2020 (Case No. WOPN-OG-6400.42.2020.MK) on permitting certain activities banned for protected plant species.
- 4d) Decision of the Marshal of the Zachodniopomorskie Province of 12 May 2020 (Case No. WRiR-I.7131.29.2020.MS) on the permit to perform the action of game disturbance.

Appendix 5 Task location maps:

- 5a) Map with the location of the main elements of the Task,
- 5b) Map with the location of the main elements of the Task in relation to protected sites).

Appendix 6 Construction drawings of rebuilt river control structures.

Appendix 7 Guidelines for implementing selected technical minimisation measures.

- 7a) Site plans – boulders.
- 7b) Site plans – bays.
- 7c) Cultivation recommendations for the strapwort – ex situ conservation cultivation.
- 7d) Guidelines for the metaplanting and restitution of the fringed water lily.

Appendix 8 Task 1B.2/3 Natural habitats requiring field identification.

Appendix 9a. Task 1B.2/3 Habitats of protected fauna and flora species requiring field identification.

Appendix 9b. Task 1B.2/3 Habitats of protected fauna and flora species requiring field identification.

Appendix 10 Task 1B.2/3 Fringed water lily sites for metaplaning.