

Odra-Vistula Flood Management Project

FINAL DOCUMENT



Environmental and Social Management
Framework

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1 LIST OF ABBREVIATIONS USED IN THE DOCUMENT

AP	Affected Population
BAWM	Board of Amelioration and Water Management
BP	Building Permit
BSCA	Bird Special Conservation Area
CAP	Act of 14 June 1960 — Administrative Proceedings Code (consolidated text, Journal of Laws of 2013 item 267 as amended)
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIA Law	Act of 3 October 2008 on access to information on the environment and its protection, public participation in environmental protection and environmental impact assessments (consolidated text, Journal of Laws of 2013, item 1235, as amended)
EMP	Environmental Management Plan
EP Law	Act of 16 April 2004 on environment protection (Journal of Laws No. 92, Item 880 as amended)
ESE	Strategy for Energy Security and the Environment, 2020 perspective
EU	European Union
Flood Directive	Flood Directive 2007/60/WE of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (OJ No 288 of 6.11.2007, p. 27 as amended)
FRMP	Flood Risk Management Plan
GWB	Groundwater Body
HSCA	Habitat Special Conservation Area
HSPA	Habitat Special Protection Area
RAF	Resettlement Policy Framework
RAP	Resettlement Action Plan

LSND	Long-Term National Development Strategy – Poland 2030. Third Wave of Modernity.
LZP	Local Zoning Plan
NBP	National Bank of Poland
NDS	National Development Strategy 2020
NGO	Non-Governmental Organization
NWMA	National Water Management Authority
PAP	Project Affected People
PCU	Project Coordination Unit
PIU	Project Implementing Units
RAC	Regional Administrative Court
RBMP	River Basin Management Plan
RDEP	The Regional Director for Environmental Protection
RIS	River Information Services
RP	The Republic of Poland
RPM Law	the Act of 21 August 1997 on real property management (consolidated text, Journal of Laws of 2014, item 906)
RWMA	Regional Water Management Authority
SAC	Special Areas of Conservation
SDC	Decision on Site Development Conditions
SEA	Strategic Environmental Assessment
SIEE	Strategy for Innovation and Effectiveness of Economy
Special Flood Act	Act of July 8 2010 on special principles of preparation and execution of flood protection projects (Journal of Laws No. 143, item 963, as amended)
SWB	Surface Water Body
VI EP	Province Inspectorates for Environmental Protection
Water Law	Water Law Act of 18 July 2001 r. (OJ from. 2012, no 145 as

	amended)
WB	World Bank
WFD	Water Framework Directive 2000/60/WE of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ No 32 of 22.12.2000, p. 1 as amended)

2 PREAMBLE

This Report presents environmental and social impacts of a large number of facilities that are planned for implementation within the Odra and Vistula River Basins as part of Odra-Vistula Flood Management Project.

The Project (Odra-Vistula Flood Management Project) comprises of a selection of priority flood protection tasks and measures that were selected after many years of analysis and studies of the catchment areas, complemented with detailed case-by-case analysis of each selected item. In the early 2000s Polish government embarked on a nation-wide analysis of flood risks and response strategies to develop a comprehensive and long-term program for projects and measures — that will span several decades — to achieve protection levels against floods that are in line with the EU Flood Directive and good international practices. Proposed flood protection projects and measures were drawn from and fully embedded in the policy and regulatory documents that are required under the EU Water Framework Directive (WFD), foremost the River Water Basin Management Plans (RWBMPs). The government revised its legal framework in the early 2000s to make it compatible with EU requirements. Between 2007 and 2013 the first “generation” of RWBMPs for all catchment areas was prepared, integrating water management and environmental objectives, based on year-long extensive public consultation and long-term observations. While the 2013 Plans were judged “overall not compliant” with the WFD, they do meet many of the specific WFD criteria and Bank requirements. Because projects on catchment area management comprise of small and large tasks, the EC’s DG Environment agreed in November 2014 upon the submission of new interim Updated Master Plans that include “List 1” which included 2,100 acceptable items, well managed and not requiring analysis of catchment area, and another 450 items on “List 2” that are deemed complex and having a wide range, requiring full catchment area analysis through an acceptable RWBMP, after 2015.

For the Project, a selection of priority tasks and measures was selected, as shown in Annex 7 to the Report. The selection was based foremost on locations that had experienced historical floods of devastating nature (“hot spots” that are recognized to be particularly vulnerable to floods, yet where mitigation measures would probably be cost-effective without being environmentally or socially onerous), work in congested areas was assumed (i.e. in certain catchment areas where individual projects could generate mutual benefits), where it would be possible to use previous experience, developed mechanisms and entities operating on the on-going Odra River Basin Flood Protection Project, and where a generally good level of institutional readiness was confirmed.

The basic criteria for projects’ selection were: prioritization within the context of the RWBMPs and comparison of all possible project options to identify the low cost and low-impact options; results of economic analyses to select cost-effective options including a risk-based approach to investments; projects creating “room for the river” and flood wave retention capacity upstream, rather than constraining the river flow by embankments; integration with environmental values and protection of habitats; flood management plans based on broad consultation with stakeholders; sustained financing from the national or regional budgets as well as outside means.

The selection covers less than one quarter of extensive “List 1” of the EC focusing on the feasible projects. On the other hand, certain projects proposed on “List 1” were excluded from the Project notably where they would affect vulnerable nature areas, habitats and areas under nature conservation (including Natura 2000 sites), for example, the floodplains of Warta River (a tributary to Odra River) and the vegetation patches within the flood bank system of Sandomierz. For this type of projects, more extensive option analysis will be required. Besides regular safety analyses, all individual selected works and measures were reviewed through mathematical simulation of water flow and flood routing to ascertain that they do not create incremental negative impacts on downstream or upstream communities, and, where possible, positive impact occurs. It is important to note that the majority of the projects related to renovation and modernization of existing flood protection facilities.

Important guidance was derived from the flood risk maps prepared in 2010-2014, indicating sections of Odra River Basin, Kłodzko Valley, areas along Nysa River and in the Vistula River Basin, that are prone to Q1% (so called century floods) flood events. The Lower Odra River map reflects cumulated risk from summer and winter floods. The maps are based on new-generation Digital Elevation maps created from remote sensing and LIDAR surveys; they are prepared for periods of 10, 100 and 150 years. The Project would notably seek low impact projects and measures ^[1].

The analysis yielded identification of the following Components:

1. *Lower and Middle Odra*, of all Polish catchment areas this river basin is most prone to repeated summer and ice-backup generated winter floods. This Component would allow maximum benefit from the existing institutional structure for project implementation created by The Odra River Basin Flood Protection Project. The city of Szczecin (near the mouth of the river) is considered to be very vulnerable due to winter floods. The city of Słubice on the right bank of the border area of Odra River is known to be very prone to both summer and winter floods because the flood protection works on the opposing left (German) bank already have been upgraded to the agreed Odra protection standard of 1-in-100 year floods. Implementation of this Component would assist Poland meet the international agreements on Odra River Basin management.
2. *Nysa Kłodzka Valley* (Nysa Kłodzka River and selected tributaries). Upper course of Nysa Kłodzka River is characterised by frequent and violent floods (every 5-8 years) causing local devastation, and at the same time it contributing significantly to increase of volume of flood waters entering Wrocław Floodway System. Construction of dry polders and modernization of embankments will lead to increasing local protection but also to significantly reducing the flood wave along downstream Nysa Kłodzka River, as well as further away in Wrocław. It is important to note that flood risk map (Map 2-2a) does not reflect well the extent of floods in Nysa Kłodzka River Valley itself —as the “floodplain” is very narrow on the steep mountains the water flow is therefore very

^[1] These measures are characterized by the following: (i) having only local impact, hydraulically and environmentally, or, if there is downstream or upstream impact, it is well recognized and managed; nor are they themselves impacted significantly by the design of future upstream or downstream developments; (ii) in vulnerable areas associated with high benefits from protection measures that are unlikely to be excessively expensive; (iv) without complex interactions across a large part of the basin that would necessitate a robustly optimized river basin plan to yield the most cost-effective variant, and (v) that have a comparatively modest environment impact and are otherwise non-controversial.

concentrated and it has high energy impact. Damages in towns and cities are not so much caused by overflowing water but by floating debris, rolling gravel and rocks that are swept along by kinetic energy of the water.

3. *The Upper Vistula River*, apart from Odra River Basin, historically it has the worst record of flood damages. The cities of Cracow, Nowa Huta (a large industrial complex and urban area adjacent to Cracow), Tarnobrzeg and Sandomierz (large industrial areas) and urban areas at the lower end of Upper Vistula River, are generally recognized as “hot spots” in flood risk analysis. In addition, many parts of catchment areas of particular Vistula River tributaries are flood-prone. For several proposed projects and measures, economic rationale is confirmed and advanced design documentation is provided, yet for other projects additional studies will be required before further decisions can be made on their merit in order to optimize the developments. The Project will finance selected tasks as well as research purpose of which is to analyse different project scenarios.
4. *Flood forecasting and improved operational management*, since it would assist the IMGW and the IMGW-PIB (the IMGW offices in Cracow) with further expanding their forecasting capabilities with respect to rainfall and spreading of flood wave, based on the tasks implemented under Odra River Basin Flood Protection Project. The Component would also finance two operation rooms at RZGW Wroclaw and RZGW Cracow, to allow for real-time overview of flood wave development, analysis of flood risk such as damage to flood banks and the data-driven operation of reservoirs, dry polders and dams in order to minimize damages.

3 EXECUTIVE SUMMARY

Environmental and Social Management Framework (ESMF) document was prepared to address all environmental and social potential adverse impacts associated with implementing the “Odra-Vistula” Flood Management Project. The ESMF provides a general option impact analysis with environmental and social criteria and an overall assessment on how to mitigate and monitor possible environmental and social effects affiliated with the investments in question.

For each of the three Project Components a framework environment impact assessment was conducted. Adequate measures to minimize and compensate for adverse impacts were proposed as well as ways of conducting environmental monitoring within each Component.

All proposed types of works within the Project are similar in terms of potential environmental impacts. All the developments will be situated within river valleys, and the implementation and impact zone will cover particular elements of the environment in those areas – most often riverbeds, river banks and terraces. For some of the conservation areas in the valley of Odra River adverse impacts are expected, thus proper mitigation measures should be implemented at the stage of design and construction works.

Key possible temporary or permanent social impacts of project-related land occupation include loss of land, loss of assets, physical displacement of people and loss of community infrastructure or common property resources. Within the Project, as far as social impacts are concerned, two categories of task will be implemented: linear and site-specific.

The linear tasks have minimal impact on single landholders. Well designed linear projects easily allow for avoiding or minimizing demolition of permanent structures. Linear resettlement differs from site-specific resettlement as regards occurrence of the problems that frequently arise when resettlement actions have to be coordinated across multiple administrative jurisdictions.

Site-specific resettlement is mostly associated with acquisition of farm land, pasture, or grazing land or the obstruction of access to natural resources for the purposes of the Project. This type of resettlement in the major part requires compensating for land or resources-based income sources. There is also high probability of resettlements associated with building dry polders and implementing passive protection tasks. Nevertheless, it is believed what it will have little impact on the entire local society due to small scale of land acquisition. All impacts related to land acquisition and involuntary resettlement will be managed as per the project’s Resettlement Policy Framework.

4 INTRODUCTION

4.1 BACKGROUND AND BASIC CHARACTERISTICS OF THE PROJECT

Ensuring and improving flood protection is one of the most important factors determining sustainable and stable social and economic development of regions and countries. Odra-Vistula Flood Management Project assumes implementation of the most urgent tasks in the field of flood protection within selected parts of river basins of the two largest Polish rivers, Vistula and Odra. The Project was divided into three Components covering: Lower and Middle Odra (Component 1), Kłodzko Valley, covering mountain and highland part of the catchment area of Nysa Kłodzka River (Component 2) and Upper Vistula River (Component 3).

Component 1 covers wide section of the river within the so-called free-flowing Odra from km 300+000 (below Malczyce water barrage under construction) to approx. km 740+200 (beginning of Lake Dąbie below the city of Szczecin). For the purpose of facilitation of managing of tasks planned for implementation within the Project and present division of competence between particular authorities in charge of water management in the Valley of Odra River, the following sections of the river are selected:

- Section of Odra River from km 300+000 (below Malczyce water barrage under construction),
- Border section of Odra River from km 542+4 (estuary of Nysa Łużycka River) to km 704+100 (fork between Western Odra and Eastern Odra),
- Section of Western Odra and Eastern Odra together with the Międzyodrze area from km 704+100 (fork between Western Odra and Eastern Odra) to km 740+200 (beginning of Lake Dąbie below the city of Szczecin),
- Lake Dąbie.

All the work necessary for implementation was divided into three Subcomponents:

- 1A – Flood protection of areas in Zachodniopomorskie Province

Covers tasks constituting part of integrated water management in the basin of Lower Odra River. The works will cover, among others, construction and modernization of existing embankments of the river, in order to increase security of adjacent areas, as well as works aimed at improving flow conditions for flood waters in the area between the embankments.

- 1B – Flood protection of Middle and Lower Odra River

Works planned for implementation will result in improvement of conditions of flow of water and ice in periods of ice backup risk (enabling operation of ice-breakers on a long section

of the river, improving the capacity of selected bridges, creating proper mooring base, enabling free flow of ice in the estuary section of the river, etc.)

- 1C – Flood protection of Słubice City

The task comprises of strengthening and widening of a section of the flood bank along the bank of Odra River and construction of a new section of the embankment protecting the city of Słubice from flood.

Section of Odra River covered by Component 1 flows in a wide river Valley of high nature quality. Despite significant alterations made to the riverbed, resulting from adjusting Odra River to the function of a waterway (the works were carried out in the second half of 19th century), the Valley maintained typical features of a large lowland river, such as significant portion of green areas within catchment area, side arms of the river, oxbows, etc. This type of landscape within the entire Valley is reflected by high content of conservation areas, such as national parks, Natura 2000 and landscape parks. Important parts of Odra River Valley are riparian forests and hornbeam forests, situated in various parts of the river Valley, as well as animal species, especially birds associated with them. The Valley of Odra River also performs an important function of ecological corridor connecting northern and southern regions of Poland as well as a migratory route for fish migrating between upper part of Odra River Basin and the Baltic Sea.

The most important and largest city in the direct vicinity of the area of implementation of Component 1 is the city of Szczecin, currently performing function of an economic and administrative center of the region. In the entire Valley, landscape structure displays features typical for German type of town and landscape planning – cities and villages are compact, surrounded by lands used to different extent for agriculture.

Within Lower and Middle Odra River the most significant flood risk is posed, in winter conditions, by ice backup created when flowing ice is stopped by existing obstacles such as shallow areas in the riverbed, narrowing of the riverbed and other obstacles caused by a result of sudden changes of the river current, backwater from sea waters and northern winds, which contribute to creation of ice backup (Lower Odra River runs a typically meridional course). This in turn causes damming of water and flooding of adjacent areas. The main aim of proposed tasks is to reduce possibility of creation of ice backup and to enable icebreaking which is the most efficient tool for minimizing risks of winter floods. These tasks will ensure safe passage of ice down the river and at the same time reduction of flood risk to adjacent areas. It is also necessary to protect existing residential buildings and infrastructure in selected places on the Middle and Lower Odra River by constructing new and modernizing existing flood banks.

Component 2 will be implemented within Kłodzko Valley, which covers mountain and highland part of the catchment area of Nysa Kłodzka River. Tasks planned for implementation are associated with improvement of flood protection facilities regarding inhabitants and inhabited areas. Flood risk in the area of Kłodzko Valley is in the first place associated with insufficient capacity of river beds and streams and transport infrastructure, insufficient number of flood reservoirs, insufficient number and height of flood banks, as well as high density of buildings in areas adjacent to the beds of watercourses. In many cases existing flood protection infrastructure is in poor technical condition.

Two Subcomponents will be implemented within this Component:

- 2A - Active protection

The scope of active protection includes construction of four dry flood water reservoirs. The task of proposed reservoirs is to reduce culmination of flood waves and to reduce the flows, which will result in reduction of the risk in the river Valleys in which they are situated and indirectly on the Nysa Kłodzka River, therefore in the entire Kłodzko Valley. Currently, the number and capacity of flood reservoirs in Kłodzko Valley is insufficient and in order to protect Kłodzko Valley against flood it is necessary to undertake tasks increasing active protection in this area.

- 2B - Passive protection

The scope of passive protection covers flood protection of areas situated along four main rivers of Kłodzko Valley: Nysa Kłodzka, Ścinawka, Biała Łądecka with the main left-hand side tributary, the Morawka River, and Bystrzyca Dusznicka River with the main left-hand side tributary Kamienny Potok. As a result of planned works, level of protection of habitable areas will be increased. Passive protection covers renovations to existing bank protection and increasing capacity of river beds and streams, construction of new or refurbishment of old embankments and safety walls, increasing capacity of existing weirs and regulation barrages, increasing capacity of existing bridge construction and pedestrian bridges, individual protective measures for households or reallocation of structures that cannot be protected beyond the boundaries of flood areas.

Watercourses in this region are represented by several types of mountain and sub-mountain types characterized by rigid, stone or gravel bed and high speed of water flow. Nysa Kłodzka River flows through the central part of Kłodzko Valley and in this section several right and left-hand tributaries enter into it, carrying waters from mountain areas surrounding the Valley. Such system of a river network determines a nature of flood phenomena in this area – fast increase of the amount of water in the watercourses, creation of a flood wave and its accumulation in the “estuary” reach of the river.

Quality nature areas, subject to legal protection are concentrated in the mountain areas surrounding Kłodzko Valley. Only in one case the proposed Project is localized within the section of the riverbed subject to conservation (Natura 2000 site and partially a landscape park), due to occurrence of valuable vegetation and fish species.

Planned tasks will cover the following Subcomponents, which at the same time constitute detailed aims of Component 3 of the Project:

- Subcomponent 3A – Flood Protection of Cracow and Wieliczka

In order to achieve effectiveness in protection of Cracow agglomeration, it is necessary to maintain the lowest possible levels of the large water within the city. This requires construction of appropriate protection measures in the city and in the catchment areas, as well as in the Vistula River Valley above Cracow. The Subcomponent will cover renovations to flood embankments of Vistula River in Cracow with a total length of 21 km, in three sections. For the protection of part of Cracow and Wieliczka, within implementation of the component, construction of four

dry flood water reservoirs is proposed, together with necessary activities in the scope of stabilization of the Serafa and Malinówka Rivers, which contribute to the Vistula River, together with modernization of existing embankments and construction of supplementary sections of the flood banks.

- Subcomponent 3B – Protection of Sandomierz and Tarnobrzeg

Kotlina Sandomierska is an area of junction of Vistula and estuaries of several significant tributaries, including the largest Carpathian tributary of Vistula – San River. The 2010 flood (the largest flood in the history of the region) caused flooding of major part of the city of Sandomierz and large scale damages. Implementation of this Subcomponent includes modernization of the flood bank system of Vistula River and its tributaries in the range of Vistula backwater together with necessary modernisation of the system of pump stations protecting the area outside the embankment during the flow of large waters.

- Subcomponent 3C – Raba Sub-basin Passive and Active Protection

Catchment area of the Raba River is a mountain area of rural and forest character. At the same time, the bottom of the Valley of Raba River and its tributaries is a strongly inhabited area. Due to mountain character of the catchment area, people and their goods are threatened by both erosion of the bed of large water and flooding resulting from natural formation of the area in question. Such phenomena occur jointly during each water rise in the catchment area of Raba River, causing significant damages.

Due to insufficient retention capacity of reservoir in the Valley of Raba River, increasing the flood reserve capacity of Dobczyce Reservoir is planned within the Subcomponent, as well as construction of new flood water reservoirs on tributaries of Raba River. The Subcomponent also comprises of construction and modernization of flood embankments and boulevards.

- Subcomponent 3D - San, Wisłoka and Dunajec Sub-basins Passive and Active Protection

Existing flood protection facilities do not guarantee full flood protection in the catchment area of San and Wisłoka Rivers, which each year results in damages. Construction of dry flood water reservoirs is proposed as supplementary part of existing flood protection system. Apart from the reservoirs, construction of embankments on tributaries of San River and on the San River itself is proposed.

Large flood risk is also associated with Valleys of Wisłoka River (e.g. in the vicinity of cities of Dębica, Jasło) and Dunajec River. In the catchment areas of these rivers such categories of tasks are planned as construction and modernization of embankments, construction of dry flood water reservoirs (or polders) and, on a smaller scale, regulatory works in the river valleys.

Within Upper Vistula River, where Component 3 will be implemented, the projects will be implemented within watercourses of various flow parameters and topography in the entire river valley. In the upper part of Vistula River Basin watercourses are of mountain and sub-mountain character, they flow through narrow valleys, with high speed of the flow and have stone or gravel river bed. In the vicinity of Cracow (capital of the region) the river enters a wider valley and is classified as a lowland river with sand-and-loam river bed. Below Cracow, in the vicinity of Sandomierz, where implementation of further tasks is planned, Vistula River is classified as large lowland river. The Valley of the river is wide, the riverbed is accompanied by additional structures, such as side arms of the river, oxbows, and other structures of high biodiversity. In the regions where works will be implemented, watercourses maintained their high natural qualities (many conservation areas with different protective measures were designated).

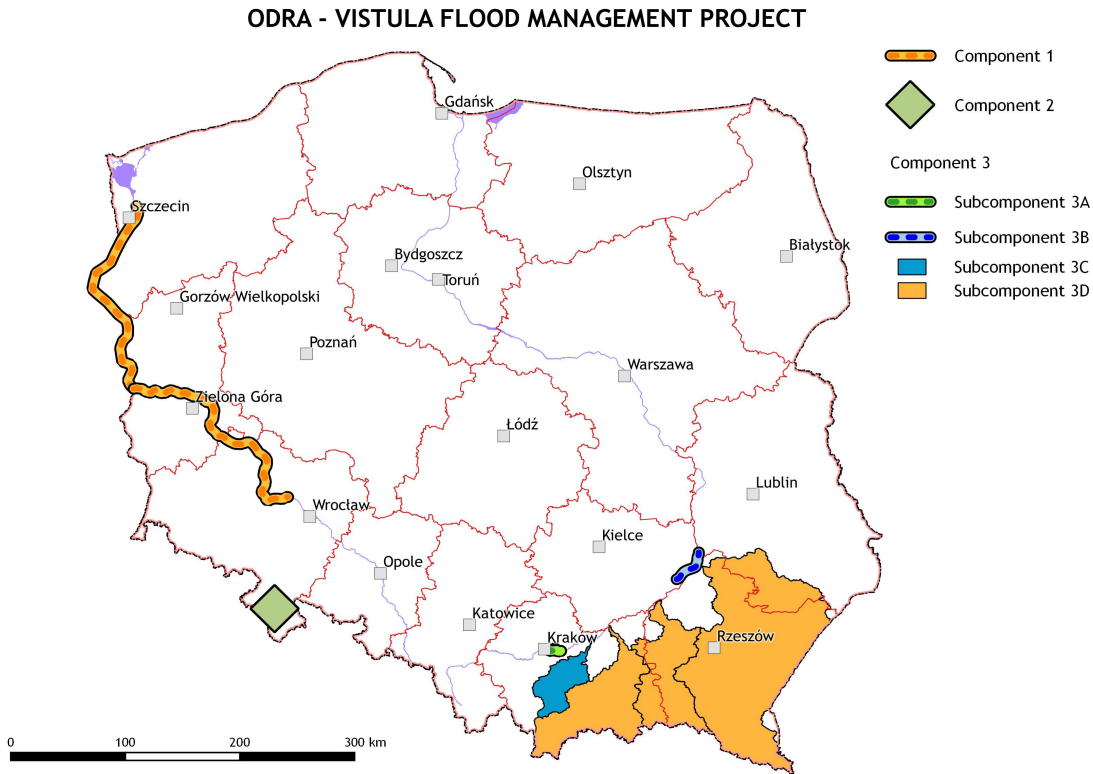


Fig. 1 General location of areas of implementation of works within particular Components of the Project

Within particular Components of the Project various developments associated with reducing flood risk will be implemented. In order to identify potential adverse impacts on the environment and the public, generated by the Project, several types of tasks in this scope were identified. (Table1).

Table 1.Types of tasks undertaken within particular Components of the Project (in alphabetical order).

Component	Type of tasks
Component 1: Lower and Middle Odra River	construction of embankments/boulevards
	construction and renovation of elements of sailing infrastructure (groins, stop and mooring bay and marking the sailing route)
	dismantlement of structures
	modernization of embankments/boulevards
	reconstruction of bridges
	modernization of pumping stations
	reconstruction and modernization of hydro-engineering structures (automatic gates, forklift flood-gates and culverts, weirs, control valves)
	reconstruction and renovation of hydrotechnical structures (automatic gates, embankment sluice and culverts, weirs, water barrages)
	regulation and maintenance works in riverbeds and inter-embankment lands of natural and artificial parts of water or strongly changed parts of water and drainage ditches
Component 2: Flood Protection of the Kłodzko	construction of dry detention basins (front dams, side dams, relief-overflow sections)
	construction of embankments/boulevards
	dismantlement of structures
	dismantlement and modification of colliding infrastructure elements (e.g. water supply system sections, sewage system sections, roads, etc.)
	modernization of embankments/boulevards
	reconstruction of bridges
	regulation and maintenance works in riverbeds and inter-embankment lands of natural and artificial parts of water or strongly changed parts of water and drainage ditches

Component	Type of tasks
	reconstruction and modernization of hydrotechnical structures (automatic gates, embankment sluice and culverts, weirs, water barrages)
Component 3: The Upper Vistula River	construction of polders
	construction of pumping stations
	construction of dry detention basins (front dams, side dams, relief-overflow sections)
	construction of embankments/boulevards
	changing the way of water management on the storage reservoir
	dismantlement and modification of colliding infrastructure elements (e.g. water supply system sections, sewage system sections, roads, etc.)
	modernization of pumping stations
	modernization of embankments / boulevards
	reconstruction and renovation of hydrotechnical structures (automatic gates, embankment sluice and culverts, weirs, water barrages)
	reconstruction of bridges
	regulation and maintenance works in riverbeds and inter-embankment lands of natural and artificial parts of water or strongly changed parts of water and drainage ditches
	renovation of retention reservoirs

Environmental Assessment and Management Framework document is to identify full spectrum of impacts on the environment and on the public that may arise as a result of implementation of the Project. The document comprises of a set of basic measures aimed at minimization of adverse impacts as well as guidelines regarding environmental monitoring.

Therefore, selecting the above mentioned categories of activities presented in Table 1, served to identify all the types of potential adverse impact on the environment associated with various stages of Project implementation and subsequent operation of the development. The impacts were identified separately for each Component because of different natural conditions, character, landscape and other environmental factors. Occurrence of impacts of a

broad spectrum of elements on the environment, both with regard to animate and inanimate nature was reviewed.

Information gathered in this document should serve as guidelines for detailed environmental analyses on subsequent stages of implementation of the Project.

Main chapters of the Framework Environment Management Plan include the following information:

- **INTRODUCTION TO BASIC INFORMATION ABOUT POLAND**

This chapter contains the most important information about the natural environment of Poland, presenting data on the geography, climatic conditions, natural resources, including basic data on demography and economy of Poland.

- **KEY ENVIRONMENTAL DATA**

This chapter presents important, from the point of view of the possible adverse impact of the investment measures, environmental information about Poland, including specific characteristics for each of the Project Components. Particular attention was paid to elements closely related to types of project measures and their location, such as surface water, soil, protected species of plants, animals, habitats, biodiversity and conservation areas, including Natura 2000 sites.

- **LEGAL FRAMEWORK FOR FLOOD RISK MANAGEMENT**

The chapter presents the most important formal and legal conditions associated with measures dedicated to reducing flood risk. These conditions are discussed in the context of major European legal acts associated with water issues (i.e. the Water Framework Directive, Floods Directive) and their transposition into Polish law. It also identifies relations between the flood risk- related activities and other documents of a strategic nature at national level.

- **CHARACTERISTICS OF PROCEDURES OF THE ENVIRONMENTAL IMPACT ASSESSMENT**

The chapter contains characteristics of the formal and legal conditions for carrying out the process of environmental impact assessment in the context of the guidelines under the European and national law. The procedures for environmental impact assessment were characterized with respect to the generalized level of analysis - strategic evaluation, and at the level of individual projects that require more detailed level of studies in the field of environmental impacts.

- **PROJECT CHARACTERISTICS - DESIGN SOLUTIONS**

The chapter provides information about general and specific objectives of the Project, illustrating characteristics of various development measures planned for implementation within the Project. Likewise, it presents the structure of the Project, including its division into individual Components and tasks performed within each of them.

- **ENVIRONMENTAL IMPACTS**

The chapter describes manner of identification of potential adverse impacts generated by the various types of measures planned within the Project. It also presents a wide range of possible impacts in relation to biotic and abiotic components of the environment, as well as cultural values and material goods.

• **MINIMIZATION AND COMPENSATORY MEASURES ACTION PLAN**

Relevant measures to minimize and compensate for identified adverse impacts on the environment are proposed. These include various measures recommended for implementation at the stage of detailed design and / or execution of investment projects. In some cases, identification of mitigation measures will only be possible at the stage of the environmental assessment of individual projects.

• **MONITORING PLAN**

A general environmental monitoring system is proposed, aimed at monitoring both the scale and significance of assumed adverse impacts and proposed minimization activities, essential in order to properly oversee correct implementation of minimization measures and to evaluate their effectiveness. The chapter presents environmental parameters subject to monitoring, rationale for monitoring and parties responsible for conducting monitoring at every stage of the Project.

• **ENCLOSURES**

Annexes 1-3 hold descriptions of the following aspects of each Component of the Project:

- Environmental impact – large spectrum of possible impact was presented, with reference to biotic and abiotic components of the environment, as well as cultural values and material goods,
- Minimizing activities – in reference to the identified impacts, adequate measures minimizing adverse impacts on the environment were proposed. The measures include various activities recommended for implementation at the stage of detailed design and/or implementation of the Project. In some cases, proposing minimizing measures will be possible only at the stage of EIA for particular Project tasks,
- Monitoring activities – general plan of environmental monitoring was planned, oriented at monitoring both scale and significance of predicted adverse impact and significant proposed minimizing measures, so that their proper implementation is appropriately supervised and their effectiveness is assessed. Parameters of the environment subject to monitoring were presented, as well as subjects responsible for implementation of the monitoring at each stage of the Project.

Annex 4-6 contains maps on which all Components of the Project are presented in the background of administrative borders, Surface Water Body and conservation areas.

Annex 7 presents all the tasks that should be implemented within the Project (as of March 2015).

Annexes 8-11 contain detailed reports from the procedure of public disclosure of EAMF.

• **REPORT FROM THE PUBLIC CONSULTATION PROCESS**

In this chapter the procedure of public disclosure of EAMF is described.

4.2 INTRODUCTION – BASIC INFORMATION ABOUT POLAND

The Republic of Poland lies in the central part of European continent. It extends across from west to east between longitudes 14°07' and 24°09'E (689 km) and from south to north between latitudes 49°00' and 54°50' N (649 km). Poland borders seven countries: Russia, Lithuania, Belarus, Ukraine, Slovakia, Czech Republic and Germany. The length of the overall border is 3 511 km, out of which the longest border is shared with Czech Republic (796 km). The sea border stretches over 440 km but the length of coastline is 770 km.

Poland's total surface area is 312 679 km², comprising of 311888 km² of land and 791 km² of sea inland water. The population of Poland has reached 38.5 million whereas population density amounts to 123.11 people per sq km.



Poland is divided into 16 Provinces, 66 cities/towns with city rights, 314 counties and 2479 communes. According to population and area, Mazowieckie Province stands out as the biggest one (5.3 million inhabitants, the area of 35 558 km²) whereas Opolskie Province is among the smallest (approx. 1 million inhabitants, the area of 9 412 km²). Within Odra basin, the project will be implemented on the territory of regions of Lower Silesia, Lubuskie and Western Pomerania Province.

The capital of Poland is Warsaw, located in the center of the country, by

The Vistula river in Mazowieckie Province. Warsaw has the biggest population of all Polish cities, with 1 724 400 inhabitants. Other big cities of Poland are Gdansk, Szczecin, Katowice, Cracow, Lodz, Poznan, and Wroclaw. The most important city centers, cultural landscape and most significant monuments in the regions where the project will be implemented were presented in chapters 7 of the document. The largest cities directly covered by the Project are:

- Cracow (approx. 760 000 citizens)

- Szczecin (approx. 408 000 citizens)
- Tarnobrzeg (approx. 48 000 citizens)
- Kłodzko (approx. 28 000 citizens)
- Sandomierz (approx. 24 000 citizens)
- Słubice (approx. 16 000 citizens).

A public road density in Poland oscillates around 89.8 km / 100 km². The biggest public road density is present in Śląskie and Małopolskie Province (120-174 km/100 km²) whereas the lowest density is observed in Lubuskie, Zachodniopomorskie and Warmińsko-Mazurskie Provinces (less than 60 km/100 km²). The total length of public roads in Poland is 281 000 km including 1 492 km of highways. The entire Polish rail network in use is estimated to 19 328 km which gives the railway density of 6.2 km/100 km². The total sum of waterway and seaway is 3 655 km.

Since 1 May 2004, Poland is the member of European Union. She also belongs to such international organizations as NATO, UN, OECD, EC and CD.

Poland is situated within range of moderate transitional climate, influenced by different masses of air: arctic-continental, arctic-sea, polar-continental, polar-sea, tropical-continental, tropical-sea. The most influential on the weather are pressure systems from the Atlantic: in winter Island low and in summer Azores high, carrying tropical air. Periodically the weather is influenced by pressure systems from Asia and Africa. In general, Polish climate features changeability of types of weather. Average annual temperature in Poland is diversified and amounts to 7-8°C. The largest precipitation occurs in mountain and tectonic forelands. In Sudety and Carpathian Mountains the amount of precipitation ranges from 800-1200 mm of rain, to 1400 mm annually high in the mountains. In the lakelands and in the uplands average precipitation amounts to between 600 to 800 mm of rain per year. The lowest amount of precipitation is registered in the central part – approx. 500 mm per year.

Three types of river regime are present in Poland: nival, nival-pluvial and pluvial-nival. Daily outflow of river waters depends on the type of the regime. Rivers in Sudety Mountains (Component 2) and Carpathian Mountains (Component 3) are characterized by large variability of daily flows, violent and short-term risings, often accompanied by a tempestuous precipitation. Upland rivers feature relatively even flow of waters and large retention capacity of valleys. Lowland (Component 1 and 3) and Lakeland rivers have even flows, due to slight sloping of the area. Due to diversified climatic and morphological conditions, there are two periods of occurrence of high flows of river waters in Poland: February-April – thaw rising; May-August – precipitation rising.

The territory of Poland is situated within two physiogeographic regions: Western Europe, Eastern Europe and sub-regions: Non-Alpine Central Europe, Sycarpathian Carpathians and internal valleys, Eastern European depression. Within those sub-regions, 7 landscape provinces were distinguished, including:

- Mid-European Low, including the regions of: South Baltic Coasts, covering southern coast of the Baltic Sea from Killonian Bay to Vistula lagoon, with Szczecińskie Coast, Koszalińskie Coast to Gdańskie Coast; the climate of South Baltic Coastal zones is influenced by masses coming from the Atlantic Ocean. Winters are usually mild,

summers with moderate temperatures. Average annual sums of precipitations amount to 600-700 mm. Mud soils prevail, as well as alluvial soils and brown soils. South Baltic Lakelands spread from South Baltic Coasts on the North to Central Lowlands on the South, from Odra river on the West to Pasłęka on the East; the climate is diversified; in the area of Wielkopolskie and Kaszubskie Lakelands is displays typically marine features; it is an early post-glacial landscape with many lakes of glacial origin.

- Bohemian Massif (major part of the Massif is situated in Czech Republic, partially in Austria, Germany and Poland; the province covers: Land of the Ore Mountains, Land of Sudety Mountains, Czech Plate, Land of Šumava, Berounka Highland, Bohemian-Moravian Highland). In Poland it covers sub-province of Sudety with tectonic foreland of Sudety Mountains. Sudety constitute a mountain range of diversified geological structure and formation and large valleys: Kłodzka and Jeleniogórska constitute their part; the climate is typical of mountains, cool and humid.
- Eastern Baltic – Belarussian (covers Eastern Baltic Coasts, Podlasko-Belarussian Height, Polesie). In the coastal area postglacial landscape of diversified relief prevails, the climate exhibits features of sea climate, winters are long and they are more chilly than on the South Baltic Coasts; lakelands are dominated by hilly formations with lakes, the climate is diversified, average sums of precipitations oscillate around 550 mm in the area of Heights, while in the area of Polesie the climate is dry and chilly.
- Polish Highlands (covering: Silesia-Cracow Highland, Małopolska Highland and Lublin-Lviv Highland). The climate is diversified, humid on the West, with continental features on the East, characterized by relatively high precipitations (between 500 mm and 800 mm); average annual stratified air temperature amounts to 7.5-10°C.
- Ukrainian Highland (sub-province: Volyn-Podolska Highland), hilly formation, moderate warm climate, under the influence of continental climate. Dry warm summers and long chilly winters.
- Western Carpathians with Western and Northern Sub-carpathians (covering Northern Sub-Carpathians, External Western Carpathians, Central Western Carpathians), the climate is typical for mountains, of increasing continental nature eastwards, precipitations amounts to 600-800 mm.

Eastern Carpathians with Eastern Sub-carpathians (covering Eastern Sub-carpathians, External Eastern Carpathians, Eastern Beskidy); the climate is in large part continental. Summers are shorter and winters are longer than in Western Carpathians.

Present river network in Poland was significantly influenced by subsequent glacial periods. During quaternary period, meltwaters formed vast glacial valleys, currently occupied by the majority of large rivers. The largest rivers in Poland are Vistula and Odra, of 1047 km and 854 km total length respectively. The main continental divide is the Baltic Sea, with 99% of Polish rivers and watercourses running into it. Slight percentage of rivers belongs to the divide of the Black Sea (rivers Strwiąż and Orawa) and to the divide of the North Sea (rivers Orlica and Izera). In Poland, the following water regions were distinguished:

- *Vistula River Basin*: water region of Small Vistula River, water region of Upper Vistula River, water region of Middle Vistula River, water region of Lower Vistula River,
- *Odra River Basin*: water region of Upper Odra, water region of Middle Odra, water region of Lower Odra and Western and Western Przymorze, water region of Warta,
- *Dniestr River Basin*: water region of Dniestr River,
- *Danube River Basin*: water region of Czarna Orawa, water region of Czadeczką, water region of Morawa River,
- *Jarft River Basin*: water region of Jarft River,
- *Elbe River Basin*: water region of Izera, water region of Elbe and Ostroźnica (Upa) Rivers, water region of Metuje, water region of Orlica,
- *Niemen River Basin*: water region of Niemen River,
- *Pregoła River Basin*: water region of Łyna and Węgorapa Rivers,
- *Świeża River Basin*: water region of Świeża River,
- *Ücker River Basin*: water region of Ücker River.

In 2013, 32.5% of the total area of Poland was covered by conservation areas of great quality of natural environment. The most significant forms of nature conservation include:

- 23 national parks of 314,500 ha with the biggest Biebrzański National Park and the smallest Ojcowski National Park (2,150 ha);
- 1480 nature reserves (165,700 ha),
- 122 landscape parks (the biggest - Dolina Baryczy Landscape Park),
- 145 special protection areas (SPA's) (56,010 km²),
- 849 special areas of conservation (SAC's) (39,110 km²).

Conservation areas in the regions where the Project will be implemented are presented in chapter 7.1.4. of the document.

Among the protected and most recognizable animals in Poland, we can enumerate bison, mountain goat, brown bear, lynx, wolf, lesser spotted eagle, white stork and lark (to enumerate only some of them). Within Odra and Vistula catchments, in regions where the Project will be implemented, natural habitats, plant species and animals typical for extensive valleys of large lowland rivers are present and for sub-mountain regions in the upper part of the catchments. Flora and fauna in relevant regions are discussed in chapter 7.1.5.

Characteristics of surface waters in area of implementation of the project is shown in chapter 7.1.1. Scope of works planned for implementation within Odra and Vistula Rivers catchment areas are discussed in detail in chapter 6.4.

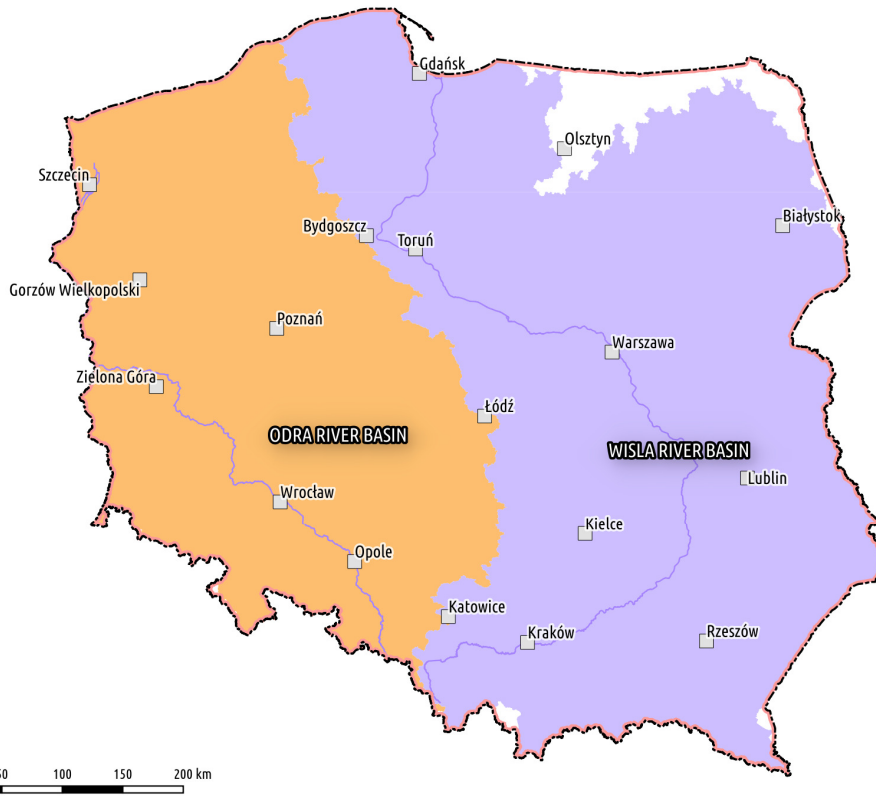


Fig.2 Odra and Vistula catchment areas within Poland

5 PROJECT DESCRIPTION – CONCEPT DESIGN

5.1 PROJECT OBJECTIVE

The objective of the project is to provide protection of people and property against flooding in basins of the largest rivers in Poland, i.e. Odra and Vistula Rivers.

5.2 PROJECT COMPONENTS

5.2.1 COMPONENT 1: LOWER AND MIDDLE ODRA RIVER

The scope of flood control includes securing the areas located along Lower and Middle Odra riverbed on the section of the free-flowing Odra River from the town of Nowa Sól to Nysa Łużycka River mouth, the border section of Odra River, i.e. from Nysa Łużycka River mouth to its branching into Odra Zachodnia and Odra Wschodnia Rivers (within the town of Widuchowa), on the section of Odra Zachodnia and Odra Wschodnia Rivers along with the Międzyodrze area and Lake Dąbie. The entirety of required work has been divided into three Subcomponents: 1A - Flood protection of areas in Zachodniopomorskie Province, 1B - Protection of Middle and Lower Odra River, 1C - Flood protection of Słubice City.

5.2.1.1 SUBCOMPONENT 1A – FLOOD PROTECTION OF AREAS IN ZACHODNIOPOMORSKIE PROVINCE

The main purpose of flood control in Zachodniopomorskie Province is to build a system of integrated water management in Odra River basin, which will take into account such aspects as flood protection of adjacent areas, protection of Odra River water quality as well as of the natural and cultural environment. All the tasks under Subcomponent 1A solve the problems with flood protection comprehensively, covering the areas that are the most exposed to the flood risk. Subcomponent 1A includes the following tasks:

• **1A.1 - Chlewice-Porzecze. Backwater embankment of Odra River at Myśla River.**

The task's objective is flood protection of the towns of Chlewice and Porzecze against high waters of Odra River and backwaters of Myśla River (the right-bank tributary of Odra River) with an embankment around the developed areas of the town of Chlewice.

- **1A.2 - Flood protection of Ognica Village.** The task's objective is to secure the areas adjacent to Odra River against flood waters and to improve drainage of water from reclaimed agricultural land.
- **1A.3 - Osinów - Łubnica. Modernization of Inter-embankment.** The task's objective is to ensure an uninterrupted flow of any high waters and ice down Odra River and the terrace area by limiting the conditions of ice backup that result in accumulation of flood waters during spring thaw. The tasks listed above will improve safety of the areas in Gryfino District.
- **1A.4 - Flood protection of Radziszewo and Daleszewo Villages on Odra River at 726+400-727+960 km.** The task's objective is flood protection of the towns of Radziszewo and Daleszewo against high waters of Odra River by building new embankments.
- **1A.5 - Modernization of the Marwicki Polder.** The task's objective is flood protection of the towns of: Marwice, Krajnik, Krzywnica and part of the town of Gryfino along with the industrial plants, including: Dolna Odra Power Plant, Przedsiębiorstwo Usług Komunalnych Gryfino, Przedsiębiorstwo Energetyki Ciepłej and a Waste Treatment Plant with a total area surface of 1,500 ha. The task is composed of three stages:
 - Stage 1 - Krajnik - Marwice. Modernization of flood embankment on East Odra River at km 712+100 - 708+862 km
 - Stage 2 - Mniszki - Gryfino. Modernization of flood embankment on East Odra River at km 720+935 - 718+850 km
 - Stage 3 - Modernization of Krajnik pump station
- **1A.6 - Restoring natural values of the Lower Odra Valley by improving retention and flood protection capacities of Międzyodrze area.** The task's objective is to reach a hydraulic balance of the entire Międzyodrze area between the Odra River distributaries: Western Odra and Eastern Odra, by creating canals, ditches and hydraulic engineering facilities operating in such way as to ensure adequate irrigation and rapid drainage of natural areas while improving the flood safety level in the areas adjacent to Odra River.

5.2.1.2 SUBCOMPONENT 1B – FLOOD PROTECTION OF LOWER AND MIDDLE Odra RIVER.

The threat of flooding in winter conditions is posed by ice backup formed by the existing barriers, which results in water damming and flooding of the adjacent areas. Due to its specific nature, flood protection of Polish and German riverside cities in Lower and Middle

Odra River boils down to prevention of ice backup and to ensure a free flow of melt water. The main objective of the development is to reduce the possibility of the formation of ice backup and to facilitate icebreaking operations as the most effective tool to minimize the risks of floods in winter. These objectives will be achieved by: renovation and modernization of existing regulating structures, elimination of ice backup prone areas, standardization of the conditions of flow and river load movement as well as modification of the existing bridge structures. These actions will ensure safe carriage of ice down the river, and thus reduce the risk of flooding in adjacent areas. Subcomponent 1B comprises the following tasks:

•1B.1 - Repair and modernization of regulatory infrastructure on the free-flowing Odra - reconstruction and modernization of regulatory infrastructure - in order to adapt section of Odra from Malczyce to the estuary of Nysa Łużycka to class III waterway.

The task's objective is to improve water transport conditions on the free-flowing section of Odra River and to adapt it to Class 3 waterway by increasing its average depths and by ensuring a more balanced transport of river load. Those tasks will allow for reduction of the number of ice backup prone areas by unifying conditions of water flow and movement of debris, while adapting the river to Class 3 waterway will allow for carrying out winter ice cover and navigation of icebreakers taking part in icebreaking actions. The free-flowing Odra River from the dam in Brzeg Dolny to the Nysa Łużycka River mouth is a Class 2 waterway. This 260 km-long section is characterized by the worst technical parameters and navigation conditions. Due to the large scale of the project, the development was divided into three stages. Stages 1 and 2 cover repair and reconstruction works. Stage 3 covers project's tasks. Stage 1 (currently in the phase of implementation) covers a section of the river on the territory of Lower Silesia Province, i.e. from km 300+000 (below water dam Malczyce, currently under construction) to km 399+200 (above the city of Nowa Sól). Stage 2 covers section of Odra River on the territory of Lubuskie Province above the city of Nowa Sól (from km 399+200) to the estuary of Nysa Łużycka River (to km 542+400). Stage 3 covers the entire task, i.e. section of Odra River from km 300+000 (below constructed water dam Malczyce) to km 542+400 (estuary of the Nysa Łużycka River).

Within Stage 2 reconstruction of existing facilities is planned (groins and local dredging works). The task is in a very advanced design stage, therefore the scope of necessary works is determined in detail and it covers total of 341 selected groins.

Within Stage 3, in order to achieve depth required for Class 3 waterway, longitudinal dams will be constructed and the existing groins (not covered by stages 1 and 2) will be expanded. In order to achieve required geometry of the waterway, functional parameters will be revised – radiuses of curves and width of the waterway in selected areas. Works allowed for in Stage 3 should account for and not collide with works implemented within stages 1 and 2. Given the large scope of the undertaking, the planned investment has been divided into two stages: Stage 1 (in progress) covering the river section in Lower Silesia Province and Stage 2 (planned) covering Odra River section in Lubuskie Province from the town of Nowa Sól (from km 427+500) to the Nysa Łużycka River mouth (to km 542+400). As part of the investment there are plans to reconstruct the existing regulating structures and de-clog the Odra riverbed.

These measures will reduce the amount of jam-conducive areas by standardizing the condition of flow and movement of river load, while adaptation of the river to Class 3 waterway will make it possible to implement winter ice-free program and introduce icebreakers participating in icebreaking.

•**1B.2 - Modernization Works on Boundary Sections of Odra River.** The border-side Odra River covers the river section from km 542+400 (Nysa Łużycka River mouth) to km 704+100 (the bifurcation into Odra Zachodnia and Odra Wschodnia Rivers in the town of Widuchowa). The task's objective is to facilitate icebreaking operations (obtaining a standardized depth of at least 1.80 m) and – by stabilizing the flow conditions and eliminating jam-conducive areas – to facilitate ice carriage from Odra River to the Baltic Sea. On the border-side section, Odra River is a regulated river. The maintenance condition of regulating structures on both German side and Polish side is insufficient. This has led to terrestrialisation and progressing reduction of the waterway depth in the recent decades. In some sections these obstacles make it virtually impossible to carry out ice-breaking operations and to carry ice down the river; this, in turn, poses a significant threat to flood protection. The scope of planned work is based on the existing regulating structures, while no changes will go beyond the existing riverbed. As it was agreed between the Polish and German side, the undertaking has been divided into stages. The first stage comprises of the elimination of commonly determined limiting areas (priority), while the subsequent stages will comprise of the remaining work in line with the concept design approved by the two parties.

The task comprises of two implementation stages:

- Stage 1 - Modernization works on boundary sections of Odra River to provide good conditions for ice-breaking in winter,
- Stage 2 - Reconstruction of river control infrastructure on boundary sections of Odra River.

•**1B.3 - Construction of Docking-mooring Infrastructure.** The task's objective is to improve the navigation conditions on Lower Odra River and border-side Odra River, on the section from Nysa Łużycka River mouth to Lake Dąbie, by building berth and mooring infrastructure and providing new signage to the waterway. As part of the task, berth and mooring infrastructure for icebreakers will be built in Szczecin. The target outcome is joint utilization of the port infrastructure by the Water Management Office, the base of ice-breakers and all the vessels owned by RWMA [Regional Water Management Authority] in Szczecin. In winter, outcomes of the task implementation will comprise increased efficiency and safety of ice-breaking operations using ice-breakers with a possibility to use the newly established berths.

The task comprises of two implementation stages:

- Stage 1 - Construction of Docking-mooring base for ice-breakers

- Stage 2 - Construction of docking-mooring infrastructure on Lower Odra and on its boundary sections and new marking of the shipping lane.

• **1B.4 - Improvement of flood water-flow from Dąbie Lake in winter.** The task's objective comprises of deepening of the navigation route on Lake Dąbie to facilitate winter ice protection program and navigation of ice-breakers participating in ice-breaking on the lake. Lake Dąbie is the main basin of ice float flowing from the upper sections of Odra River. Irrespective of the place where ice backup occurs, each ice-breaking operation on Odra, Warta and Noteć Rivers must commence on Dąbie Lake to which ice floats from the entire river area must be carried. This task is therefore the key element of winter flood protection on Odra River.

• **1B.5 - Dredging of Klucz-Ustowo ditch.** The Klucz-Ustowo ditch is a branching of Wschodnia Odra River at km 730.5 which merges with Odra Zachodnia River at km 29.8. The task's objective is to improve the condition of the waterway by increasing its current depth. In winter the project will facilitate winter ice protection program and operation of ice-breakers participating in ice-breaking on this section of the river.

• **1B.6 - Reconstruction of Bridges to Ensure a Minimum Clearance.** The task's objective is to ensure an adequate clearance for ice-breaking operations involving river ice-breakers by modifying the existing bridge structures crossing the waterway. The existing bridges on Odra River are a real barrier to winter ice protection program and operation of ice-breakers participating in ice-breaking. Implementation of this task assumes refurbishment of five bridges which are the greatest obstacle, often making it impossible to carry out ice-breaking activities in an effective manner. The scope of task was divided into stages by assigning particular bridges to beneficiaries in accordance with management structure of sections of Odra River:

- Stage 1 – Bridges on the section managed by RWMA in Szczecin.
 - Railway bridge at km 733.7 of Regalica River in Szczecin,
 - Railway bridge at km 615.1 of Odra River in Kostrzyń on Odra,
 - Road bridge at km 614.9 of Odra River in Kostrzyń on Odra,
 - Road bridge at km 2.45 of Warta River in Kostrzyń on Odra,
- Stage 2 – Bridges on the section of the River managed by RWMA in Wrocław.
 - Road bridge at km 514.10 of Odra River in Krosno Odrzańskie.

• **1B.7 Flood protection of Nowa Sól and below Krosno Odrzańskie.** The aim of the task is to protect against flood areas situated along the valley of Odra River with special regard to flood protection of the city of Nowa Sól and areas located below the city of Krosno Odrzańskie. The entire task was divided into three stages:

- STAGE 1 - Nowa Sól-Pleszówek. Construction of a left-side embankments of the Odra river on km 429.85-432.40 and embankments of the Czarna Struga river at km 0+000-3+330.

The task is a continuation of modernization of the flood protection system of Pleszówek district, but also of developed areas in the municipality of Otyń.

The area protected within the present project covers developed areas in the northern part of the city of Nowa Sól (mainly in Pleszówek district), developed areas of Otyń, Modrzyca and Konradów, as well as rural areas located on Borbowniki polder and within territories of the above mentioned cities. The surface of the area in the scope of potential and direct flood risk amounts to 29.3 km² (2,930 ha). The task is in a highly advanced design stage, therefore the scope of necessary works is specified in detail and it covers:

- Extension of the left-side embankment of Odra River on 2,737 m long section together with associated works (embankment crossing, culverts, repair of the road, dismantling works on garden plots, alterations to the power line),
- Extension of the left-side backwater embankment of Czarna Struga River together with associated constructions (embankment crossing, culverts, repair of the road) including expansion of the existing body of the embankment on 2.619 km section and construction of a new section of the embankment of 510 m length,
- Extension of the right-side backwater embankment of Czarna Struga River together with associated constructions, covering in particular demolition of the embankment on a 244 m section, expansion of section of the existing flood embankment of 2.402 km length, construction of a new section of the embankment on a 371 m long section.
- Regulating the riverbed of Czarna Struga River.

- STAGE 2 - Nowa Sól-Pleszówek. Construction of a draining pump station with modernization of existing embankments on Czarna Struga River.

The task is a continuation of modernization of the flood protection system of the city of Nowa Sól and the second stage of implementation of changes and improving flood protection of Pleszówek district, but also of developed areas in Otyń municipality. The task is in a highly advanced design stage, therefore the scope of necessary works is specified in detail and it covers:

- Construction of a left-side embankment of Odra River, crossing the valley of Czarna Struga River and making it impossible for Odra River backwater to enter the valley of Czarna Struga River.
- Construction of a flood waters pump station together with associated facilities, draining waters of Czarna Struga River in case of occurrence of large flood water in Odra River.

- Regulatory works on Czarna Struga River on section from km 3+33 to km 7+618 together with extension of both-sides flood embankments and associated facilities.
- STAGE 3 - Wężyska - Chlebowo. Construction of a left-side flood embankment on Odra River at km 528.6 ÷ 532.0.

The aim of the task is to construct a new flood embankment (together with associated facilities) on the section of the river between Wężyska and Chlebowo, which will replace existing flood embankment damaged during the 1997 flood. The task is in a highly advanced design stage, therefore the scope of necessary works is specified in detail. The section of the embankment covered by the project is 5,513m long and it is a part of a left-side embankment protecting 4,150 ha area. These include developed areas in Kosarzyn, Łomy, Chlebowo, Wężyska, Czarnowo Sarbia, Chojna, Retno, Strumiennie as well as rural and forest areas. The number of inhabitants in the area is approx. 2,800 people. The new embankment is planned further away from the riverbed, in order to increase capacity of the valley.

The aim of the development is to improve the level of flood protection of left-hand side of the valley of Odra River in the above mentioned area, in accordance with "General strategy of flood protection for the Upper and Middle Odra after the Great July Flood of 1997", prepared on the commission of RWMA in Wrocław in 1998.

5.2.1.3 SUBCOMPONENT 1C - FLOOD PROTECTION OF SŁUBICE CITY

The flood of 1997 was a real threat to Słubice, as a result of which the town inhabitants had to be evacuated. Long-term water emergency condition impaired the embankments in the Słubice area. Potential loss of stability and a break in the embankments would be catastrophic for the town – due to its low altitude almost entire Słubice would be under water. In order to improve flood protection of the town of Słubice, strengthening and widening of the existing embankment along Odra river is proposed, along with a construction of a new ring embankment securing Słubice from the north – task 1C.1, and refurbishment of the beds of Czarny and Racza Struga Canals – task 1C.2.

- 1C.1 - Extension and Construction of Flood Embankments.** The task's objective is to protect the town of Słubice against flood by reinforcing and widening existing embankment along Odra River (from km 582+500 to km 588+000) and building a new ring embankment from the north (the embankments starts at km 587+400 of Odra River course). The scope of work covers modification of the existing embankment on the approx. 6.9 km-long section and building a new embankment on the 5.9 km-long section.

- **1C.2 - Reconstruction of Czarny Kanał and Racza Struga.** The task's objective is to facilitate proper drainage of the adjacent areas and discharge of surface water to Racza Struga and Czarny Canal beds by restoring the proper technical condition of the existing hydraulic facilities. The task includes the reconstruction of the Racza Struga bed on a 2 km-long section as well as the reconstruction of the Czarny Kanał bed on a 4.1 km-long section.

5.2.2 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

The scope of flood control of the Kłodzko Valley covers flood protection of the inhabitants (approx. 234,000) and of developed areas with a total area of 497 ha. It covers protection of humans and animals along with property. The Project provides for the individual protection of approx. 250 households as well. The flood risk in Kłodzko Valley is mainly attributable to the insufficient capacity of the river beds and transport structures, insufficient number of flood reservoirs and insufficient number and height of embankments. This is accompanied by the poor technical condition of the existing flood protection structures which do not ensure flood protection to the inhabitants of the river-bank areas. The scope of works included in flood protection of the Kłodzko Valley covers active protection tasks - Subcomponent 2A, as well as passive protection tasks - Subcomponent 2B.

5.2.2.1 SUBCOMPONENT 2A - ACTIVE PROTECTION

The scope of active protection comprises of the construction of four dry detention basins: Boboszów on Nysa Kłodzka River, Roztoki Bystrzyckie on Goworówka Stream, Krosnowice on Duna stream and Szalejów Górny on Bystrzyca Dusznicka River. The purpose of the reservoirs is – by reducing the culmination of flood waves and reducing the size of flows – to minimize the risk in the river valleys where they are located, and indirectly also on Nysa Kłodzka River and thus throughout the Kłodzko Valley. Currently, there are two dry retention reservoirs in the Kłodzko Valley: Miedzygórze on Wilczek Stream – max. capacity of 0.83 million cubic m and flooding area at the maximum damming – 6.6 ha, and Stronie Śląskie on the Morawa River: max. capacity of 1.4 million cubic m and flooding area at the maximum damming of 25.0 ha. The number and capacity of the existing reservoirs are insufficient; in order to protect the Kłodzko Valley from flooding it is necessary to take actions enhancing active protection in the area. At the stage of preliminary study work, the location of thirteen flood control reservoirs was reviewed. When choosing the most optimal solutions, the following aspects were considered: the ability to protect large population centers which suffered during the previous floods, especially in 1997 and 1998; the size and nature of the catchment area expressed by the ratio of the reservoir capacity to the catchment area (reduction capacity of the reservoir); topographic opportunities of the reservoir location; quantity and size of collisions with existing infrastructure and land development; local government's attitude reflected in placing the investment in the local land use plans of municipalities. Subcomponent 2A comprises the following tasks:

•**2A.1 - Construction of "Bobosłów" - a dry flood control reservoir on Nysa**

Kłodzka River. The dry detention basin is planned on Nysa Kłodzka River valley in the towns of Bobosłów and Pisary, above the town of Międzylesie. The maximum capacity of the reservoir is 1.4 million cubic m, while its flooding area at the maximum damming is 21.0 ha. The direct advantage of the basin construction is flood protection of the towns of Bobosłów and Międzylesie, which suffered during the flood of 1997. Nysa Kłodzka River is characterized by rapid high waters, while the centenary water flow rate against the annual is approx. 220, i.e. very high; this only proves the validity of the basin construction.

The length of a dam along the crown axis is 230.0 m, while its height in the highest point is 17.0 m. Water will flow through the dam via outlets and slope overflows along the right abutment of the dam. There are 16 buildings in the project area colliding with the proposed location of the reservoir. Five of them are residential buildings, mainly cottages, while others are farm buildings. The facilities which also collide with the development are an MV power line providing power to the villages in the vicinity, an overhead telecommunication line and a local road between the villages of Bobosłów and Pisary.

•**2A.2 - Construction of "Roztoki Bystrzyckie" - a dry flood control reservoir on**

Goworówka stream. The retention reservoir is planned in Goworówka Stream valley above the town of Roztoki. The maximum capacity of the reservoir is 2.7 million cubic m, while its flooding area at the maximum damming is 48.0 ha. The direct advantage of the reservoir construction is flood protection of the town of Roztoki and - in conjunction with "Bobosłów" reservoir – protection of the town of Bystrzyca Kłodzka, which suffered great damage during the flood of 1997. The Goworówka River is characterized by rapid high waters, while the centenary water flow rate against the annual is approx. 180, i.e. very high; this only confirms that the river needs to be tamed before it enters Nysa Kłodzka River, thus proving the validity of the basin construction.

The length of a dam along the crown axis is 750.0 m, while its height in the highest point is 15.5 m. Water will flow through dam via outlets and slope overflows along the right abutment of the dam. There are no buildings in the project area colliding with the proposed reservoir. The elements which collide with the development are an MV power line, gas pipeline and a local road between the villages of Roztoki and Goworów.

•**2A.3 - Construction of "Szalejów Górny" - a dry flood control reservoir on**

Bystrzyca Dusznicka River. The retention reservoir is planned in the valley of the Bystrzyca Dusznicka River near the town of Szalejów Górny and above the town of Szalejów Górny. The maximum capacity of the reservoir is 9.9 million cubic m, while its flooding area at the maximum damming is 118.7 ha. The basin is to control 64% of the entire Bystrzyca Dusznicka River catchment area, which will significantly affect the flow in the river below the basin and enhance flood protection of the town of Kłodzko.

The length of the dam along the crown axis is 735.0 m, while its height in the highest point is 19.3 m. Water will flow through the dam via an overflow weir and outlets. There is one building in the project area colliding with the proposed reservoir. There are no utilities in the development area.

- **2A.4 - Construction of "Krosnowice" - a dry flood control reservoir on Duna stream.** The dry detention basin is planned in Duna stream valley, in its mouth section, approx. 500 above m the town of Krosnowice. The maximum capacity of the reservoir is 1.9 million cubic m, while its flooding area at the maximum damming is 44.0 ha. Duna catchment area is only slightly afforested (20%), which increases the rapidity of high flood waters. The centenary water flow rate against the annual is approx. 260, i.e. very high; this only confirms that the river needs to be tamed before it enters Nysa Kłodzka River.

The dam length along the crown axis is 450.0 m, while its height in the highest point is 15.7 m. Water will flow through the dam via a slope overflow and outlets. There are no buildings in the project area colliding with the proposed reservoir. The elements which collide with the development are an MV power line and a telecommunication line.

5.2.2.2 SUBCOMPONENT 2B - PASSIVE PROTECTION

The scope of passive protection covers flood protection of the areas along the four main rivers in Kłodzko Valley: Nysa Kłodzka, Ścinawka, Biała Łądecka with the main left-side tributary – the Morawka, and Bystrzyca Dusznicka with the main left-bank tributary – the Kamienny Potok River. The built-up areas will be protected as class II or III of importance. Passive protection comprises: modification and renovation of the existing bank protection measures and enhancing the throughput of river and stream beds; construction of new and modification of existing embankments and floodwalls; (works carried out within developer areas or in their direct vicinity in scope necessary for protection of developer areas) enhancement of throughput of the existing dams and barrages; enhancement of throughput of the existing bridge and footpath structures; individual protection of households or moving the developed areas that are impossible to protect outside the flooding areas. Subcomponent 2B comprises the following tasks:

- **2B.1 - Flood protection of Nysa Kłodzka River Valley** The scope of work related to flood protection of Nysa Kłodzka River covers the section starting from km 179+500, i.e. the lower design stand of the "Boboszów" reservoir, to km 113+000, i.e. above the locality of Bardo. In total, work will be performed on a 66.5 km-long river section. As part of entire work, in particular the following will be performed: section-based modification and renovation of the existing bank protection measures (within developer areas or in their direct vicinity); enhancing the capacity of river and stream beds; construction of new embankments and floodwalls on the section whose total

length is 14.5 km; modification of the existing embankments and floodwalls on the section whose total length is 6.5 km; enhancement of capacity of 38 bridge and footpath structures; enhancement of throughput of 13 dams and barrages; and moving approx. 145 developed areas beyond the flooding areas, of which approx. 50 building may possibly be households indicated for physical relocation. Implementation of this task is planned for the year 2019.

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•**2B.2 - Flood protection of Ścinawka River Valley** The scope of work related to flood protection of the Ścinawka River Valley covers the section starting from km 26+850, i.e. from the Polish - Czech border, to km 0+000 i.e. to Nysa Kłodzka River mouth. In total work will be performed on a 26.8 km-long river section. As part of entire work, in particular the following will be performed: section-based modification and renovation of the existing bank protective measures and enhancing the capacity of river and stream beds; construction of new embankments and floodwalls on the section on sections necessary for protection of developed areas (whose total length is 8.5 km); modification of the existing embankments and floodwalls on the section on sections necessary for protection of developed areas whose total length is 1 km; enhancement of capacity of 20 bridge and footpath structures; enhancement of capacity of 5 dams and barrages; and moving approx. 105 developed areas beyond the flooding areas, of which approx. 30 building may possibly be households indicated for physical relocation. Implementation of this task is planned for the year 2019.

•**2B.3 - Flood protection of Biała Łądecka River valley and Morawka River.** The scope of work related to flood protection of Biała Łądecka River Valley covers the section starting from km 36+400, i.e. above the locality of Stronie Śląskie, to km 0+000 i.e. to Nysa Kłodzka River mouth. The scope of work related to flood protection of the Morawka River Valley covers the section starting from km 6+900, i.e. above the locality of Nowa Morawa, to km 0+000 i.e. to the place where it enters the Biała Łądecka River, at the level of Stronie Śląskie. In total, work will be performed on a 36.40 km-long section of Biała Łądecka River and a 6.90 km-long section of Morawka River. As part of entire work, in particular the following will be performed: section-based modification and renovation of the existing bank protective measures (on sections necessary for protection of developer areas) and enhancing the capacity of the beds of the two rivers; construction of new embankments and floodwalls (where necessary for protection of buildings) on the section whose total length is 25.0 km (for the two rivers); modification of the existing embankments and floodwalls on the section whose total length is 4 km (for the two rivers); enhancement of capacity of 23 bridge and footpath structures (for the two rivers); enhancement of capacity of 9 (for the two rivers) dams and barrages; and moving approx. 60 developed areas beyond the flooding areas, of which approx. 18 building may possibly be households indicated for physical relocation. Implementation of this task is planned for the year 2019.

- **2B.4 - Flood protection of Bystrzyca Dusznicka River Valley and Kamienny Potok River.** The scope of work related to flood protection of the Bystrzyca Dusznicka River Valley covers the section starting from km 30+000, i.e. above the locality of Duszniki Zdrój, to km 0+000, i.e. the place where it enters Nysa Kłodzka River. The scope of work related to flood protection of the Kamienny Potok River Valley covers the section starting from km 9+900 to km 0+000, i.e. the place where it enters the Bystrzyca Dusznicka River, at the level of Szczytno. In total work will be performed on a 30.00 km-long section of the Bystrzyca Dusznicka section and a 9.90 km-long section of the Kamienny Potok. As part of entire work, in particular the following will be performed: section-based modification and renovation of the existing bank protective measures and enhancing the capacity of the beds of the two rivers; construction of new embankments and floodwalls on the section whose total length is 8.0 km (for the two rivers); modification of the existing embankments and floodwalls on the section whose total length is 6.5 km (for the two rivers); enhancement of capacity of 66 bridge and footpath structures (for the two rivers); enhancement of capacity of 12 (for the two rivers) dams and barrages; and moving approx. 50 developed areas beyond the flooding areas. of which approx. 15 building may possibly be households indicated for physical relocation. Implementation of this task is planned for the year 2019.

5.2.3 COMPONENT 3: THE UPPER VISTULA RIVER

Component 3 The Upper Vistula is located in the area of 3 provinces: Małopolskie, Podkarpackie and Świętokrzyskie.

The purpose of Component 3 Upper Vistula is to implement tasks aiming at limiting threats in flood risk management on selected areas, within gradual improvement of the level of flood safety in the catchment of the Upper Vistula river. The Subcomponents cover areas of very high flood risk level, on which the risk became material during the 2010 flood. The flood in 20120 was the largest recorded rise of waters in the regions covered by the project. Planned tasks will ensure secure passage of historically documented large water (including that of 2010), and at the same time will raise the level of security for protected areas against higher waters.

The planned actions comprise the following Components which, at the same time, are the detailed Project objectives:

- Subcomponent 3A – Flood Protection of Cracow and Wieliczka
- Subcomponent 3B – Protection of Sandomierz and Tarnobrzeg
- Subcomponent 3C – Raba Sub-basin Passive and Active Protection
- Subcomponent 3D – San, Wisłoka and Dunajec Sub-basins Passive and Active Protection.

Subcomponent 3A – Flood Protection of Cracow and Wieliczka. In order for the protection measures in the Cracow agglomeration to be effective, it is necessary to maintain high water levels as low as possible within the city, in the conditions of precipitation water management control and steering their discharge to into river receiving bodies. Such task requires building of adequate protection structures in the city and in the catchment areas as well as in The Vistula river valley above Cracow.

The Subcomponent will comprise modification of The Vistula river embankments in Cracow on the total length of 21 km in three sections. The embankments to be modified are the last fragments of protection structures that have not been modified since the flood of 2010 in Cracow.

In order to protect part of Cracow and Wieliczka, as part of the component implementation, the construction of retention capacity is planned in the form of four dry detention basins along with the necessary actions to stabilize the Serafa and Malinówka River beds (The Vistula river is the receiving body of these rivers) and modernization of the existing embankments and construction of supplementary embankments on specific sections. The planned actions will complement an investment which was launched as a consequence of the flood of 2010; construction of the dry detention basin “Bieżanów” on the Serafa River (completion date: August 2015).

The division of Subcomponent 3A into is and tasks in presented in Table 2.

Table 2. Tasks within of Subcomponent 3A – Flood Protection of Cracow and Wieliczka

Sign	Task
1. Upgrading Embankments	
3A.1	Finishing reconstruction of flood embankments on the Vistula rive in Cracow: <ul style="list-style-type: none"> -Section 1 – left-hand side embankment from Wanda bridge to Przewóz barrage together with backwater embankments of the Dłubnia river -Section 2 – left-hand side embankment of the Vistula river from Przewóz barrage to Suchy Jar
3A.2	Finishing reconstruction of flood embankments of the Vistula river in Cracow <ul style="list-style-type: none"> -Section 3 – right-hand side embankment of the Vistula river from Dąbie barrage to Przewóz barrage
2. Flood Protection in Serafa Valley	
3A.3	Increase flood protection in Serafa Valley in the city of Cracow and in the city of Wieliczka: Stage II Serafa 2 retention reservoir, dam at chainage 9+223 km, Stage III Malinówka 1 retention reservoir, dam at chainage 0+220 km, Stage IV Malinówka 2 retention reservoir, dam at chainage 2+320 km, Stage V Malinówka 3 retention reservoir, dam at chainage 3+017 km

Subcomponent 3B – Protection of Sandomierz and Tarnobrzeg. Kotlina Sandomierska is a Vistula river node and an area of mouths of several important tributaries, including the largest Carpathian tributary of Vistula - San. The area is protected with embankments the condition and protection effectiveness of which was verified by the flood of 2010 (the largest in the history of the region); the majority of Sandomierz was flooded and significantly destroyed. Under the Subcomponent, modernization of The Vistula river embankments will be performed as well as of the embankments of its tributaries within The Vistula river backwaters; moreover, the necessary modernization of the pump station system will be performed which protects the landside of the embankment during high water flows. The modernization also comprises synchronization of embankment crown coordinates along their course and on both river banks to adapt them to the same safety level on the protected area. Due to historical conditions the current embankment crown coordinates in the area do not match one another.

Division of Subcomponent 3B – **Protection of Sandomierz and Tarnobrzeg** tasks is presented in the table below.

Table 3. Tasks from Subcomponent 3B – Protection of Sandomierz and Tarnobrzeg

Sign	Task
1. Protection of Sandomierz	
3B.1	Flood protection within estuary section of Aramentówka, construction of new pump station "Koćmierzów" and gravity lock Koćmierzów, and a water discharge channel carrying water from Atramentówka to the pump station
3B.2	Flood protection within Struga A watercourse together with reconstruction and expansion of "Nadbrzezie" pump station
3B.3	Expansion of perimeter embankment securing Huta Szkła and housing estate in the city of Sandomierz against flood waters
3B.4	Securing embankments of Koprzywianka river - left-hand side embankment on km 0+000 – 12+900, right-hand side embankment on km 0+000 – 14+400
3B.5	Construction of water pump station in the city of Szewce
3B.6	Expansion of water pump station in the city of Zajeziórze
2. Protection of Tarnobrzeg	
3B.7	Vistula Stage 2 – expansion of the right-hand side embankment of the Vistula river on 13,959 km section, right-hand side embankment of the San river on 2,193 km section, and left-hand side embankment of the Łęg river on 0,112 km section on the

Subcomponent 3C – Raba Sub-basin Passive and Active Protection. The Raba River basin is mountainous farming and forestry area. At the same time, the area is highly developed with settlements in the valley of the Raba and its tributaries. Approx. 6410 buildings may be flooded with 500-year water, of which 45% are residential buildings and 214 are industrial structures, along with 399 public utility buildings. There are about 10,000 people at risk in this zone. Given the mountainous nature of the basin, the people and their property are exposed to erosion of the high water bed as well as to flooding of the naturally shaped terrain. These phenomena occur simultaneously during every consecutive damming up in the Raba river basin, causing significant damage, also below the Dobczyce retention reservoir. The increase in the basin area surface of high flood activity below the reservoir frequently reduces the protective impact of the dam. This was the case during the flood of 2010 (the largest flood recorded in the region so far). The current size of flood reserves of the capacity of 33.8 million cubic meters failed to retain flows from the reservoir at the level of non-damaging flow (300 cubic m/s). Therefore, as part of this Subcomponent, there are plans to increase the amount of the flood reserve of the Dobczyce reservoir and to build retention capacity (dry reservoirs) on the Raba river major tributaries both downstream and upstream of Dobczyce reservoir, reaching the desired effect for the settlement areas situated in the valley of the Raba river.

Construction and modernization of flood embankments is also planned within the Subcomponent. New embankments and boulevards will protect developed areas in the valley of Raba and its tributaries. The embankments were planned on loosely developed urbanized areas and in the centers of villages, within developed areas, construction of boulevards was planned, due to limited available space.

Implementation of the Subcomponent was divided into two stages:

- 3C.1 – Dry Polders and other Structures Phase I - Phase I
- 3C.2 – Dry Polders and other Structures Phase I – Phase II

Subcomponent 3D – San, Wisłoka and Dunajec Sub-basins Pasive and Active Protection. Existing flood protection objects do not guarantee full flood protection on the area of San catchment (together with Wisłok), which each year results in flood damages. Supplementary to the existing flood protection facilities, preliminarily construction of dry reservoirs was planned. Apart from reservoirs, construction of embankments on San and its tributaries was planned.

High risk of flooding is also associated with Wisłoka valleys (e.g. Dębica, Jasło) and with Dunajec. In the catchments of these rivers mainly the following types of tasks are planned: construction and modernization of embankments, construction of dry reservoirs (or polders) as well as, on a smaller scale, regulatory works in the river valleys.

Implementation of the Subcomponent was divided into two stages:

- 3D.1 – Dry Polders and other Structures Phase I

- 3D.2 – Dry Polders and other Structures Phase II

The general progress of Component 3 varied. Some tasks have already had their environmental decisions awarded (majority of tasks from Subcomponent 3B), while some of the planned actions are still at the pre-Feasibility Study stage.

5.3 PROJECT SCHEDULE

Subcomponent	Name of task	Masterpl	Prefeasibility Study			Feasibility Study					Permits			Start of tender	Commencement date	Completion date	
			Technical concept	Feasibility study	Preliminary cost estimate	EIA Report	Report on water and law matters	Construction design	Detailed design	Construction cost estimate	Environmental decision	Water permit	Building permit				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
COMPONENT 1 - LOWER AND MIDDLE ODRA RIVER																	
1A - Flood protection of areas in Zachodniopomorskie Province	1A.1- Chlewice-Porzecze. Backwater embankment of Odra River at Myśla river	YES 1_31_O	-	-	-	YES	YES	2011	2011	2011	2012	2012	2013	2015	2015	2017	
	1A.2- Flood protection of Ognica Village	APGW*	2014	-	2014	2016	2016	2016	2017	2017	2016	2017	2017	2017	2017	2019	
	1A.3- Osinów-Łubnica. Modernization of Inter-embankment	APGW*	2014	-	2014	2016	2016	2016	2017	2017	2016	2017	2017	2017	2017	2019	
	1A.4- Flood protection of Radziszewo and Daleszewo Villages on Odra River at 726+400-727+960 km	YES 3_499_O	2014	-	2014	2016	2016	2016	2017	2017	2016	2017	2017	2017	2017	2019	
	1A.5- Modernization of the Marwicki Polder	STAGE I- Krajnik - Marwice. Modernization of flood embankment on East Odra River at 712+100 - 708+862 km	YES 1_34_O	-	-	-	2012	YES	2012	2012	2012	2013	2013	2013	2015	2015	2017
		STAGE II- Mniszki - Gryfino. Modernization of flood embankment on East Odra River at 720+935 - 718+850 km	YES 1_33_O	-	-	-	2012	YES	2012	2012	2012	2013	2013	2013	2015	2015	2017
		STAGE III- Modernization of Krajnik Pump Station	APGW*	2014	-	2014	2016	2016	2016	2017	2017	2016	2017	2017	2017	2017	2019
1A.6- Restoring natural values of The Lower Odra Valley by improving retention and flood protection capacities of Międzyodrze	YES 3_496_O	2016	-	2014	2017	2018	2018	2019	2019	2019	2018	2019	2019	2019	2019	2021	

Subcomponent	Name of task	Masterpl	Prefeasibility Study			Feasibility Study					Permits			Start of tender	Commencement date	Completion date
			Technical concept	Feasibility study	Preliminary cost estimate	EIA Report	Report on water and law matters	Construction design	Detailed design	Construction coast estimate	Environmental decision	Water permit	Building permit			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	area															
	1B.1. Repair and modernization of regulatory infrastructure on the free-flowing Odra - reconstruction and modernization of regulatory infrastructure - in order to adapt section of Odra from Malczyce to the estuary of Nysa Łużycka to class III waterway	YES 1_486_O	1994/ 1997/ 2013/ 2016	-	-	2018	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022
	1B.2- Modernization Works on Boundary Sections of Odra River	YES 3_381_O	2014	2006	2014	2017	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022
		YES 3_392_O	2014	2006	2014	2017	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022
	1B.3- Construction of Docking-mooring Infrastructure	YES 1_198_O	2013	-	2014	2016	2017	2017	2017	2017	2017	2018	2018	2018	2018	2020
		YES 3_393_O	2018	-	2014	2019	2019	2019	2020	2020	2019	2020	2020	2020	2020	2022

Subcomponent	Name of task	Masterpl	Prefeasibility Study			Feasibility Study					Permits			Start of tender	Commencement date	Completion date
			Technical concept	Feasibility study	Preliminary cost estimate	EIA Report	Report on water and law matters	Construction design	Detailed design	Construction cost estimate	Environmental decision	Water permit	Building permit			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	1B.4-Improvement of flood water-flow from Dąbie Lake in winter	YES 1_6_O	2009	2004	2009	2016	2017	2017	2017	2017	2017	2018	2018	2018	2018	2020
	1B.5-Dredging of Klucz-Ustowo ditch	YES 3_390_O	-	-	2014	2016	2016	2016	2017	2017	2016	2017	2017	2017	2017	2019
	1B.6-Reconstruction of Bridges to Ensure a Minimum Clearance	-	2016	-	2014	2016	2017	2017	2017	2017	2017	2018	2018	2018	2018	2020
	1B.7- Flood protection of Nowa Sól and below Krosno Odrzańskie	STAGE I - Nowa Sól-Pleszówek. Construction of a left-side embankments of the Odra river on km 429.85-432.40 and embankments of the Czarna Struga river on km 0+000-3+330	YES 1_474_O	-	-	2009	2011	2012	2008	2012 2015	2011	2012	2015	2015-09	2015-12	2018-12
STAGE II - Nowa Sól-Pleszówek. Construction of a draining pump station with modernization of existing embankments on the Czarna Struga river		APGW*	-	-	-	2012	2015	2012 2015	2015	2015	2013	2015	2015	2015-09	2015-12	2018-12
STAGE III - Wężyska - Chlebowo. Construction of a left-side flood embankment on the Odra river on km 528.6+532.0.		YES 1_471_O	-	-	-	2010	2011	2011	2011	2010 2015	2011	2011	2015	2015-09	2015-12	2018-12
1C - Flood protection of Słubice City	1C.1-Extension and Construction of Flood Embankments	YES 1_152_O	-	-	-	2011	YES	2013	2013	2013	2011	2011	2014	2015	2015	2018

Subcomponent	Name of task	Masterpl	Prefeasibility Study			Feasibility Study					Permits			Start of tender	Commencement date	Completion date
			Technical concept	Feasibility study	Preliminary cost estimate	EIA Report	Report on water and law matters	Construction design	Detailed design	Construction coast estimate	Environmental decision	Water permit	Building permit			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	1C.2-Reconstruction of Czarny Kanał and Racza Struga		-	-	-	2011	YES	2013	2013	2013	2011	2011	2015	2015	2015	2018
COMPONENT 2 - FLOOD PROTECTION OF THE KŁODZKO																
2A - Active protection	2A.1-Construction of "Boboszków" - a dry flood control reservoir on Nysa Kłodzka River	YES 1_501_O	2012	2004 2009	2012	2014	2015	2013	2015	2015	2015	2015	2016	2016	2016	2019
	2A.2-Construction of "Roztoki Bystrzyckie" - a dry flood control reservoir on Goworówka stream	YES 1_458_O	2013	2004 2009	2013	2014	2015	2015	2016	2016	2015	2015	2016	2016	2016	2019
	2A.3-Construction of "Szalejów Górny" - a dry flood control reservoir on Bystrzyca Dusznicka River	YES 1_502_O	2012	2004 2009	2012	2014	2015	2015	2015	2015	2015	2015	2016	2016	2016	2019
	2A.4-Construction of "Krosnowice" - a dry flood control reservoir on Duna stream	YES 1_444_O	2013	2004 2009	2013	2014	2015	2015	2016	2016	2015	2015	2016	2016	2016	2019
2B - Passive protection	2B.1-Flood protection of Nysa Kłodzka River Valley	-	2017	2004 2009	2004	2018	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022
	2B.2-Flood protection of Ścinawka River Valley	-	2017	2004 2009	2004	2018	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022
	2B.3-Flood protection of Biała Łądecka River Valley and Morawka River	-	2017	2004 2009 2011	2004 2011	2018	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022
	2B.4-Flood protection of Bystrzyca Dusznicka River Valley and Kamienny Potok River	-	2017	2004 2009	2004	2018	2018	2018	2019	2019	2018	2019	2019	2019	2019	2022

(*) - Tasks reported by the implementation unit

2014 - Date of preparation of documentation or obtaining decision

YES - Complete documentations or decisions obtained in accordance with the declaration of the implementation unit - materials during completing and verification

2017 - Dates proposed

Component 3: The Upper Vistula River

Subcomponent	Contract	Masterplan	Preliminary Feasibility Study or Concept of Flood Protection	Feasibility Study	Water permit	Environmental decision	Construction Permit	Design documentation	Beginning of public procurement proceeding procurement	Start date	End date
1	2	3	4	5	6	7	8	9	10	11	12
3A – Flood Protection of Cracow and Wieliczka	Upgrading Embarkments	Y	Yes/No	2016	2016	2016	2017	2017	2017	2018	2020
	Flood Protection in Serafa Valley	Y	No	2012	2016	2012	2017	2018	2018	2019	2020
3B – Protection of Sandomierz and Tarnobrzeg	Protection of Sandomierz (Świętokrzyskie Authority for Land Improvement and Water Facilities in Kielce)	Y	Yes	2015	2014	2014	2015	2015	2015	2016	2019
	Protection of Tarnobrzeg (Podkarpackie Authority for Land Improvement and Water Facilities in Rzeszów)	Y	Yes	na	2015	2015	2015	2015	2016	2017	2019
3C – Raba Sub-basin Passive and Active Protection	Dry Polders and other Structures	N	Yes	2017	2017	2017	2018	2018	2018	2018	2021
3D – San, Wisłoka and Dunajec Sub-basins Passive and Active Protection	Dry Polders and other Structures	N	Yes	2016	2018	2018	2020	2020	2020	2021	2025

6 LEGAL FRAMEWORK

6.1 LEGAL FRAMEWORK OF FLOOD RISK MANAGEMENT

6.1.1 FLOOD RISK MANAGEMENT PLANS

On European level, general framework for developing Flood Risk Management Plans is contained in the provisions of Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (EU Journal of Laws L 327 of 22.12.2000, p. 1 as amended; hereinafter: Framework Water Directive; WFD) and directive 2007/60/EC of the European Parliament and the Council of 23 October 2007 on the assessment and management of flood risks (EU Journal of Laws L 288 of 06.11.2007, p. 27 as amended, hereinafter: the Flood Directive).

WFD requires developing river basin management plan for each basin and program of action in order to achieve good ecological and chemical status. Implementing the program may also contribute to reduce results of flood (article 11 (3) letter l of WFD). However, reduction of flood risk does not constitute substantial aim of this directive.

Framework for flood risk assessment and its management for the purposes of reducing adverse effects on human health, environment, cultural heritage and economic activity, associated with floods on the European territory is the main aim of the Flood Directive. The main instrument for achieving this aim is flood risk management plan, coordinated at the level of basin or coastal area. The plans should be prepared and published by 22 December 2015.

Flood risk management plans are drawn on the basis of flood hazard maps and flood risk maps, prepared in accordance with article 6 of the Flood Directive. The maps subsequently become part of the flood risk management plan.

In accordance with article 9 of the Flood Directive, member states are obliged to coordinate application of the Flood Directive and WFD, with particular impact on increasing efficiency, exchange of information and feasibility of reaching synergy and common benefits, regardless of environmental aims set out in the WFD. In consequence, the Flood Directive imposes obligation to draw up first flood risk management plans and their reviews in coordination with reviews of the river basin management plans established by WFD. Information from flood risk maps should be consistent with information presented in accordance with WFD.

Provisions of WFD and the Flood Directive were transposed to the Polish law by the Law of 18 July 2001 – the Water Law (consolidated text: Journal of Laws of 2012, pos. 145 with amendments). In accordance with provisions of this Law, flood protection is the responsibility of organs of government and local government administration, and it is planned with regard to flood risk maps and flood risk management plans. Flood protection is implemented regardless of all the elements of flood risk management, in particular of prevention, protection, proper preparation and reaction in case of occurrence of flood, reconstruction and drawing conclusions in order to reduce potential adverse effects of flood on human health, environment, cultural heritage and economic activity.

Main planning instrument dedicated to flood risk management is flood risk management plan. The plans are prepared for basins and water regions and they include all the element of flood risk management, in particular flood prevention, flood protection and information on the state of preparation in case of occurrence of flood. reconstruction and drawing conclusions in order to reduce potential adverse effects of flood on human health, environment, cultural heritage and economic activity. Content of the plan is listed in article 88g (2) of the Water Law. The plans should be reviewed every 6 years.

Flood risk management plans encompass a catalogue of activities aimed at achieving aims of flood risk management, while a document entitled water maintenance plan includes, among others, indication of planned activities in the scope of flood protection or removing effects of flood, ensuring flow of ice and counteracting the occurrence of adverse ice phenomena, and ensuring functioning of water structures, in particular their proper technical and functional condition, with indication of entities responsible for implementation of these activities, and justification of necessity of their implementation (regardful of assumed effects of their implementation), estimate cost-benefit analysis resulting from the planned activities, and in case of activities concerning maintenance of water structures – with indication of scope, size, approximate localization, deadlines and manners of their implementation. Therefore, as regards technical means of flood protection, flood risk management plans will be concretized and refined by water maintenance plans.

As for procedural aspects of preparing flood risk management plans, in accordance with article 88h of the Water Law, plans for river basins are approved and updated by resolution of the Council of Ministers. Projects of these plans are drawn by the President of National Water Management Authority in agreement with minister for water management. Projects of plans for water regions are prepared by directors of Regional Water Management Authorities. If the basin is partially located on the territory of another member state, the President of National Water Management Authority, in agreement with minister for water management, initiates cooperation with organs of this state in order to prepare common international flood risk management plan or a set of aligned flood risk management plans for international basin.

6.1.2 STRATEGIC DOCUMENT AT NATIONAL LEVEL – RELATION WITH FLOOD RISK MANAGEMENT PLANS

The main strategic document setting out main trends, challenges and scenarios for social and economic development of the country and direction of spatial development of the country with regard for the principle of sustainable development is **the Long-term Strategy of National Development – Poland 2030** (LSND). The document defines three strategic areas: competitiveness and innovation of the economy (renovation), balancing development potential of polish regions (diffusion) and effectiveness and efficiency of the state (effectiveness). LSND and the Concept of Spatial Management of the Country create

framework for Mid-term Strategy of Country Development 2020 and nine strategies concerning:

- Innovation and Effectiveness of the Economy,
- Development of Transport,
- Energy and Environment Safety,
- Regional Development,
- Human Capital Development,
- Social Capital Development,
- Sustainable Development of Village, Agriculture and Fishing,
- Efficient State,
- Development of National Security System of the Republic of Poland.

LSND indicates necessity to implement flood protection. Flood risk management plans constitutes one of the elements that leads to fulfilling activities from the scope of increasing environment protection by minimizing flood risk. In accordance with LSND flood systems should support renovation of agricultural and food sector, by increasing productivity and competitiveness. The plans are complementary as regards implementation of this direction of intervention.

National Development Strategy 2020 (NDS) is a document based on LSND. It indicated necessity of adjusting emergency response system to greater number of emergency situations, which is consistent with flood risk management plans. NDS states that the plans shall include all the activities aimed at minimizing flood risk. Provisions of the plans will also be taken into account in spatial planning documents. NDS also sets out assumptions that should be accounted for in the flood risk management plan.

Moreover, the document lists activities that are consistent with the plan and that should be converted to activities within different strategies, e.g. introducing construction standards allowing for reduction of losses resulting from natural disasters in the Energy Security and Environment until 2020 (ESE) strategy. ESE also lists investment activities minimizing flood risk – which is complementary to the flood risk management plans prerequisites.

• **Master planning**

Master planning is implemented on the basis of strategic document entitled **Concept of Master Planning Management of the Country** (the Concept), adopted on 16 March 2012 by the Council of Ministers. Flood risk management plans enter into a complex relation with the Concept. They become detailed provisions for aims and activities from the Concept, but also fulfill some of its aim on their own.

• **Innovation and Effectiveness of the Economy**

Strategy of Innovation and Effectiveness of Economy (SIEE) does not directly refer to flood risk and flood protection. However, it does imply necessity of implementing a task concerning application of sustainable architecture, including, among others, taking into account the

climatic and topographic factors. The plans also indicate activities that should lead to reducing constructing on areas at risk of flooding.

• **Transport**

Regarding transport, the strategy in question is the Strategy for Development of Transport until 2020 (with 2030 perspective). The document is focused, among others, on the aims that should be fulfilled by transport in Poland. Implementation of flood risk management plans will influence transport sector by reducing influence of weather phenomena (including flood) on the infrastructure.

In accordance with provisions of the strategy, directions of intervention in the scope of improving inland navigation management will cover, among others, taking account of inland navigation during construction and renovation of hydraulic structures. Renovation and construction of hydraulic structures is included in the tasks that, in accordance with flood risk management plan, should lead to reducing the flood risk.

Planned system of harmonized river information services will cover general hydrological information, which constitutes element of implementation of non-technical measures listed in the flood risk management plan and it fulfills the aim of flood risk management constituting in reduction of flood effects during the flood by improving forecasting and warning on meteorological and hydrological hazards.

• **Energy security and environment**

With regard to energy security and environment, key role is played by ESE for achieving the main objective, which is securing livelihood of present and future generations regardless of environment protection and creating conditions for sustainable development of a modern energy sector, callable of granting energy security for Poland as well as competitive and efficient economy, and specific objective constituting in sustainable management of environment resources, a direction of intervention was provided, constituting in managing waters for flood protection, draught and water deficit. Flood risk management plans are one of the instruments for this direction, and they are complementary to the task consisting in adjusting the water management sector to climate changes.

ESE mentions flood risk management plans as element of activities aimed at adjusting water economy to climate changes. It also includes a list of factors that should be taken into account in activities aimed at minimization of risks – these are cost-benefit analysis, human life and health, environment protection, cultural heritage and economic activity.

Finally, ESE establishes direction of intervention consisting in organizing master planning management, which is to a large extent influenced by costs associated with flood protection resulting from lost water retention areas, developed areas at risk of flooding and associated costs of removing flood damages.

Complementary to the system of integrated strategies for development of Poland is the Strategic Plan for Adaptation of Sectors and Areas sensitive to climate changes. Within the plan, flood protection is one of the highest priorities, along with functioning of systems of warning and response in extreme circumstances (falling within group of non-technical tasks covered by flood risk management plans), adaptive activities in agriculture, forestry, transport and urban infrastructure (storm water drainage).

6.1.3 REQUIREMENTS OF THE FRAMEWORK WATER DIRECTIVE IN THE SCOPE OF IMPLEMENTATION OF FLOOD INVESTMENTS (STAGE OF ENVIRONMENTAL DECISION)

As a rule, WFD is based on the so-called framework control, which only indicates conditions that should be fulfilled by the addressee undertaking actions and is limited to indicating results of these actions. However, the Directive comprises of different types of obligations imposed on the member states, which requires individual identification of character of its provisions in order to estimate the scope of obligation of transposition imposed on member states. As regards article 4 (7) WFD, its character indicates necessity of precise and clear transposition to the national law. This provision creates mechanism of assessment of activities the implementation of which may lead to deterioration of the water environment. According to the mechanism:

- failure to achieve good groundwater status, good ecological status or, where relevant, good ecological potential,
- failure to prevent deterioration of a body of surface water or groundwater that is the result of new modifications to the physical characteristics of a surface water body or alterations to the level of body of groundwater,
- failure to prevent deterioration from high status to good status of a body of surface water that is the result of new sustainable human development activities

does not constitute breach of WFD provision if the following conditions are fulfilled jointly:

1. all practical steps are taken to mitigate the adverse impact on the status of the body of water;
2. the reasons for those modifications or alterations are specifically set out and explained in the river basin management plan and the objectives are reviewed every six years;
3. the reasons for those modifications or alterations are of overriding public interest and/or beneficial to the environment and to society of achieving the objectives set out in paragraph 1 are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development;
4. the beneficial objectives served by those modifications or alterations to the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.

Step 1: Identification of water protection objective in the meaning of Article 4 (7) WFD

Water protection objective should be indicated referring to the body of water subject to impacts. All the objectives are listed in Article 4 (1) letter a WFD.

Should the impact also concern protected areas listed in Annex IV WFD, in the meaning of Article 4 (1) letter c) WFD, objectives for given areas should be indicated. If more than one

objective applies to a given body of water, more restrictive objective should be selected, in accordance with Article 4 (2) WFD.

Step 2: Identification of impacts on water protection objectives

Impact of changes in physical characteristics on parameters of potential/state of water that should be achieved/maintained has to be explained on the basis of the following scheme:

- assessment of current state of elements, including description of methodology used for establishing state of particular elements,
- identification of measures enabling achieving environmental objective from WFD in the scope of ecological state/potential for the entire SWB,
- factors of impact of the investment on elements decisive for achieving the objective for the entire SWB,
- indicating why no threat for achieving environmental objectives is stated as a result of occurrence of specific factors of impact, with account for measures enabling achieving the objective.

Given the fact that it is possible that the EIA report is not prepared for the investment, the above mentioned information should be verifiable on the basis of the Project Information Card.

Potential threat of not achieving water protection objectives should lead to the necessity of imposing obligation to prepare EIA report for a group II development; otherwise, it will not be possible to apply article 81 (3) of the EIA Law of 3 October 2008 on access to information on the environment and its protection public participation in environmental protection and environmental impact assessments (consolidated text, Journal of Laws of 2013, item 1235, as amended).

Step 3: Verification of provisions of Article 4 (7) – (9) WFD

- Provision 1: Were all practicable steps taken to mitigate the adverse impact on the status of the body of water?

It should be indicated how, in reference to parameters deciding on the possibility of achieving objective for a given body of water, actions were undertaken in order to maximally mitigate effects of a given development on a given objective. If it is not possible to implement potential minimizing measure, justification should be given. It should also be indicated what monitoring obligations were adopted in order to verify efficiency of minimizing measures.

- Provision 2: Are the reasons for those modifications or alterations specifically set out and explained in the river basin management plan and the objectives are reviewed every six years?

If derogation from Article 4 (7) is applied to the investment in a river water basin management plan (RWBMP), justification for derogation from the plan should be quoted. If the investment is not covered by derogation on the date of issuing environmental decision, the organ in charge of the proceeding should impose on the applicant the obligation of delivering detailed information on reasons justifying implementation of the investment to the

President of the National Water Management Authority, on the basis of article 38j of the Water Law.

- Provision 3: Are the reasons for those modifications or alterations of overriding public interest and/or the benefits to the environment and to society of achieving the objectives outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development?

Fulfilling this condition will be justified if it is indicated that water protection objectives may not be achieved due to protection of interests associated with implementation of the development. The provision provides possibility of overriding environmental objectives in the face of necessity of protection.

- Overriding public interest,
- Human health,
- Human security.

The last possibility of derogating from environmental objectives from WFD is associated with precedence of the development implementing principle of sustainable development. The justification should indicate what criteria of weighing interests were taken into account by the authority deciding on the precedence.

- Provision 4: Cannot the beneficial objectives served by those modifications or alterations of the water body, for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option?

Applying this provision should be justified by presenting process of options of the development at the following levels:

1. Selection of method of achieving the objective (e.g. choice of flood protection measure),
2. Locality options,
3. Process and design options,
4. Organizational and functional variants (e.g. the scope of water management in the reservoir).

It should be explained to the greatest possible extent why lack of possibility of implementing options more favorable from the point of view of the water state of protection was stated for particular variants. This may be associated with technical unavailability or disproportionate costs.

- Provision 5: Does the application of derogation permanently exclude or compromise the achievement of the objectives of WFD in other Body of water within the same river basin district?

It should be noted that due to the nature and scope impact of the development does not interfere with achieving conservation objectives in other water bodies in the same river basin. The point here is to identify a causal relationship between changes in physical characteristics resulting from implementation of the development and the possibility of occurrence of risks to

the achievement of objectives for other water bodies within the same river basin in case of derogation from Article 4 (7) WFD. It should be assumed that if impact of the development due to its nature and extent did collide with achieving the objectives in other water bodies within the same river basin without applying derogation from Article 4 (7) WFD, it would be necessary to introduce the derogation (resulting in the obligation of delivering relevant information to the President of NWMA for the purposes of updating RWBMP).

- Provision 6: Does the application of the new provisions guarantee at least the same level of protection as the existing Community legislation on environment protection?

The justification should in particular refer to the requirements set out in the following directives:

1. Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment (EU Journal of Laws L 175 of 5 July 1985, p. 40);
2. Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (EU Journal of Laws L 206 of 22 July 1992, p. 7);
3. Directive 2001/42/EC of 27 June 2001 on the assessment of the effects of certain plans and programs on the environment (EU Journal of Laws L 197 of 21 July 2001, p. 30).

In the context of directives 2001/42/EC and 85/337/EEC, general information should be stated on variants of the investment (at strategic level in reference to Directive 2001/42/EC, and as regards an investment in reference to Directive 85/337/EEC) as well as on minimization and compensation at the stage of the investment.

Regarding Directive 92/43/EEC, it has to be noted that in case of confirming adverse impact on Natura 2000 site integrity lack of options of implementation of the development should be proved, as well as providing compensatory measures securing integrity of Natura 2000 network.

6.2 LEGAL FRAMEWORK OF SOCIAL IMPACTS

6.2.1 POLISH LEGAL CONDITIONINGS

6.2.1.1 GENERAL REQUIREMENTS

In general, compensation of social impacts resulting from implementation of flood investments is subject to provision of the following laws:

- the Law of 3 October 2008 on access to information on the environment and its protection, public participation in environment protection and environmental impact assessments (consolidated text: Journal of Laws of 2013, pos. 1235 with amendments),

- the Law of 8 July 2010 (Flood Act) on specific rules for the implementation of flood structures (Journal of Laws No 143, pos. 963 with amendments) and
- the Law of 21 August 1997 on the real property management (consolidated text: Journal of Laws of 2014, pos. 906, hereinafter the RPM Law).

In accordance with the EIA Law, one of the criteria considered by the organ assessing if the environmental impact assessment (EIA) is required for the investment is the area of the project and number of people affected by its impacts, along with population density. Moreover, during the EIA it is necessary to carry out assessment of impact on the people and material goods as well as to conduct analysis of social conflicts. The EIA Law also imposes an obligation to carry out public consultations in the EIA process and to refer back in detail to the remarks and motions filed during the consultations. EIA is carried out during the first stage of issuing consent for implementation of the investment (as a part of procedure of issuing environmental decision), which allows for early assessment of social impacts associated with implementation of flood investments and for proposing appropriate minimizing and preventive activities.

Mechanisms directly associated with the loss or limitation of the ownership right and other property rights to the real estate as well as the loss or limitation of rights resulting from lease agreements are provided in the provisions of the Flood Act and the RPM Law. Expropriation of real estate or its part, as well as permanent or temporary limitation of manner of use of the real estate or its part is stated in the Building Permit (BP) issued by the Voivode. Expropriation takes place the moment the BP becomes final.

Prior to issuing BP, a party may demand that the motion for expropriation covers his real estate or its part that will no longer be fit for current use after implementation of the investment. If the investor refuses to expropriate this additional part, the party is entitled to sue him before a an independent common court for purchase of the unviable piece of land.

As regards transferring the ownership of the real estate to the State Treasury, the owner or the holder of usufruct rights (i.e. the legal right of using and enjoying the fruits or profits of state land) is entitled to financial or land-for-land compensation. The Flood Act does not indicate any preference for the land-for-land compensation; financial compensation allowing for purchasing similar real estate is rather assumed.

The amount of compensation is determined separately for each real estate by negotiating individually with the current owner or holder of usufruct right. The negotiations are based on the independent and objective valuation prepared by licensed appraiser.

The amount of compensation is determined for the real estate in the condition as of the date of issuing BP, but in reference to real estate value as of the date on which the amount of compensation is determined.

In case the investor and the expropriated party reach agreement as regards the amount of compensation, a written agreement is concluded, determining the amount of compensation, and time and manner of payment. However, if the agreement is not reached within 2 months from the date of issuing final BP, the amount of the compensation is determined by the Voivode (regional authority). Before issuing decision on the amount of compensation, the Voivode appoints an independent expert appraiser. Also the affected party is entitled to present opinion of an expert; in such case the Voivode has to account for the opinion presented by the affected party in the decision determining the amount of compensation. If

the affected party files remarks and motions in the proceedings, the Voivode has to refer to them during the proceedings and subsequently in the issued compensation decision.

The decision issued by the Voivode may be challenged by the party.

6.2.2 PUBLIC CONSULTATION

Procedures regarding public consultations are provided in the EIA Law. The consultations constitute part of EIA. The assessment is conducted as part of the procedure of issuing environmental decision, and if the investor introduced changes in the project as compared to conditions set out in the environmental decision, EIA will also be carried out within BP.

Additionally, in accordance with the Law of 14 June 1960 – Code of Administrative Procedure (consolidated text: Journal of Laws of 2013, pos. 267 with amendments), parties affected by the implementation of the investment are individually informed on any action undertaken by the organ issuing the decision and on all the documents filed by the investor at all stages of the procedure.

The affected parties are entitled to actively participate in the proceedings at any stage, file remarks, motions, documents, their own opinions, expert opinions, etc. Entire case file concerning the proceeding are open to the parties and have to be shared on request. The organ is obliged to refer to all remarks, motions, documents, etc. filed by the party. It is also possible to hold administrative hearing, open to the affected parties, in particular if there are disputes concerning any aspect of the case.

6.2.3 APPEAL PROCEDURES

In accordance with provisions of CAP, each decision, including BP and decision of the Voivode establishing the amount of compensation for expropriation may be appealed to the organ of second instance (Ministry for Construction). CAP states that it is obligatory for the organ issuing an administrative decision to add information on the deadline for filing an appeal, organ to which the appeal should be delivered and manner of filing an appeal. Filing an appeal is free of charge.

In case of appeal from the decision establishing the amount of compensation, the expropriated party may file a motion for paying the compensation in the amount stated in the contested decision. In such case the compensation is paid as stated, which does not influence the appeal proceeding.

The decision issued in the appeal proceeding may be further contested to the Regional Administrative Court (RAC) within 30 days from the date of delivery of judgment to the complainant. The ruling of provincial administrative court may be further subject to cassation, which has to be filed for within 30 days from delivery of a copy of the judgment with substantiation to the party.

6.2.4 ANALYSIS OF INCONSISTENCIES AND CORRECTIVE MEASURES

OP 4.12	Polish laws	Corrective action
<p>Lack of legal title to the land should not bar compensation. People without legal title are eligible for compensation.</p>	<p>Polish legal system does not account for the right to compensation of the occupants/users of the land that do not hold legal title to it (except for the people whose legal title to the real estate was lost or who acquired the title by usucaption (method by which ownership of property (i.e. title to the property) can be gained by possession of it beyond the lapse of a certain period of time).</p>	<p>In case a project affected person without legal title or legal rights over the land is affected by project-related land acquisition the case will be analyzed individually for the possibility of applying general mechanisms from the Civil Code to achieve the objectives of OP 4.12.</p> <p>As per OP 4.12 affected people without legal titles will be not eligible to receive compensations for the land. However, they will be eligible for compensation for any structures, crops or improvements to the land that were done before the cut-off date and to receive adequate solutions in cases where they have to be physically or economically displaced.</p> <p>In this cases, additional nonfinancial mitigation measures can be applied..</p>
<p>WB Policy requires compensation for the loss of income resulting from taking of land that generates the displacement of economic activities (e.g. business, agriculture, etc).</p>	<p>Provisions of polish law do not provide compensation for the loss of income resulting from land take required for an investment.</p>	<p>Persons who lost income or employment will receive support (health insurance, professional trainings etc.) from the employment offices.</p> <p>In case of entrepreneurs or agricultural activities, it is possible to apply general mechanisms from the Civil Code (covering loss suffered (<i>damnum emergens</i>) and the expected profits which are lost (<i>lucrum cessans</i>).</p>
<p>Particular attention should be paid to vulnerable social groups, such as the poor, the elderly, single mother headed household, children, ethnic minorities.</p>	<p>Polish law does not require planning specific measures aimed at additionally assisting vulnerable social groups (the elderly, the handicapped, the poor, and other groups with special needs).</p>	<p>The project will grant to the affected people help in obtaining assistance from offices and institutions.</p> <p>Additional measures will be implemented as needed to ensure that the objectives of OP 4.12 are met.</p>

<p>WB Policy requires additional compensation for expenses incurred by PAP as a result of physical relocation (i.e. transport of materials) and assistance in implementing the resettlement.</p>	<p>Assistance regarding incurring costs of relocation and other similar costs resulting from the necessity to move to a new location by the citizens and enterprises is not provided in the provisions of law.</p>	<p>In order to cover costs of relocation and other similar costs it is possible to apply general mechanisms from the Civil Code in a manner that achieves the requirements of OP 4.12.</p>
<p>The compensation should be paid prior to physical occupation of the land for the purposes of implementation of the investment.</p>	<p>The flood act allows for occupying the land and commencing works before the compensation is paid.</p>	<p>In all cases, no work will begin until there is documented evidence that the project-affected person has been informed well in advance, compensation has been paid and it has granted permission to enter the land.</p> <p>The only exceptions are cases where the process is taken to the courts because negotiations fail or other reason or cases were absentee owners cannot be found. In these cases, as per Polish regulations, the compensation amount will be put into an escrow account and the money will be available to affected people once the court makes a decision or the owner is located.</p> <p>To minimize the risk of starting works before compensating for losses the project will plan and conduct land acquisition well in advance of starting construction</p>
<p>Compensation for the loss of assets is based on their market value plus any transaction costs (e.g. taxes and registration fees) and the objective is for the compensation to be enough to effectively replace the affected asset (replacement value).</p>	<p>Applied methods of valuation may lead to lowering the value of the real estate as compared to prices of similar real estate on the local market.</p>	<p>The valuation of the real estate will be conducted by an independent and experienced appraiser. Expert opinion should be verified by PIU. The expropriated party should be granted proper amount of time to get familiar with the appraiser's opinion. Should there be any doubts regarding the sufficiency of the due amount of compensation, value of the real estate should be estimated by an independent appraiser in the proceeding with the Voivode.</p> <p>In all cases effective replacement value will be achieved.</p>
<p>Requires to prepare a</p>	<p>Provisions of polish law do not</p>	<p>Socio-economic baselines and</p>

<p>socio-economic baseline, Resettlement Action Plan and monitor of compensation, resettlement and livelihood restoration measures as well as evaluation of their efficiency.</p>	<p>account for obligation to gather a socio-economic baseline and prepare a Resettlement Action Plan as such and there is no obligation of monitoring or evaluation of their effectiveness.</p>	<p>Resettlement Action Plans will be prepared based on the LARPF, monitored and evaluated in line with OP 4.12 and good practices.</p>
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6.3 LEGAL FRAMEWORK OF ENVIRONMENTAL IMPACTS

6.3.1 LEGAL GROUNDS: EU LAW AND NATIONAL LAW

Rules governing procedures on environmental impact assessments from international and community law (respectively the Aarhus convention and SEA, EIA, Habitats Directives) are transposed to the Polish legal regime by the Law of 3 October 2008 on access to information on the environment, public participation in environment protection and environmental impact assessments (Journal of Laws No 199, pos. 1227; hereinafter the EIA Law) and the Law of 16 April 2004 on the nature protection (Journal of Laws of 2013, pos. 627 as amended; hereinafter).

The EIA Law describes:

- Rules and procedures concerning:
 - Providing information on the environment and its protection,
 - Environmental impact assessments (including cross-border assessments);
 - Principles of public participation in the environment protection;
 - Authorities competent in cases concerning providing information on the environment and its protection and environmental impact assessments.

6.3.2 STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

The EIA Law defines SEA as proceeding on the assessment of impact on the environment results of implementation of a policy, strategy, plan or program, encompassing, in particular:

- Agreeing on the level of detail of information included in the environmental impact forecast,

- Preparing environmental impact forecast,
- Obtaining required expert opinions,
- Ensuring public participation in the proceeding.

SEA is required for:

- concept of master plan management for the country, study of conditions and directions of spatial management of municipality, plans of spatial management¹ and strategy for regional development;
- policies, strategies, plans or programs regarding industry, energy, transport, water management, waste management, forestry, agriculture, fishery, tourism and use of land, developed by authorities, that set out framework for subsequent implementation of projects that are likely to have significant impact on the environment;
- policies, strategies, plans and programs other than already listed, the implementation of which may result in significant impact on Natura 2000 site if they are not directly related to Natura 2000 site protection or are not resulting from this protection.

SEA procedure is also required in case of proposed documents other than those listed above, if the authority preparing the document, in cooperation with authorities for environment protection, notices that it creates frames for subsequent implementation of projects that are likely to have significant impact on the environment, and that implementation of provisions of the document may have significant impact on the environment.

In the light of EIA law, SEA proceeding should constitute of the following steps²:

- agreeing on the scope and level of detail required for the forecast with organ od environmental protection and organ of sanitary inspection;
- preparing SEA forecast for the project of the program;
- ensuring public participation in the SEA proceeding;
- delivering draft of the program and SEA forecast to the authority in charge of environment protection and authority in charge of sewage inspection for appraisal;

¹ Minister for construction, town planning and housing management in agreement with the Minister for environment and the Minister for health may, by the means of resolution, impose additional requirements concerning forecast of environmental impact regarding draft of master plans, in consideration of specific needs of town planning at the level of municipality and taking into account: 1) form of the forecast; 2) scope of issues that should be identified and analyzed in the forecast; 3) geographic scope of the forecast; 4) types of documents including information that should be considered in the forecast.

² With appropriate modifications on the basis of Article 113-117 of the EIA Law in case of cross border proceeding or on the basis of Articles 34-35 of the Law on nature conservation in case of habitat assessment.

- referring in the final version of the project to conclusions from the forecast, opinions of organ for environment protection and organ of sanitary inspection as well as remarks and motions filed within public participation;
- enclosing to the approved plan/programme a summary containing justification for the selection of given document in reference to considered alternative variants and information on the manner in which SEA forecast, opinions of the organ for environment protection, organ of sanitary inspection, conclusions from public participation procedure were used, as well as information on the methods and frequency of conducting analyses of implementation of the provisions of the programme;
- analysis of effects of implementation of the plan/programme in the scope of impact on the environment, in accordance with adopted methods and frequency.

The relevant authority to issue reviews within SEA is the General Director for Environment Protection (GDEP) – in case of documents developed and altered by central organs of government administration, and RDEP in case of other documents. Main Sewage Inspector provides reviews and approves documents prepared and altered by organs of central government administration within the SEA, and the same function is performed by province sewage inspector in case of master plan; state regional sewage inspector is responsible in case of remaining documents.

6.3.3 ENVIRONMENTAL IMPACT ASSESSMENT OF INDIVIDUAL TASKS

As for legal grounds of proceeding on the assessment of individual projects, it should be noted that the EIA Law defines it as proceeding on the assessment of environmental impact consisting in particular of:

- Verification of EIA report,
- Obtaining required opinions and approvals,
- Ensuring public participation in the proceeding.

EIA is obligatory for the following types of projects that are likely to have significant impact on the environment:

- Proposed projects always likely to have significant impact on the environment (group I projects);
- Proposed projects potentially likely to have significant impact on the environment, if the obligation to carry out EIA was imposed by the organ in charge of the proceeding (group II projects).

EIA is carried out as a part of:

- 1) Main stage of the proceeding, i.e. issuing environmental decision,
- 2) Implementation stage (the reassessment), which is a proceeding for issue of a building permit, decision approving building project, decision on consent for change in the manner of using a building structure, decision on consent for implementation of a road development, decision on consent for an project in the scope of public airport and decision on the consent of an project in the meaning of provisions of the Law of 8 July 2010 on specific terms of preparing for implementation projects in the scope of flood protection (the building decisions):
 - If the necessity of carrying out the second EIA was stated by the organ issuing environmental decision;
 - At the request of party planning implementation of the development, submitted to the organ issuing the decisions;
 - If the issuing building decision states that the application was changed with respect to requirements set out in the environmental decision;
 - If it is not possible to confirm readiness of installation to capture carbon dioxide at the stage of issuing decision on environmental conditions, as regards installations combusting fuels for power generation of rated power not less than 300 MW.

EIA constituting part of the procedure of issuing environmental decision³ is carried out by the organ competent to issue the decision. EIA constituting part of issuing building decisions is carried out by RDEP.

Organs issuing decision on environmental conditions are:

- 1) Regional Director for Environment Protection (RDEP) – for projects from group I, such as roads, railway lines, overhead power lines, petroleum transport, petroleum products, chemicals or gas, water dams, nuclear facilities and radioactive waste storage; from group I and II implemented in restricted areas, in sea areas, implementing changes to forests, which are not property of the State, for agricultural use, implementation of projects in the scope of public airports in the meaning of provisions of the Law of 12 February 2009 on specific rules of preparing and implementing projects in the scope of public airports, terminals, associated with regional road network, projects in the meaning of the Law of 8 July 2010 on specific terms of preparing for implementation of projects in the scope of flood protection facilities, projects for identifying and excavating mineral deposits and projects of revising or expanding the above mentioned facilities;

³ As for the main stage, issuing decision on environmental condition precedes obtaining other project decisions listed in Article 72 (1) and (1a) of the EIA Law.

- 2) General Director for Environment Protection – in case of projects for construction of a nuclear power facilities and associated developments, implemented on the grounds of the Law of 29 June 2011 on preparation and implementation of projects of nuclear power facilities and associated developments;
- 3) Starosta – in case of land consolidation, exchange or division of land,
- 4) Director of Regional Directorate of State Forests – in case of change of a forest owned by the State Treasury into a farmland,
- 5) Mayor, City Mayor or City President – for remaining projects.

In case of group I projects, the applicant may file the application for issuing environmental decision together with a Project Information Card and application for determining the scope of the report (instead of delivering the EIA report).

The organ determines the scope of the report taking into account current knowledge and methods of research, as well as existing technical capabilities and availability of data. Resolution on the scope of the EIA report is issued after obtaining opinion from RDEP and, if applicable, from State Sanitary Inspection.

The obligation of conducting EIA for a planned investment from group II is imposed in a resolution, on the basis of Project Information Cards by the organ issuing environmental decision. The resolution also set out the scope of EIA report. It is issued after consulting RDEP and, if applicable, organ of state sanitary inspection, also if the organ does not find it necessary to perform EIA.

If an EIA is carried out, organ issuing environmental decision has to agree on the conditions of implementation of the project with RDEP and, if applicable, with organ of state sanitary inspection prior to issuing the decision⁴. In his aligning resolution, RDEP sets out conditions of implementation of the project and its standpoint on the necessity of carrying out EIA, as well as proceeding on cross-border environmental impact within the proceeding on issuing building permit.

Before issuing environmental decision, the organ in charge of the proceeding grants public participation in the EIA proceeding. It is obligatory to justify and publicly announce the decision, in accordance with rules set out in the EIA Law.

As for the implementation stage (the reassessment), EIA report prepared within EIA constituting part of proceeding on issuing a Building Permit should include specific and detailed information compliant with data gathered from the building project and other information obtained after decision on environmental conditions is issued and following development decisions, if already issued, as well as determine level and manner of considering requirements regarding environmental protection imposed in these decisions.

⁴That is developments for which the following decisions are required: Building Permit, decision on consent for resuming construction works, decision on consent for demolition of a nuclear facility, decision on conditions of construction and management of land, decision on consent for implementation of a road development, decision on determining location of a railway, decision on determining location of a highway, decision on determining location of Euro 2012 projects.

After receiving the EIA report, organ issuing the Building Permit agrees on the conditions of implementing the project with RDEP/GDEP, which in turn requests the main organ to ensure public participation and organ of state sanitary inspection for issuing an opinion.

The main organ issues the building decision taking into account conditions set out in the environmental decision and in RDEP's/GDEP's resolution. The organ is obliged to impose obligation of performing natural compensation or requirements in the scope of preventing, reducing and monitoring of the impact of the investment – if such need results from the EIA. The building decision has to be justified and announced publicly following the rules set out in the EIA Law.

As for the assessment of impact on Natura 2000 sites, it should be mentioned that in case of group I and II investment the assessment constitutes part of proceeding on issuing environmental decision and at the stage of reassessment (if applicable).

As for projects other than projects that can have significant impact on the environment, organ relevant for issuing decision requires prior to implementation of such project⁵ to ensure that at the same time it is not directly associated with protection of a Natura 2000 site or does not result from its protection, is obliged to consider if such project may potentially have impact on a Natura 2000 site, before issuing the decision (these are the so-called group III developments). If the organ finds that occurrence of impact is possible, resolution on obligation of presenting appropriate documents to proper RDEP is issued. On the basis of obtained information, RDEP resolves on the obligation of conducting assessment of impact on a Natura 2000 site (or lack thereof). In a resolution imposing obligation of conducting the assessment RDEP a report on the impact of the project on a Natura 2000 site is requested and the scope of the report is determined. If the assessment is carried out, RDEP applies to the organ in charge of the main proceeding for granting the possibility of public participation and submits the impact assessment report to that organ.

After conducting public consultations RDEP aligns conditions for implementation of the project, if the impact assessment shows that the plan or project does not have significant adverse impact on a Natura 2000 site or if the significant adverse impact on the site is possible but at the same time provisions of Article 34 of the Law on nature protection are fulfilled. If the impact assessment shows that the project may have significant adverse impact on a Natura 2000 site and the provisions of Article 34 of the Law on nature protection are not fulfilled, RDEP refuses to approve conditions of implementation of the plan/project. If the significant adverse impact concerns priority species and habitats, prerequisites for issuing permit for development are much stricter. In such case the permit may only be issued in order to protect human health and life, securing public safety, achieving advantageous results of primary meaning for the environment, resulting from the requirement of an overriding public interest, after obtaining opinion of the European Commission.

Organ in charge of the main proceeding issues the decision with consideration of conditions of implementation established in the resolution issued by RDEP. In the decision, an obligation is imposed regarding natural compensation or undertaking measures preventing, reducing and monitoring environmental impacts of the project, if such necessity is concluded

⁵ Such decisions in particular include decisions from Article 72 (1) of the EIA Law; permits issued on the grounds of the Law of 9 June 2011 – Geological and mining law; water permit; permit for removal of trees or shrubs; permit for raising and using artificial island, construction and installations in Polish marine areas.

from the conducted impact assessment. The organ may also refuse to issue consent for implementation of the project, if it may have significant impact on a Natura 2000 and provisions of Article 34 of the Law on nature protection are not fulfilled.

6.3.4 PUBLIC PARTICIPATION IN EIA OF INVESTMENTS

Public participation in proceedings leading to issue of a decision is regulated, among others, by Aarhus convention, ratified by Poland. In accordance with its provisions, the citizens are ensured access to information on the environment and may actively participate in administrative proceedings. Allowing the public to take part in EIA procedure is one of the most significant elements of the assessment. Responsibility to grant public participation lays on the administrative organ in charge of the proceeding on environmental conditions, within which EIA is carried out. Moreover, the organ in charge of the proceeding on issuing Building Permit encompassing second EIA or assessment of impact on a Natura 2000 site grants public participation in the proceeding.

Public participation is required for projects that are always likely to have significant impact on the environment (group I) and for those projects potentially likely to have significant impact on the environment (group II) and projects likely to have impact on Natura 2000 sites (other than projects likely to have significant impact on the environment) on which obligation of carrying out EIA or assessment of impact on a Natura 2000 site was imposed.

Public participation in the proceeding on issuing environmental decision begins when a public announcement is made on the commencement of environmental impact assessment, including opportunity to access EIA report and necessary documentation in the case, as well as opportunity to file remarks and motions regarding the proceeding (which may be filed within 21 days).

In case of projects that are controversial to the public, it is recommended that the Investor undertakes his own consultations that may begin much earlier, e.g. at the stage of project planning, so that the public gets familiar with the planned development, doubts are explained and the public consultations are closed after 21 days. It is also possible to organize public discussions regarding the project, with participation of interested parties. It should be noted that when documentation is delivered to the public, it is often impossible or very difficult to introduce major changes to the scope of the project due to the fact that this would result in necessity to prepare new documents and to re-open the case by the organ. Any activity undertaken at early stage, may allow for issue of the decision without delay.

In order to ensure public participation in the process of issuing the decision, organ of administration informs the public by the means of public announcement on the proposed project and initiating procedure on issuing environmental decision and EIA. The announcement also contains information on the opportunity of accessing documentation, venue for its presentation, opportunity to file comments and motions within 21 days, manner and venue for filing comments and motions, organ of administration that will consider them,

organs of administration taking part in the assessment and, if relevant, on the date and place of holding administrative hearing open to the public. The announcement is published on the website of Bulletin of Public Information of the organ in charge of the proceeding, in a manner customary for the place of the seat of the organ, in a manner customary for the place of the planned development. If the seat of the organ is situated in a different municipality than municipality of the planned development – also by press information or in a customary manner.

After publishing this information, public participation takes place, in form of accessing documentation of the case and submitting comments and motions. Comments and motions must be submitted within 21 days, after this deadline they will not be considered.

This stage of EIA is open to all interested parties. Any manner of participating is admissible (comments and motions must be submitted in a written form, verbally to the protocol or by means of electronic communication).

All the reservations submitted within public participation should be dealt with before decision on environmental conditions is issued.

Finally, decision requiring public participation is announced publicly, together with information on the ways in which it is possible to access its contents.

6.4 WORLD BANK REQUIREMENTS - PROCEDURES

6.4.1 OP / BP 4.01 ENVIRONMENTAL ASSESSMENT

The Bank requires Environmental Assessment (EA) of projects proposed for Bank support to ensure that they do not have, or mitigate potential negative environmental impacts. The EA is a process where reach and type depend on the nature, scale, and potential environmental impact of the proposed project. The EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The EA takes into account the natural environment (air, water and land); human health and safety; social aspects; and cross-border and global environmental aspects. The Borrower is responsible for carrying out the EA and the Bank advises the Borrower on the Bank's EA requirements.

The Bank classifies the proposed projects into three major categories, depending on the type, location, sensitivity, scale of the project and the nature and magnitude of its potential environmental impacts.

- **Category A:** The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
- **Category B:** The proposed project's potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural or semi-natural habitats- are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases migratory measures can be designed more readily than Category A projects.
- **Category C:** The proposed project is likely to have minimal or no adverse environmental impacts.

As regards categories A and B, EA has to allow for public consultation with public affected by the implementation of the project and with NGOs in the scope of environmental aspects of implementation of the Project. The borrower initiates consultations at the earliest possible stage and the consultations continue throughout entire implementation of the project.

6.4.2 OP / BP 4.04 NATURAL HABITATS

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions in its economic and sector work, project financing, and policy dialogue. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, the Bank promotes the rehabilitation of degraded natural habitats. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

6.4.3 OP / BP 4.11 PHYSICAL CULTURAL RESOURCES

Physical cultural resources are defined as movable or fixed facilities, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Their cultural interest may be at the local, provincial or national level, or within the international community. Physical cultural resources are important as sources of valuable scientific and historical

information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process. When the project is likely to have adverse impacts on physical cultural resources, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the EIA process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

6.4.4 OP / BP 4.36 FORESTRY

The Bank's Policy envisages the protection of forests through consideration of forest-related impact of all project's operations, ensuring restrictions for operations affecting critical forest conservation areas, and improving commercial forest practice through the use of modern certification systems. In the process of forest conservation interventions, especially the local people, the private sector and other pertinent stakeholders should be consulted. In general, the Policy aims at reducing deforestation and enhancing the environmental and social contribution of forested areas.

6.4.5 OP / BP 4.12 INVOLUNTARY RESETTLEMENT

This Policy is based on assisting the displaced persons in their efforts to improve or at least restore their standards of living.

The main purpose of the Policy is that development's tasks should not cause the impoverishment of the people who are within the area of their influence. In cases where resettlement of people is inevitable, or in cases where loss of assets and impacts on the livelihood of the PAPs is experienced, a proper action plan should be undertaken to at least restore, as stated above, their prior standard of life. Concerning public consultation, resettles as well as the host communities should be consulted for the successful implementation of the resettlement process. The views of the consulted resettles and the host communities should be incorporated into the Resettlement Action Plan including the list of their choices. All impacts related to land acquisition and involuntary resettlement will be managed in accordance to the project's Resettlement Policy Framework.

OP 4.12 Involuntary Resettlement is applied whenever the implementation of the Investment requires:

- a) involuntary taking of land resulting in:
 - a. relocation or loss of shelter,
 - b. loss of assets or access to assets,
 - c. loss of income sources or livelihood
- b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

To address the impacts of these activities, the borrower is obliged to prepare a Resettlement Policy Framework or a Resettlement Action Plan depending if the specific interventions and related impacts have been identified or not. OP 4.12 also states that:

- Involuntary resettlement should be avoided where feasible exploring all viable alternative project design, and if it is not feasible to avoid resettlement, its range and impact should be minimized;
- Resettlement process should be planned and implemented as development activity providing means and assets allowing PAPs to participate in benefits resulting from implementation of the investment. Support should be offered to social groups affected by resettlements in order to improve their economic status, income and livelihood, or at least restore their status;
- The resettled should receive compensation at replacement value, assistance in relocation and support in the transition period;
- Lack of legal title to the ground should not bar compensation;
- Particular attention should be paid to vulnerable social groups and individuals (e.g. single mothers, the handicapped, the poor);
- The communities should be given opportunity to participate in planning, implementation and monitoring of the resettlement process;
- The resettled should be assisted in integration with the host community;
- Process of resettlements should be closely linked to the schedule of the main investment so that the resettled people receive compensation before the construction or other activities covered by the projects begin;
- Monitoring of resettlement is required as well as evaluation of its efficiency;
- As regards rural or farming lands, even when it is possible to apply financial compensation, land-for-land compensation is recommended, if economically feasible. Farm that lost their fixed assets entirely and became entirely unprofitable should receive compensation in the amount equal to the value of the entire farm;
- For losses that are hard to compensate for financially, such as access to public services, access to clients or suppliers, fishery areas, access to pastures and forest areas, an

attempt should be made to grant access to equivalent and culturally relevant resources and income opportunities.

6.4.6 OP / BP 4.37 SAFETY OF DAMS

Design and construction of new dams implemented as part of a project financed by the Bank need to be supervised by experienced and competent professionals. Moreover, the borrower should adopt and implement certain dam safety measures for the design, bid tendering, construction, operation, and maintenance of the dam and associated works.

The Bank distinguishes between small and large dams:

- Small dams are normally less than 15 meters in height.
- Large dams are 15 meters or more in height. Dams that are between 10 and 15 meters in height are treated as large dams if they present special design complexities. Dams under 10 meters in height are treated as large dams if they are expected to become large dams during the operation of the facility.

For small dams, generic dam safety measures designed by qualified engineers are usually adequate. For large dams, the Bank requires:

- a) reviews by an independent panel of experts (the Panel) of the investigation, design, and construction of the dam and the start of operations. The Panel consists of three or more experts, appointed by the borrower and acceptable to the Bank, with expertise in the various technical fields relevant to the safety aspects of the particular dam;
- b) preparation and implementation of detailed plans: a plan for construction supervision and quality assurance, an instrumentation plan, an operation and maintenance plan, and an emergency readiness plan;
- c) prequalification of bidders during procurement and bid tendering, and
- d) periodic safety inspections of the dam after completion.

As for existing dams and dams under construction (DUC), the Bank may finance the following types of projects that do not include a new dam but will rely on the performance of an existing dam or a DUC:

- power stations or water supply systems that draw directly from a reservoir controlled by an existing dam or a DUC;
- diversion dams or hydraulic structures downstream from an existing dam or a DUC, where failure of the upstream dam could cause extensive damage to or failure of the new Bank-funded structure; and irrigation or water supply projects that will depend on the storage and operation of an existing dam or a DUC for their supply of water and could not function if the dam failed. Projects in this category also include operations that require increases in the capacity of an existing dam, or changes in the characteristics of the impounded materials, where failure of the existing dam could cause extensive damage to or failure of the Bank-funded facilities.

If a project involves an existing dam or DUC in the borrower's territory, the Bank requires that the borrower arrange for one or more independent dam specialists to:

- (a)inspect and evaluate the safety status of the existing dam or DUC, its appurtenances, and its performance history;
- (b)review and evaluate the owner's operation and maintenance procedures; and
- (c)provide a written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam or DUC to an acceptable standard of safety.

The Bank may accept previous assessments of dam safety or recommendations of improvements needed in the existing dam or DUC if the borrower provides evidence that:

- a)an effective dam safety program is already in operation, and
- b)full-level inspections and dam safety assessments of the existing dam or DUC, which are satisfactory to the Bank, have already been conducted and documented.

Necessary additional dam safety measures or remedial work may be financed under the proposed project. When substantial remedial work is needed, the Bank requires that

- (a)the work be designed and supervised by competent professionals, and
- (b)the same reports and plans as for a new Bank-financed dam be prepared and implemented.

For high-hazard cases involving significant and complex remedial work, the Bank also requires that a panel of independent experts be employed on the same basis as for a new Bank-financed dam.

7 ENVIRONMENTAL MANAGEMENT

7.1 BASIC ENVIRONMENTAL DATA

7.1.1 SURFACE WATER AND GROUNDWATER

7.1.1.1 POLAND

Water issues in Poland are regulated by the Water Framework Directive (WFD), which in legal terms will be presented in more details in Chapter 7.1. In accordance with the terminology adopted in the WFD Poland has been divided into 10 river basins - main spatial units of water management. Areas of the Vistula and Odra river basins cover 97% of the area of the country. The other drainage basins are peripheral areas. Surface waters have been divided into Surface Water Body (SWB) characterized by different abiotic and biotic conditions. SWB include sections of rivers, canals, natural or artificial reservoirs, internal waters, transitional and coastal waters. They were also differentiated as natural water body, significantly modified water body (e.g. sections of rivers which were strongly anthropogenically transformed) and artificial water body (e.g. canals). In case of groundwater, it was also divided into Groundwater Body (GWB) occurring in a particular aquifer. The main (environmental) objective of the WFD is not to cause deterioration of the quality of surface and groundwater, and also for the SWB and GWB to achieve in a timely manner so-called good state of the aquatic ecosystem and water dependent ecosystems, measured by multiple parameters in the field of biotic and abiotic components of the environment. Good water state includes, in the case of surface water: good ecological state in terms of biological, hydro morphological and physicochemical quality elements, and good chemical state. In the case of groundwater a good quantitative and good chemical conditions are considered. According to the WFD methodology the project impact assessment on the surface and groundwater must refer to the impact on individual SWB and GWB in the context of achieving the environmental objectives by this water Body⁶. WFD takes into account the possibility of deterioration of water (i.e. failure to achieve the environmental objective), provided that at the same time a number of conditions are met and the so-called derogation is granted.

Vistula River is the largest river in Poland. Its length equals 1,047 km and is entirely located on the territory of Poland. The area of the Vistula River basin covers an area of 194,424 km² (including 25,725 km² outside the territory of Poland). The spring of the river is located in the Beskid Śląski Mountains, on the western slope of Barania Mountain, at a height of 1,106 m asl. Vistula River flows into the Baltic Sea in the area of Gdańsk Bay, forming a delta called Żuławy (approx. 50 km from the estuary it separates into two streams (the other one is called Nogat). The largest left-bank tributaries of the Vistula are Nida, Kamienna, Pilica, Bzura and Brda Rivers. The largest right-bank tributaries are Raba, Dunajec, Wisłoka, San, Wieprz, Narew, Wkra and Drwęca Rivers.

⁶ The environmental aims for water protection coincide with the aims deriving from the needs of protection of Natura 2000 sites

The Odra River is the longest inland navigable waterway in Poland, referred to as: Odra Waterway (*Odrzańska Droga Wodna*). Its length is 854.3 km (out of which 742 km is located in Poland). The area of Odra River basin covers an area of 118,861 km² (106,056 km² within the boundaries of Poland, which is 32.9% of the area of the country). The river begins in Odrzańskie Mountains at a height of 634 m asl. The average decrease equals 0.74 ‰. In the upper section it creates a natural border between Poland and Czech Republic, and from the estuary of Nysa Łużycka River for approx. 161.7 km it marks the border between Poland and Germany. Above the city of Gryfino (704.1 km) it separates into two flows: the Eastern Odra and the Western Odra Rivers. In the vicinity of Szczecin Odra River flows in several riverbeds. The biggest left-bank tributaries are: Opawa, Nysa Kłodzka, Bystrzyca, Kaczawa, Bóbr, Nysa Łużycka Rivers. The biggest right-bank tributaries are: Mała Panew, Barycz and Ina, and Warta Rivers.

7.1.1.2 COMPONENT 1: LOWER ODRA AND MIDDLE ODRA RIVER

The section of Odra River covered by the Project, which includes construction and reconstruction of embankments along with the renovation and expansion of river facilities. In this part Odra River is considered to be the abiotic type No. 21 - Great Lowland River (according to WFD classification). Free-flowing sections of rivers of this type are characterized by the presence of various forms of riverbed, in particular: deep tunnel Valleys with a hard, sandy or gravelly bottom; sandy shoals and islands with varying degrees of stability and vegetation coverage; side arms and hollows behind the islands. Wide flood lowlands with numerous oxbow lakes with diverse degrees of connection to the river also occur. The aquatic vegetation of the oxbow lakes, hollows and side arms of the river indicate the high level of its ecological condition.

The discussed section of Odra River is one of the fish lands of *Abramis brama*, which include middle and lower sections of major rivers with mostly sandy or muddy riverbeds, calmer currents and warm or moderately warm water. The dominant ichthyofauna species are: *Abramis brama*, *Abramis bjoerkna*, *Rutilus rutilus*, *Alburnus alburnus*, *Perca fluviatilis*, *Esox Lucius*, *Sander lucioperca*. The presence of reophile, lithophile and predatory species, as well as free migration of diadromous species indicate high ecological condition of great lowland rivers in terms of ichthyofauna. Taking into account macro-invertebrates, the presence of organisms associated with the swift current and having higher requirement for oxygen, like larvae of *Trichoptera*, *Ephemeroptera*, *Odonata* indicate good ecological condition.

Proposed development covers two Surface Water Bodies (SWBs) of Odra River situated between Wrocław and the estuary of the Nysa Łużycka River:

- 1) PLRW6000211511 "Odra from Śląskie Embankments to Wschodni Canal", included in the Combined Water Bodies (CWBs) No. SO1108;
- 2) PLRW60002115379 "Odra from Wschodni Canal to Czarna Struga", included in the Combined Water Bodies (CWBs) No. SO1113.

Both water bodies were found to be significantly modified. These SWBs were considered at risk of failing to achieve environmental objectives, and for "Odra River from Wschodni Canal to Czarna Struga" has been planned a derogation from the environmental objectives by 2015.

Moreover, the development includes four SWBs of Odra River situated between the estuary of Nysa Łużycka River and the estuary of Odra River and SWB of Lake Dąbie. The tasks planned within this section are construction and modernization of the flood embankments and the pumping stations, refurbishment of bridges and regulation of water in the Międzyodrze area - by unblocking and deepening the canals and refurbishment of the automatic gates, flood-gates and culverts. All SWBs were considered significantly modified and at the risk of failing to achieve the environmental objectives. Also, the derogation from the environmental objectives by 2015 has been planned. This section, the same as previously presented section of the Middle Odra River, is considered to be the abiotic type No. 21 - Great Lowland River.

The SWBs of the Middle Odra covered by the investment plans are significantly modified by humans. Existing narrow embankment separates flood lowland and most of its oxbow lakes from the mainstream of the river. Most of the shoreline of Odra River in this section is regulated in the form of groins that restrict the natural riverbed processes and prevent the formation of islands and sandbanks by focusing the current in the central part of the riverbed. For low and medium water levels they also hinder connectivity between the riverbed and oxbow lakes preserved within the terrace zone. It should be noted that Odra River serves as a migratory route for the diadromous fish in the section from the estuary to the Śląskie Embankments that is the entire length of discussed SWB. However, the existing dam of Śląskie Embankments containing the inefficient chamber fish ladder and damming of numerous tributaries of the Upper Odra River significantly reduces further fish migration to the historical spawning areas located above mentioned SWB. The frontier section of Odra River is also significantly modified by man, in order to ensure the waterway function and flood protection. Particularly valuable habitats are well preserved within the inter-embankment zone oxbow lakes, side arms of the river and the whole area of Międzyodrze. It should be noted that one of the objectives of the investment is to normalize water relations in the area and as a consequence to improve the state of valuable natural habitats, including oxbow lakes and natural eutrophic reservoirs (habitat No. 3150).

Table 4. SWB tasks implemented under Component 1: Lower and Middle Odra River.

No.	SWB Code	Name	Abiotic type	Status	Condition
1	PLRW6000211511	Odra River from Śląskie Embankments to Wschodni Canal	21	HMWB	bad (5) ⁷
2	PLRW60002115379	Odra River from Wschodni Canal to Czarna Struga	21	HMWB	bad (5) ⁸
3	PLRW60002117999	Odra River from Nysa Łużycka to Warta	21	HMWB	bad (5)
4	PLRW60002119199	Odra River from Warta to Western Odra	21	HMWB	bad (5)
5	PLRW6000211971	Odra River from Western Odra to Parnica	21	HMWB	bad (5)
6	PLRW6000211999	Odra River from Parnica to the estuary	21	HMWB	bad (5)
7	PLLW90329	Lake Dąbie	Lake – type 3b - Lake with a high calcium content, with a large catchment outflow, not stratified	HMWB	bad (5)

According to the VIEP monitoring data for 2010-2012 the ecological potential of SWBs of Odra River from Śląskie Embankments to Eastern Canal and from the Warta River to the Western Odra River were rated as moderate - Class 3. The rest of the SWBs of the Odra River were evaluated as poor - Class 4, based on the assessment of the macro-invertebrates. For one SWB of the Odra River there is lack of VIEP monitoring data. SWB of the Lake Dąbie got "below good potential" rating. Mentioned evaluations indicate moderate transformation of the ecosystem on the section of the river covered by the development and lack of significant chemical pollutants (all rating of physicochemical elements in the Class 2). The results of the VIEP monitoring show higher ecological potential of discussed SWB than expected when they were differentiated. However, this potential still remains less than good. According to the "Report on the condition of the environment in the Lower Silesia Province in 2012" the region is dominated by water classified as Class 3 - moderate ecological condition/potential (48.8%). Good ecological condition/potential was found for 26.2% of monitored SWBs and very good condition - only for 2.5%. The poor condition/potential was determined for 15.6% of the SWBs. No SWBs were found to have bad condition/potential. In reference to these data, the results of the monitored SWB of Odra "From Śląskie Embankments to the Eastern Canal" place it in the most strongly represented group of water

⁷ According to the VIEP monitoring data from the years 2010-2012; MOdraate ecological potential - Class 3 (phytoplankton - Class 2, macrozoobenthos - Class 3, ichthyofauna - Class 3, physicochemical elements – Class 2)

⁸ SWB not included in VIEP monitoring in years 2010-2012

body in the region. According to the report, "Condition of the environment in Lubuskie Province in the years 2011-2012" a good ecological condition/potential was achieved by respectively 44% and 45% of investigated SWBs, moderate by 26% and 37%, and poor by 4 and 14%. On the other hand, according to the study "Report on the condition of the environment in Western Pomerania Province in 2012" among 371 SWBs of rivers that were investigated in the years 2010-2012 the condition/ecological potential for up to 45% was defined as good or above good. While for 55% it was defined as less than good, including 26% of the SWBs found as poor condition.

Table 5. Assumptions made in determining the forecast of discussed SWBs potential (condition in Class 5 - bad) are too low, considering not finding the SWBs with determined bad condition or ecological potential in Lower Silesian and Lubuskie Provinces. Only in the Western Pomerania Province there were identified SWBs of rivers with determined bad condition/ecological potential. Results of the VIEP monitoring from in 2010-2012 for SWBs on which are implemented tasks under Component 1: Lower and Middle Odra River.

No.	SWB Code	Phyto-plankton	Macrophytes	Macro-invertebrates	Ichthyofauna	Physical and chemical elements
1	PLRW6000211511	2	I.d.	3	3	2
2	PLRW60002115379	I.d.	I.d.	I.d.	I.d.	I.d.
3	PLRW60002117999	3	2	4	I.d.	2
4	PLRW60002119199	2	1	3	I.d.	2
5	PLRW6000211971	2	3	4	I.d.	2
6	PLRW6000211999	2	I.d.	4	I.d.	2
7	PLLW90329	BPD				I.d.

Key:

I.d. – lack of data

BDC – below good condition

BDP – below good potential

7.1.1.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

Planned tasks are located mostly within Kłodzko Valley and include the river basin of Nysa Kłodzka River and its tributaries (to the Bardo Śląskie cross – this is so-called catchment of the upper flow of the Nysa Kłodzka River). Mountains ranges surround Kłodzko Valley from all sides. The western part of the Valley is created by the orlicko-bystrzycki metamorphic and the eastern by łądecko-śnieżnicki metamorphic. The Valley occupies a central part of the upper catchment area of the Nysa Kłodzka River and together with Upper Nysa Trench it is

the largest inter-mountain valley in the Sudety Mountains. Within this structural basin rivers formed vast Valleys and gorges (Bardzki Gorge). The tributaries which flow into Nysa Kłodzka River create a system of deeply cut in the surface river valleys of a typical mountainous nature. The spring of the Nysa Kłodzka River is located in Śnieżnik Massif, on the slopes of Trójmorski Peak. In the upper course of the river it uses the natural tectonic depression – Upper Nysa Ditch. Then it flows through the Kłodzko Valley and cuts Bardzkie Mountains, creating in the vicinity of Bardo the antecedent gorge of Nysa Kłodzka River. After leaving Bardzkie Mountains it flows through Sudeckie Foothills, and further through the Silesian Lowland. Nysa Kłodzka River has numerous tributaries. The left-bank tributaries include: Bystrzyca River (64.2 km²), Łomnica River (18.8 km²), Duna River (34.7 km²), Bystrzyca Dusznicka River (200.9 km²) and Ścinawka River (593.5 km²). The most important right-bank tributaries are: Goworówka River (37.9 km²), Wilczka River (47.0 km²), Pławna River (32.3 km²), Biała Łądecka River (314.6 km²) and Jaskówka River (52.9 km²). In the middle course (up to Biała Głuchowska tributary) Nysa Kłodzka River is a lowland river. In this section the river is divided by four dams creating cascade reservoir system with max. damming of 10 m (Otmuchów Reservoir, Nyski Reservoir, Topola and Kozielno). Another reservoir will be built at an altitude of Kamieniec Ząbkowicki. The dam reservoirs disrupt the continuity of the river, changing its hydrological and ecological relationships. The area below the reservoirs is an upland catchment. The riverbed in a considerable distance is regulated and surrounded by embankments. In total there are 20 dams on Nysa Kłodzka River which constitute a barrier to fish migration and bed-load sediment flow. Within the Valley the river web creates a fan-shaped arrangement of rivers and streams. Their erosion valleys supply Nysa Kłodzka River. Due to the geological structure of the ground and significant decrease of the terrain, the Nysa Kłodzka River reacts very quickly to the outflow of water from mountain areas.

This section of Nysa Kłodzka River and its tributaries are located in Kłodzko Valley surrounded by Sudety Mountains, in the Central Sudety macroregion. Geographical location determines the occurrence of abiotic types of rivers related to upland and mountainous areas. The area of the Project covers 23 SWBs representing the following abiotic types:

- Type No. 3 – Sudecki Stream (two SWB);
- Type No. 4 – Silicate upland stream with coarse substrate - West (14 SWB);
- Type No. 5 – Silicate upland stream with fine-grained substrate - West (1 SWB);
- Type No. 7 – Carbonate upland stream with coarse substrate (1 SWB);
- Type No. 8 – Small silicate upland river - West (4 SWB);
- Type No. 10 – Medium upland river - West (1 SWB).

Among 23 SWBs covered by the project, 13 belong to natural water bodies, and 10 are heavily modified water bodies.

Ecosystems of mountainous and upland streams and rivers are dominated by organisms adapted to swift current and low temperature of water, strong variations in flow rate, as well as demonstrating a high oxygen requirement. Flora and fauna of these environments is associated with rocky or gravel bed substrate, which provides a convenient feeding and breeding places for most taxa. In streams and smaller upland and mountainous rivers the

dominant component of flora is phytobenthos and algae belonging to the periphyton growing on bedrock and stones. Macrophytes are quite rare, only in larger rivers, with a slightly calmer current. In water of this type macroinvertebrates are represented by *Plecoptera* and larvae of *Trichoptera*, *Ephemeroptera*, *Odonata*, which belong to the family of rheophile and cold-water, demonstrating a high oxygen requirement. Streams under abiotic types no. 3, 4 and 7 belong to the fish land of *Salmo trutta* m. *fario* – with the swift current, rocky or gravel substrate and cool water. Dominant species of the ichthyofauna are: *Salmo trutta* m. *fario*, *Cottus gobio*, *Cottus poecilopus*, *Thymallus thymallus*. Larger type no. 8 upland rivers belong to the fish land of *Thymallus thymallus* (in the upper courses) and *Barbus barbus* (in the lower courses) and type no. 10 rivers are the fish land of *Barbus barbus*. Rivers of the fish land of *Thymallus thymallus*, with pebbly-gravel beds, slow current and moderately cool or cool water are mostly inhabited by the dominant species: *Salmo trutta* m. *fario*, *Cottus gobio*, *Cottus poecilopus*, *Barbus barbus*, *Chondrostoma nasus*. Rivers of the fish land of *Barbus barbus*, with gravel and sandy beds, quite swift current and moderately cool water are inhabited by the dominant species: *Barbus barbus*, *Chondrostoma nasus*, *Vimba vimba*, *Leuciscus cephalus*, *Leuciscus leuciscus*, *Gobio gobio*. Rivers and streams of mentioned types are also a place of spawning for diadromous species, as long as there is morphological permeability to the sea. The high rates of the ecological condition and/or ecological potential in terms of ichthyofauna in the streams and rivers of these types affects from significant occurrence of rheophile, lithophile species sensitive to oxygen deficiency and transformation of habitat. Important issue is also the ecological permeability of the water courses. Among the macroinvertebrates, presence of organisms associated with the swift current and having higher oxygen requirement: larvae of: *Plecoptera*, *Trichoptera*, *Ephemeroptera*, *Odonata* indicate good ecological condition.

The SWBs covered by the development are significantly modified by man - almost half of them were classified as heavily modified water body. 21 of the 23 SWBs were found at the risks of not achieving the environmental objectives. The reasons for the defining of the body as significantly modified is presence of weirs, numerous thresholds corrections and structures elevated to reduce the risk of flooding. For all the SWBs threatened by failure in achieving the environmental objectives derogations from the environmental objectives by 2015 has been planned. That indicates recognition of the key role of ensuring flood safety in relation to environmental objectives for this area.

Table 6. SWB where tasks under Component 2 are implemented: Flood Protection of the Kłodzko.

No.	SWB Code	Name	Abiotic type	Status	Condition
1	PLRW60003121613	Biała Łądecka River from the spring to Kobyla River	3	NAT	2 (good)
2	PLRW600031216269	Morawka River	3	NAT	2 (good)
3	PLRW6000412269	Dzik River	4	NAT	2 (good)
4	PLRW6000412289	Czerwionka River	4	NAT	2 (good)
5	PLRW6000412369	Kamienica River	4	NAT	5 (bad)

No.	SWB Code	Name	Abiotic type	Status	Condition
6	PLRW60004121169	Nysa Kłodzka River from the spring to Różanka River	4	HMWB	5 (bad)
7	PLRW60004121189	Domaszkowski Stream	4	NAT	2 (good)
8	PLRW60004121299	Wilczka River	4	HMWB	2 (good)
9	PLRW60004121499	Bystrzyca River	4	HMWB	2 (good)
10	PLRW60004121529	Plawna River	4	HMWB	2 (good)
11	PLRW60004121569	Łomnica River	4	HMWB	2 (good)
12	PLRW60004121589	Upper Duna River including Lower Duna River	4	HMWB	2 (good)
13	PLRW60004121629	Biała Łądecka River from the Kobyla to Morawka, including Morawka from Kleśnica River	4	NAT	2 (good)
14	PLRW60004121649	Orliczka River	4	NAT	2 (good)
15	PLRW60004121929	Jaszkówka River	4	NAT	2 (good)
16	PLRW60004122569	Posna River	4	HMWB	2 (good)
17	PLRW6000512188	Bystrzyca Dusznicka River from Kamienny Potok to Wielisławka River	5	HMWB	5 (bad)
18	PLRW60007121839	Bystrzyca Dusznicka River from the spring to Kamienny Potok River	7	HMWB	5 (bad)
19	PLRW6000812159	Nysa Kłodzka River from Różanka to Biała Łądecka River	8	NAT	2 (good)
20	PLRW6000812199	Nysa Kłodzka River from Biała Łądecka to Ścinawka River	8	NAT	2 (good)
21	PLRW6000812299	Ścinawka River from Bożanowski Potok to Nysa Kłodzka River	8	NAT	2 (good)
22	PLRW60008121699	Biała Łądecka River from Morawka to Nysa Kłodzka River	8	HMWB	2 (good)
23	PLRW60001012333	Nysa Kłodzka River from Ścinawka to separation of the Młynówka Pomianowska River	10	NAT	5 (bad)

Table 7. Results of the VIEP monitoring in 2010-2012 for SWBs on which are implemented tasks under Component 2: Flood Protection of the Klodzko.

No.	SWB Code	Phyto-plankton	Macrophytes	Macro-invertebrates	Ichthyofauna	Physical and chemical elements
1	PLRW60003121613	I.d.	I.d.	I.d.	2	I.d.
2	PLRW600031216269	1	I.d.	I.d.	2	1
3	PLRW6000412269	I.d.	I.d.	I.d.	I.d.	I.d.
4	PLRW6000412289	I.d.	I.d.	I.d.	I.d.	I.d.
5	PLRW6000412369	3	2	3	I.d.	2
6	PLRW60004121169	2	I.d.	I.d.	I.d.	1
7	PLRW60004121189	I.d.	I.d.	I.d.	I.d.	I.d.
8	PLRW60004121299	I.d.	I.d.	I.d.	I.d.	I.d.
9	PLRW60004121499	I.d.	I.d.	I.d.	I.d.	I.d.
10	PLRW60004121529	I.d.	I.d.	I.d.	I.d.	I.d.
11	PLRW60004121569	I.d.	I.d.	I.d.	I.d.	I.d.
12	PLRW60004121589	I.d.	I.d.	I.d.	I.d.	I.d.
13	PLRW60004121629	2	I.d.	I.d.	I.d.	1
14	PLRW60004121649	b.d.	I.d.	I.d.	I.d.	I.d.
15	PLRW60004121929	4	I.d.	I.d.	I.d.	2
16	PLRW60004122569	3	I.d.	I.d.	I.d.	2
17	PLRW6000512188	4	2	I.d.	I.d.	2
18	PLRW60007121839	1	I.d.	I.d.	I.d.	1
19	PLRW6000812159	3	I.d.	I.d.	I.d.	1
20	PLRW6000812199	3	I.d.	I.d.	2	BDC
21	PLRW6000812299	4	I.d.	I.d.	1	BDP
22	PLRW60008121699	4	I.d.	I.d.	I.d.	BDC
23	PLRW60001012333	2	3	I.d.	3	2

Key:

I.d. – lack of data

BDC – below good condition

BDP – below good potential

Assumption made in the forecast of ecological condition/potential of the discussed SWBs determine the condition/potential as good (Class 2) in the case of 18 SWBs, and as bad (Class 5) for 5 SWBs. According to the "Report on the condition of the environment in the Lower Silesia Province in 2012" the region is dominated by water included in Class 3 - moderate ecological condition/potential (48.8%), good condition/potential was found for

26.2% of the monitored SWBs and very good conditions were found for only 2.5% of them. The poor conditions/potential were determined for 15.6% of SWB. No SWBs were determined as representing bad ecological condition/potential. In 2010-2012 VIEP assessed 14 out of 23 discussed SWBs. For 5 out of these 14 the conditions/ecological potential were determined as good and very good, for next 5 as moderate (the Class was determined mostly in terms of biological elements), and for 4 it was found poor. The results of the monitoring indicate achieving lower ranges than the ones predicted while determining the SWBs. Nevertheless, some of the rivers and streams in the region have been classified as Class 1 or Class 2 of ecological condition/potential. Such conclusion finds confirmation in the "Report on the condition of the environment in the Lower Silesia Province", which indicates that the streams and smaller river courses in Sudety region represent good ecological condition/potential.

7.1.1.4 COMPONENT 3: THE UPPER VISTULA RIVER

In terms of hydrography this component includes:

- Vistula River, Serafa Stream and Malinówka Stream within Cracow and Wieliczka area;
- Vistula River in the vicinity of Tarnobrzeg and Sandomierz including the estuary section of San River and other selected rivers in the area, mostly tributaries of Vistula River;
- Raba River and its tributaries,
- San River and its tributaries.
- Wisłoka River and its tributaries,
- Dunajec River and its tributaries

Tasks within the Component 3 are located in the river basin of Vistula River in the water region of Upper Vistula River. SWBs where the individual tasks within the Component 3 will be performed are indicated in the table below.

Table 8. SWB on which projects will be implemented within the Subcomponent 3A - Flood Protection of Cracow and Wieliczka

No.	SWB Code	Name	Abiotic type	Status	Condition
1	PLRW200019213775	Vistula River from Skawinka to Podłężanka	19	HMWB	bad ³
2	PLRW20009213769	Dłubnia River from Minóżka (excluding Minóżka) to the estuary	9	HMWB	bad ³
3	PLRW200026213774	Serafa River	26	HMWB	bad ³

Table 9. SWB on which projects will be implemented within the Subcomponent 3B:
Subcomponent 3B: Protection of Tarnobrzeg and Sandomierz

No.	SWB Code	Name	Abiotic type	Status	Condition
1	PLRW20002121999	Vistula River from Wisłoka to San	21	HMWB	bad ⁹
2	PLRW2000212319	Vistula River from San to Sanna	21	HMWB	bad ⁵
3	PLRW20002122999	San River from Rudnia to the estuary	21	HMWB	bad ⁵
4	PLRW200019219899	Łęg River from Murynia to the estuary	19	HMWB	bad ⁵
5	PLRW200019219699	Trześniówka River from Karolówka to the estuary	17	HMWB	bad ⁵
6	PLRW20002621952	Tributary from near the Sielec	26	NAT	bad ¹⁰
7	PLRW200019219499	Koprzywianka River from Modlibórka to the estuary	19	HMWB	bad ⁵
8	PLRW200026219494	Gorzyczanka II	26	NAT	bad ⁶
9	PLRW20001723154	Tributary from Chwałowice	17	NAT	bad ⁷
10	PLRW2000172312	Strachocka River	17	NAT	bad ⁷

As regards Subcomponents 3C and 3D the scope of tasks may potentially cover All the SWB in the catchment area of Raba, Wisłoka and Dunajec.

The main river of the area – Vistula River flows through the podkarpackie lowering – Kotlina Oświęcimska, Cracow Gate (*Brama Cracowska*) and Kotlina Sandomierska dewatering the areas of Cracowsko-Częstochowska Upland and the Lesser Poland Upland (*Wyżyna Małopolska*) on the north side (left-bank tributaries) and the Foothills and the Carpathian Mountains (*Karpaty*) on the southern side (right-hand tributaries, including the Raba). Given the abiotic type, Vistula River in the vicinity of Cracow is sandy-loamy lowland river. In the vicinity of Tarnobrzeg and Sandomierz, Vistula River changes its nature into a great lowland river flowing widely, mainly in flat and sandy Valley. Small tributaries of Vistula River, flowing entirely or partially in her Valley, are mainly sandy or gravel lowland streams or small highland rivers (Dłubnia, Serafa). Right-hand tributaries of Vistula River, such as Raba and Dunajec, are of prevalently mountain and submountain nature (except for their lower sections) of high changeability of flows, pebble and gravel bottoms and winding course. Wisłoka River gains typically mountain character only in its upper course.

In its upper course Raba River, in abiotic terms, constitutes a flysch stream and in its middle course – small flysch river. Below Dobczyce reservoir the river changes into a lowland gravel river. Dunajec River for the major part is a middle highland river (eastern type), in its upper course it is a small flysch river and in its lower course lowland sand and clay river. Wisłoka River in its upper course is a small flysch river, which changes into a middle highland river (eastern type) and then, in its middle course, into a lowland sand and clay river.

⁹ Data based on monitoring of VIEP in the years 2010-2012

¹⁰ Data based on the Water management plan for the area of The Vistula river drainage basin

The largest Carpathian tributary of Vistula River is San. In abiotic terms, in its upper course it is a flysch stream, then it changes into a small flysch river, middle highland river, sand-and-clay lowland river, and in its lower course it is a large lowland river. The Valley of the river and the riverbed are therefore abundant in morphological forms reflecting varied abiotic types. The largest tributary of San River is Wisłok. In terms of abiotic types, it shows similar variability to that of San, although in its lower course it is a sand-and-clay lowland river. Characteristic of San's upper part of catchment are large water reservoirs: Solina reservoir, created as a result of constructing a dam on San on km 325+400 and Myczkowce reservoir created as a result of constructing a ground dam on San in Myczkowce on km 319+000.

Among mountain tributaries of Raba, Wisłoka, Dunajec and San Rivers, as regards abiotic type, flysch streams and small flysch rivers prevail, flowing mainly in a v-shaped Valleys, of slightly winding course. The quality of water in this region is influenced mainly by water consumption, introduction of municipal and industrial wastewater and zonal pollution. On the condition of water and ecosystems dependent on them, affects not only the chemical pollution but also the hydropower constructions in riverbeds and river Valleys.

The vast majority of SWBs under Component 3 are designated as significantly modified water body, which means that most of the anthropogenic transformation of rivers are very large. Vistula River was considered significantly modified over the entire length of the studied area mainly due to the presence of dams and damming creations preventing fish migration, changes in the SNQ related to hydroelectricity and the presence of embankments restricting natural lagoons and isolating the oxbow lakes.

Also in the catchment area of the Raba, Wisłoka, Dunajec and San Rivers significant majority of SWBs is heavily modified, mainly due to the presence of barriers for fish migration in the form of numerous barrages, threshold corrections, anti-bed-load sediment dams and water reservoirs. Due to these reasons, the condition of a large part of the SWBs has been identified as bad.

The main utility level of groundwater in discussed area is related to the quaternary formations in the Valley of Vistula River. The thickness of the sandy-gravel deposits ranges from 20 to 30 m. The Major Groundwater Reservoirs (MGR) present in the Valley of the Vistula River and the major tributaries are mainly of a porous type. Tasks implemented under Component 3 are located within 11 GWBs (PLGW2200151, PLGW2200150, PLGW2200139, PLGW2200138, PLGW2200126, PLGW2200125, PLGW2200127, GW2200153, GW2200154, GW2200155, GW2200156, PLGW2200157, PLGW2200158, PLGW9000159, PLGW2200160). Groundwater here is characterized by good chemical condition and in vast majority by good quantity.

7.1.2 CULTURE LANDSCAPE AND MONUMENTS

7.1.2.1 POLAND

Cultural, religious and national heritage have impact on national identity of modern Poland. Poland is situated in Middle Europe and as such it was localized on the junction of commercial trails, for centuries remaining country of one nation and one religion. At the same time, turbulent history, openness and tolerance meant richness of cultural resources, of both religious and secular origin. Religion, tradition, habits, monuments of Polish culture constitute a thousand-years-old heritage of material and spirituals culture of the Polish people.

On the territory of Poland of today there are many valuable objects constituting important elements of the landscape, such as: monasteries, fortified castles, temples, churches, cemeteries. Many towns and cities present unique urban structures, based on former assumptions of medieval dwellings. Cultural landscape of Poland is created by religious buildings: cathedrals (among others, in Wrocław, Cracow, Gniezno, Nysa, Poznań, Gdańsk, Kołobrzeg, Świdnica, Kalisz), sanctuaries (Jasna Góra – sanctuary of the Queen of Poland; Kalwaria Zebrzydowska – the oldest pilgrim agglomeration in Poland), monasteries (Lubiąż, Sulejów, Henryków, Wąchock, Jędrzejów, Oliwa). Secular buildings constitute material architectural heritage and integral part of national identity. These objects are often ruined, abandoned, functionally useless, however of large cultural value. The most famous ones include: castles (Malbork, Frombork, Kórnik Działyńskich) and palaces (Cracow, Antonin, Wiśnicz, Wilanów).

Former military structures, such as Modlin, Przemyśl, Gonicz, Cracow and Wrocław fortresses are witnesses of turbulent history of Poland. Both former and modern fortifications constitute important parts of Polish cultural landscape. Well-preserved structures, i.e. Międzyrzeczki Rejon Umocniony, Wał Pomorski, Forty Racławickie, Boyen Fortress, Hitler's headquarter in Gierłoża, Fortifications on Hel Peninsula are a true monument in the memory of all the fallen in defense of the homeland.

Poland was one of the first signatories of a UNESCO World Heritage Convention. With 14 positions present on the UNESCO list Poland occupies 9th position in Europe and 15th in the World. Polish treasures include, among others: the Old Town in Cracow, the Old Town in Warsaw, Royal Salt Mines in Wieliczka, Kalwaria Zebrzydowska, Teutonic Castle in Malbork, Auschwitz-Birkenau, Folk Hall in Wrocław.

Legal acts

One of constitutional duties of the Country (article 5 and 6 of the Constitution of the Republic of Poland) is to protect cultural heritage. Material and non-material cultural heritage and monuments are a common good, and taking care of them is obligatory under article 82 of the Constitution. The Republic of Poland guards independence and inviolability of its territory, grants human and citizen freedoms and rights and security of its citizens, guards national heritage and secures environment protection with regards for the principle of sustainable development (article 5).

Basic legal act containing principles of monument protection and taking of care of them in Poland is the Law of 23 July 2003 on monument protection and taking care of the monuments (Journal of Laws of 2003, no 162, pos. 1568 with amendments) together with resolutions. The law determines subject, scope and form of monument protection and care, rules for drawing programs of monument protection and care of monuments on all administrative levels, as well as financing of conservatory, restoration, construction works associated with monuments and organization of organs of monument protection (art. 1). Monument protection is the responsibility of organs of government and self-government administration, and the care should be executed by the owners of monuments.

7.1.2.2 COMPONENT 1: LOWER AND MIDDLE ODRA RIVER

The Valley of Middle and Lower Odra River is diversified in terms of morphology and landscape. The Valley of Middle Odra River on the South borders Wysoczyzna Czerwińska, Valley of Lower Bóbr, Wzniesienia Gubińskie. Towards the East it changes into Kotlina Kargowska, Pradolina Głogowska. On the North and on the West it borders Pojezierze Łagowskie and Równina Torzymska. To the North the Valley narrows down to form Lubuski Przełom Odry and Kotlina Freienwaldzka. The Western part is the section bordering with Germany and the Eastern part neighbours Kotlina Gorzowska, Równina Gorzowska, Pojezierze Myśliborskie.

The Valley of Lower Odra River is narrow at the beginning (about 2-3 km) and it borders Równina Weltyńska, Wzgórza Bukowe, Równina Goleniowska from the East, Wzniesienia Szczecińskie, Równina Wkrzańska from the West. The northern part of the Valley is over 10 km wide. In its estuary part Odra River is divided into two branches. For about 30 km it flows in two riverbeds – Eastern Odra and Regalica. The Eastern branch is an artificial riverbed, the Western part crosses Lake Dąbie. The area between them, the so-called Międzyodrze is a plain with numerous lakes, wetlands and oxbows. Many monumental hydraulic facilities are situated in this area, once serving to regulate the level of water, mainly in order to maintain Pasturek and for flood protection.

The landscape of the valley mainly constitutes of rural areas, Meadowi, Pasturek. On its big section the river maintained large landscape potential. The flood Plains, wetland forests, oxbows result in large natural value of the area. Within large agglomerations the River was partially transformed.

Due to border location and significance of Odra River as commercial waterway, there are numerous monuments on the discussed section of the river, associated with secular, religious, military and hydraulic structures.

Beginning of regulatory works at the end of 19th century resulted in changed in the landscape of the Valley and the riverbed. Numerous hydraulic structures from the first half of the 20th century served to regulate the level of waters and their use for energy production.

The landscape of the Middle and Lower Odra River is the landscape of cities performing different functions – military, commercial, harbor: Głogów, Bytom Odrzański, Nowa Sól,

Sulechów, Krosno Odrzańskie, Słubice, Górzycza, Kostrzyn nad Odrą (Polish part) and Eisenhüttenstadt and Frankfurt (Odra) on the territory of Germany.

Process of regulating Odra River took place in the second half of the 19th century and continued till the first half of the 20th century. That period coincided with rapid development of means of transport, including railways. Currently, the Odra is intersected by several bridges which have unique technical features, e.g. the drawbridge on the railway line No 273 in Szczecin Podjuchy district or unused for more than 70 years old railway bridge in the region of Siekierki, which is also the longest bridge crossing of Odra River.

A characteristic feature of the cities along the Odra River is the proximity of buildings to the river banks - as it results from a close link between the development of the centers and Odra River. The Odra River Valley in the lower and middle section as a result of territorial changes after World War II became a border river. In the landscape of the Valley typical structures of towns, cities and villages located directly on the River can be distinguished. For centuries the river has indicated direction of their development, deciding on commercial and agricultural potential of areas situated over the river.

7.1.2.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

The area of Kłodzko Valley has its eastern border with Góry Złote, Śnieżka Massive, and its western border with Góry Bystrzyckie. On the North it borders Obniżenie Ścinawki and Bardziek mountains. Kłodzko Valley covers micro regions: proper Kłodzko Valley, Wzgórza Rogówki, Wysoczyzna Łomnicy, Obniżenie Bystrzycy Kłodzkiej, Wysoczyzna Idzikowa, Wysoczyzna Międzylesia. Wysoczyzna Łomnicy, Obniżenie Bystrzycy Kłodzkiej, Wysoczyzna Idzikowa and Wysoczyzna Międzylesia is often joined into a separate unit - Rów Górnej Nysy. Rów Górnej Nysy with Kłodzko Valley and surrounding mountains chains combined are a historical lands called Ziemia Kłodzka.

The grounds of Kłodzko have high cultural wealth. Over the centuries, the current Kłodzko district was successively ruled by the Polish Kingdom until the twelfth century. Then it came under Czech and the House of Habsburg rule respectively. As a result of the three Silesian wars, the area was ultimately passed under the German (Prussian) rule in the 18th century. It was only as a result of territorial changes after World War II (1945) that the area was included in the boundaries of the so-called Polish Western Lands. Rich history, multi-cultural influences resulting from prolonged periods of belonging to a different state and administrative structures, and various religious influences led to a very varied tissue of historic buildings in Kłodzko Valley.

The main city in the region is Kłodzko. Its strategic position on the commercial trail between Czech and Poland decided on the destiny of these lands. Over the century, the area was the object of numerous wars. In the 18th century the city was transformed into a fortress and the city developed as part of it. The time of WWII in Kłodzko was inseparably associated with the fortress, which served as Gestapo prison and later as AEG military factory. Also today, the fortress is the central point of the landscape of the city.

Because of richness of mineral resources and mineral waters' deposits, many Spa resorts were built in the area, many of which have magnificent sanatorium infrastructure with origins in the 18th century. The most renowned are modern spas: Polanica-Zdrój, Duszniki-Zdrój, Kudowa-Zdrój, Łądek-Zdrój and Długopole Zdrój.

The landscape of Kłodzko Valley is associated with varied formation of the land. Large slopes and deep valleys force the villages to develop along the rivers, Road and other communication trails.

After WWII the landscape in the area was again transformer. The changes mainly regarded quitting agricultural use of the land. As a result villages situated on Steep slopes were abandoned and farmlands were subject to plant succession.

7.1.2.4 COMPONENT 3: THE UPPER VISTULA RIVER

Subcomponent 3A – Flood Protection of Cracow and Wieliczka: Flood protection of cities in the area of basin of the Upper Vistula and protection of the city of Cracow shall be implemented in areas of specific cultural values. Cracow and its historical heritage has a significant place in the civilization and culture of Central Europe in terms of European history of urban planning and architecture. These features are characterized by a high historical, artistic, and symbolic value and the authenticity of the substance and its chronological continuity that is unique in the scale of Poland. Cracow, the former capital of the Polish state (until the 16th century.) has also a special place in the minds of Poles. There are unique historical buildings and architectural complexes in the city. Wieliczka, which houses one of the oldest mines in Europe, the Wieliczka Salt Mine, presents equally high cultural value. Cracow and Wieliczka are the first Polish sites included in the UNESCO World Heritage Site.

Subcomponent 3B - Protection of Sandomierz and Tarnobrzeg shall be implemented in a culturally heterogeneous area. Since the early Middle Ages these areas have developed along the river and have a great heritage and a large number of historic buildings. There are two major urban centers, Sandomierz and Tarnobrzeg, in the area of the component implementation. Sandomierz is distinguished by unique historical and cultural values, and is considered to be the most valuable historical urban-landscape unit in Poland. At the same time the city became the capital of the Central Industrial District, which was under construction in the 30s of the 20th century and ceased to be built after World War II. The nature of Tarnobrzeg, in turn, was shaped by the discovery of deposits of sulfur in the 50s of the 20th century. The small, peripheral town of Tarnobrzeg quickly expanded to its present size.

Subcomponent 3C – Raba Sub-basin Passive and Active Protection will in turn be implemented in the area, which cultural landscape is shaped by non-compact development (except for the centers of villages), sometimes spontaneously scattered to the hill tops. Mostly religious buildings (churches) dominate. Landscape and mountain location results in

the tourist development of this area (including winter tourism). The most important monuments include the traditional architectural objects - wooden houses and farm buildings in the characteristic style, manor-grange settlements, churches and religious monuments of landscape architecture.

Subcomponent 3D - San, Wisłoka and Dunajec Sub-basins - Passive and active flood protection in the catchment area of San, Wisłoka and Dunajec rivers will be implemented in an area where development is varied, localized in the Valleys of San, Wisłoka and Dunajec rivers and their tributaries. On the one hand it is the area of tributaries of the main rivers, of little varied buildings, on the other – cities situated in the Valleys of the main rivers, e.g. Jasło, Dębica, Mielec (Wisłoka Valley), of large historical and cultural value. The history of San Valley reaches Celtic culture, but the most characteristic monuments are associated with medieval ethnic groups named Łemkowie and Bojkowie. One of the most significant values of cultural landscape of the region is composition of antique rural buildings in the surrounding nature. Particular attention should be paid to monuments of wooden sacral architecture – Greek-catholic churches. On the steep slopes of San Valley castles were located, such as Sobień, Leski castle, also belonging to valuable monuments of the region.

7.1.3 TANGIBLE PROPERTY

7.1.3.1 POLAND

The concept of tangible property has a very broad definition, the meaning of which can be very different depending on the subject of analysis - from the strictly civil point of view tangible properties can encompass both movable and immovable items. Due to the subject of this report and the Consultant's tasks, i.e. the environmental impact assessment of projects in the field of flood protection, for the purposes of the works the term "tangible property" will include immovable objects and their parts (as defined in civil law), in particular:

- Residential buildings;
- Transport infrastructure: roads, railways, airports;
- Industrial sites;
- Storage and logistic facilities
- Food processing facilities;
- Technical and transmission infrastructure;
- Public buildings;
- Farms with arable land, meadows and pastures;
- Other properties.

Higher density of tangible properties as defined here is present in urban areas, particularly in cities, where the mixing of the different manufacturing, service, and social functions takes place.

The following cities forming centers of agglomeration in areas where Project will be carried out are:

- Cracow
- Sandomierz
- Tarnobrzeg
- Kłodzko
- Szczecin
- Zielona Góra

High density of capital and population is observed within those urban centers and adjacent areas (mainly around Cracow and Zielona Góra). At the level of development plans of provinces (region) there are also sub-regional centers acting as centers of services and jobs of local importance, often going beyond the scope of a single district (i.e. land district).

7.1.3.2 COMPONENT 1: LOWER AND MIDDLE ODRÁ RIVER

In Odra River Valley section encompassed by Component 1, the following urban centers: Szczecin, Gryfino, Świnoujście, Kostrzyń, Słubice, Nowa Sól and Krosno Odrzańskie can be indicated as places of the highest concentration of capital, services and material goods. Szczecin, the agglomeration formed around a strong industrial, commercial, administrative, and scientific center, plays the most important economic role among the above-mentioned cities. Other indicated cities, after the changes of state borders in 1945, began to gravitate towards the main centers in the provinces (capitals and the headquarters of the provincial assemblies). Their economic development is not as tightly connected with the use of Odra River as it is in Szczecin. Due to its location and a wide range of available services and opportunities for development, the city attracts new residents, which is related to the phenomenon of urban development, including satellite municipalities. The existing rural communities and small towns will be transformed in the sense of resignation from agricultural production for housing development.

Other indicated cities act as sub regional and regional centers. Some of them take advantage of their position near the border with Germany as well as lower salary in Poland (in euro), and are focused on acquiring investments in the form of modern industrial plants to areas of special economic zones or improved properties for investment. Improving quality of communication network, in particular road infrastructure, also affects the availability of these cities. Nevertheless, along with the economic changes gradual depletion of the population in the border areas takes place. It results from a change in the structure of the national economy and the division of the Odra River Valley between Poland and Germany, whereby

towns situated on the river lost their role as the leading centers for both banks. Despite the Polish accession to Schengen Area, the process of "re-bonding" will last several decades. The settlement structure, inherited after a long period of German rule in the area, plays an important role in the functioning of these centers. Villages and smaller towns are concentrated at the sub-regional and regional centers, which limits the processes of urban sprawl.

7.1.3.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

Town planning structure of the area of Kłodzko and the location of relevant material goods is tightly connected with the landscape. The building developments are spread mainly along roads in river Valleys, running parallel to these watercourses. The dominant function of land use in the area is agricultural. Basic services are provided in the municipalities, where the city of Kłodzko is the regional center. The city, with the county office, has administrative and service function, and is a place of concentration of capital within a special economic zone. Other municipalities within the Kłodzkie county have practically no industrial sites, apart from those associated with the mining sector (mineral aggregates). Tangible properties of a very high value to the area of Kłodzko are clustered together complexes of spa resorts, which are often the basis for the local economy development. Local climate, access to sources of healing waters, developed tourism, a wide range of activities and typically spa-like cultural landscape make this area very attractive.

Agriculture has an important role in the economy of the region because of the fertile soil, i.e. brown earth. Over 65% of the acreage of agricultural land is used for arable purposes. There are also swamps along the river, which, due to their fertility make it an attractive place for farming.

7.1.3.4 COMPONENT 3: THE UPPER VISTULA RIVER

Subcomponent 3A – Flood Protection of Cracow and Wieliczka. The project will be implemented in the area of Greater Cracow, which determines the character of tangible properties located in the area of impact. In the area of Cracow, Wieliczka municipality has a total 812,726 inhabitants. Therefore, there is a large number of educational institutions (48 nurseries, 380 kindergartens, 490 schools, 84 secondary schools and 13 universities), and health care facilities (587) and hospitals.

Cracow and Wieliczka are the cities of Cracow Industrial District. Of the 131 068 registered businesses 10 165 of entrepreneurs declare industrial activity. The dominant industries are steel, electrical machinery and chemical (including pharmaceuticals and sodium) industries. Agricultural activity is of lesser importance. The structure of firms by employment size shows the dominance of micro-enterprises, i.e. the smallest firms employing not more than 9 people.

There are also 14 wastewater treatment plants and a municipal waste incinerator is currently being built on the subject area.

A well-developed network of roads and technical infrastructure (high-voltage networks, water and sewage networks, pipelines, and heat pipelines) operates in this area. Drinking water and water for industrial needs is drawn from surface water (Rivers: Sanka and Rudawa) and the groundwater reservoirs.

Subcomponent 3B - Protection of Sandomierz and Tarnobrzeg. The area covered by the project is diversified in terms of urbanization and tangible properties. Two cities stand out here: Sandomierz and Tarnobrzeg, which are the home to a total of 73,289 people. The cities have a fairly well-developed network of kindergartens and schools, health care facilities and hospitals. They have a good road and technical infrastructure. There are approximately 8.5 thousand entrepreneurs. Highly developed chemical industry (Tarnobrzeg), sulfur mining (Tarnobrzeg), glassworks (Sandomierz) are among the main industries. The remainder of the area, inhabited by a total of approx. 75,000 people, is purely agricultural in nature. Agricultural production focuses on horticulture (mainly apples and cherries) and gardening. Social and technical infrastructure is less developed, with the exception of the road infrastructure. The main industries in the region are industrial processing of fruit and vegetables.

Water for industrial purposes is mainly drawn from surface waters. In other cases ground waters dominate.

Subcomponent 3C: - Raba Sub-basin Passive and Active Protection. The municipalities where the Subcomponent will be implemented is inhabited by 89 353 people. Myślenice is a well-developed electrical and clothing industry center as the city is included in the Cracow Industrial District. The analyzed area has a large number of educational institutions: 1 nursery, 58 kindergartens and 69 schools. It also has a well-developed medical infrastructure, including 56 clinics.

There are 16 072 enterprises, including 1007 industrial and 208 agricultural businesses, operating in the municipalities where the project will be implemented. The structure of firms by employment size class shows the dominance of micro-enterprises, i.e. the smallest firms employing not more than 9 people.

The road network in the area is well developed; there are three national roads (transit), where the road No. 7 is part of the E77 international road. The remaining technical infrastructure is at a low level. Approximately 60% of the population uses water from waterworks. Water is drawn from seepage spring areas (less frequently surface water) and the groundwater reservoirs, mostly illegally. The drainage system is best developed in Myślenice (approx. 50% of the population). The level of sewer systems in the remaining areas ranges from 20 to 3%. Similarly, gas-heating infrastructure is at a low level. Electrotechnical infrastructure is relatively well developed.

Subcomponent 3D - San, Wisłoka and Dunajec Sub-basins Passive and Active Protection. Area of implementation of this Component is diverse. Undeveloped sections of the Valley of San River interweave with bigger or smaller villages and large cities such as

Przemyśl, Sanok, Lesko, Jarosław, while due to specificity of mountain regions the catchment area of San River is in the first place covered with forests and farmlands, and housing estates (including those within large cities) take 2.49% of the area. Communication takes 0.56%, industrial areas 0.3% and farmlands almost 50% of San River's catchment area. The program will cover selected areas within San catchment exposed to the threat of flooding. On threatened areas 7431 housing buildings were identified, 9362 outbuildings, 961 public buildings and 178 industrial facilities. Flood risk area covers 516.473 km² of urbanized land (housing, industrial buildings and communication) and 1.965 km² of rural areas.

7.1.4 CONSERVATION AREAS

7.1.4.1 POLAND

As a result of the high diversity of landscapes and ecosystems in Poland there is a wide network of nature conservation areas, which consists of eight national forms of protection and one Europe-wide form (Natura 2000 sites). In the past it often impeded the transformation of nature by man. The ultimate form of protection is national parks, then there are nature reserves and Natura 2000 sites. In the first two cases, human activity within the areas is strictly subordinated to the protection of nature. In case of Natura 2000 such activity is possible under existing rules, provided that it is not possible to execute projects which might have negative impact on the objects of conservation in the area, which are particular species and natural habitats.

7.1.4.2 COMPONENT 1: LOWER AND MIDDLE ODRA RIVER

Individual tasks included in the component will be implemented within or in the areas immediately adjacent to Odra riverbed. In the middle and lower courses, although some regulation processes were made in the past, the Valley of the river retains a very high level of natural value what is reflected in a variety of nature conservation areas established in the Valley of the river. Nature conservation areas established in the Valley of Odra River are part of both the national nature conservation system (landscape parks, nature reserves, national parks) and the European system of protected areas (Special Protection Areas - SPA, Special Areas of Conservation - SAC). The Valley also plays a very important role as an ecological corridor of European importance.

Table 10. Conservation areas within the borders of project site, the surroundings and vicinity of the tasks implemented under Component 1

Task	Name of the area	Space relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
1A.1 - Chlewice-Porzeccze. Backwater embankment of Odra River at Myśla River	Lower Odra River PLH320037	Area coincides with the area of the development.
	Valley of Lower Odra River PLB320003	Area coincides with the area of the development.
	Estuary of Warta River Landscape Park	Area coincides with the area of the development.
	Estuary of Warta River PLC080001 (SPA, SAC)	Area located in the surrounding of the development within approx. 5 km
	Estuary of Warta River National Park	Area located in the surrounding of the development within approx. 5 km
1A.2 - Flood protection of Ognica Village	Lower Odra River PLH320037	Area located in the surrounding of the development within approx. 5 km
	Valley of Lower Odra River PLB320003	Area located in the surrounding of the development within approx. 5 km distance.
1A.3 - Osinów-Łubnica. Modernization of Inter-embankment	Lower Odra River PLH320037	Area coincides with the area of the development.
	Valley of Lower Odra River PLB320003	Area coincides with the area of the development.
1A.4 - Flood protection of Radziszewo and Daleszewo Villages	Lower Odra River PLH320037	Area coincides with the area of the development.
	Valley of Lower Odra River PLB320003	Area coincides with the area of the development.
	Bukowe Hills PLH320020	Area located in the surrounding of the development within approx. 2 km distance.
	Wełyńskie Lake PLB320018	Area located in the surrounding of the development within approx. 4.5 km distance.
	Wełyńska Refuge PLH320069	Area located in the surrounding of the development within approx. 1.7 km distance.
	Bukowe Hills PLH320020	Area located in the surrounding of the development within approx. 1.8 km distance.
	Valley of Tywa River PLH320050	The area is located in the vicinity of the development within approx. 2.2 km distance.

Task	Name of the area	Space relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
1A.5 - Modernization of the Marwicki Polder	Lower Odra River PLH320037	Area coincides with the area of the development.
	Valley of Lower Odra River PLB320003	Area spatially coincides with the area of the development.
	Bukowe Hills PLH320020	Area located in the surrounding of the development within approx. 2 km distance.
	Wełtyńskie Lake PLB320018	Area located in the surrounding of the development within approx. 4.5 km distance.
	Wełtyńska Refuge PLH320069	Area located in the surrounding of the development within approx. 1.7 km distance.
	Bukowe Hills PLH320020	Area located in the vicinity of the development within approx. 1.8 km distance.
	Valley of Tywa River PLH320050	Area located in the surrounding of the development within approx. 2.2 km distance.
1A.6 - Restoring natural values of Lower Odra River Valley by improving retention and flood protection capacities of Międzyzdrze area	Lower Odra River PLH320037	Area coincides with the area of the development.
	Valley of Lower Odra River PLB320003	Area coincides with the area of the development.
	Bukowe Hills PLH320020	Area located in the surrounding of the development within approx. 2 km distance.
	Wełtyńskie Lake PLB320018	Area located in the surrounding of the development within approx. 4.5 km distance.
	Wełtyńska Refuge PLH320069	Area located in the surrounding of the development within approx. 1.7 km distance.
	Bukowe Hills PLH320020	Area located in the surrounding of the development within approx. 1.8 km distance.
	Valley of Tywa River PLH320050	Area located in the surrounding of the development within approx. 2.2 km distance.
1B.1 - Repair and modernization of regulatory infrastructure on the free-flowing Odra - reconstruction and modernization of regulatory infrastructure - in order to adapt section of Odra from Malczyce to the	Kargowskie Bends of Odra River PLH080012	Area coincides with the area of the development.
	Middle Odra River Valley PLB080004	Area coincides with the area of the development.
	Gryżyny Tunnel Valley PLH080067	Area located in the surrounding of the development within approx. 2.6 km distance.

Task	Name of the area	Space relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
estuary of Nysa Łużycka to class III waterway	Gryżyński Landscape Park	Area located in the surrounding of the development within approx. 2.6 km distance.
1B.2 - Modernization Works on Boundary Sections of Odra River	Middle Odra River Valley PLB080004	Area coincides with the area of the development.
	Krzysiński Landscape Park	Area coincides with the area of the development.
	Pliszki River Valley PLH080011	Area coincides with the area of the development.
	Estuary of Ilanka River PLH080015	Area coincides with the area of the development.
	Lower Odra River PLH320037	Area coincides with the area of the development.
	Lower Odra River Valley PLB320003	Area coincides with the area of the development.
	Estuary of Warta River Landscape Park	Area coincides with the area of the development.
	Estuary of Warta River PLC080001 (SPA, SAC)	Area coincides with the area of the development.
	Estuary of Warta River National Park	Area coincides with the area of the development.
	Krzymowskie Hills PLH320054	Area located in the surrounding of the development within approx. 3 km distance.
1B.3 – Construction of Docking-mooring Infrastructure	as above	as above
1B.4 - Improvement of Flood Water-flow from Dąbie Lake in Winter	Lower Odra River PLH320037	Area coincides with the area of the development.
	Estuary of Odra River and Szczeciński Lagoon PLH320018	Area coincides with the area of the development.
	Wilderness in Stępnickie Forest PLH330032	Area located in the vicinity of the development within approx. 2 km distance.
1B.5 - Dredging of Klucz-Ustowo Ditch	Lower Odra River PLH320037	Area coincides with the area of the development.
	Bukowe Hills PLH320020	Area located in the surrounding of the development within approx. 3 km distance.

Task	Name of the area	Space relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
1B.6 - Reconstruction of Bridges to Ensure a Minimum Clearance	Chrobotkowe Conifer Forests near Brzózka PLH080031	Area located in the vicinity of the development within approx. 4 km distance.
	Estuary of Warta River PLC080001 (SPA, SAC)	Area coincides with the area of the development.
	Estuary of Warta River National Park	Area coincides with the area of the development.
	Lower Odra River PLH320037	Area coincides with the area of the development. However some elements of the project are also located in the surrounding of the protected area within approx. 4 km distance from its borders.
1B.7 – Flood protection of Nowa Sól and below Krosno Odrzańskie	Middle Odra River Valley PLB080004	Area coincides with the area of the development.
	Nowosolska Odra River Valley PLH080014	Area coincides with the area of the development.
1C.1 - Extension and construction of flood embankments (Flood protection of Słubice City)	Słubickie Riparian Forests PLH080013	Area coincides with the area of the investment.
1C.2 – Reconstruction of Czarny Kanał and Racza Struga (Flood protection of Słubice City)	Słubickie Riparian Forests PLH080013	Area located in the vicinity of the development within approx. 3.4 km distance.

In reference to 12 nature conservation areas possibility of occurrence of adverse impacts associated with implementation of particular projects was confirmed. They will in the first place result from planned flood protection projects such as: construction and modernization of flood banks, regulatory and maintenance works within riverbeds and terrace areas, recreation of structures associated with navigation (groins). Impacts that may occur were analyzed in detail in chapter 7.2. and annex 1 of this document. For the majority of areas predicted adverse impacts will be of little range and intensity. During further works associated with implementation of particular tasks attention should be paid to Natura 2000 sites: Lower Odra River Valley PLB320003, Middle Odra River Valley PLB080004, Lower Odra River PLH320037 covering large areas of valuable natural habitats and habitats of species associated with Valley of Odra River.

7.1.4.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

Activities in the area of active and passive flood protection implemented under Component 2 will be performed in the upland and mountainous part of the catchment area which is characterized by high natural qualities. The central part of the region of proposed work is crossed by the Valley of Nysa Kłodzka River, on the east surrounded by upland and mountainous areas from which flow down the tributaries supplying Nysa Kłodzka River.

The upper part of Nysa Kłodzka River catchment area is highly covered with a network of nature conservation areas which include both, areas designated at the national level (national parks, nature reserves, landscape parks) and areas which are part of protected areas at the European level - Special Protection Areas (SPAs), Special Areas of Conservation (SACs). Nature conservation areas in this region are clustered in the mountain areas (Stołowe Mountains, Bystrzyckie Mountains, Śnieżnik Massif) due to the highest natural qualities preserved in these areas (mainly as a result of low anthropic pressure and relatively low degree of transformation of the environment).

Within the area covered directly by the tasks under Component 2, potentially significant conflict occurs with the Biała Łądecka Natura 2000 site (PLH020035) which includes a significant section of the Biała Łądecka riverbed.

Table 11. Nature conservation areas within the project site, the surroundings and vicinity of the tasks implemented under Component 2

Task	Name of the area	Space relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
2A.1 - Construction of "Boboszków" - a dry flood control reservoir on Nysa Kłodzka River	Bialskie Mountains and Śnieżnik Massif PLH020016	Area located in the vicinity of the development, the nearest place, approx. 2 km from the boundary of the site.
	Śnieżnicki Landscape Park	Area located in the vicinity of the development, the nearest place, approx. 2 km from the boundary of the site.
2A.2 - Construction of "Roztoki Bystrzyckie" - a dry flood water control reservoir on Goworówka stream	Bialskie Mountains and Śnieżnik Massif PLH020016	Area located in the vicinity of the development, the nearest place, approx. 2.6 km from the boundary of the site.
	Śnieżnicki Landscape Park	Area located in the vicinity of the development, the nearest place, approx. 2.6 km from the boundary of the site.
2A.3 - Construction of "Szalejów Górny" - a dry flood water control reservoir on Bystrzyca Dusznicka River	Piekielna Valley near Polanica PLH020010	Area located in the vicinity of the development, the nearest place, approx. 3 km from the boundary of the site.
	Stołowe Mountains PLB020006	Area located in the vicinity of the development, the nearest place, approx. 2.2 km from the boundary of the site.
	Stołowe Mountains PLH020004	Area located in the vicinity of the development, the nearest place, approx. 2.2 km from the boundary of the site.

Task	Name of the area	Space relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
2A.4 - Construction of "Krosnowice" - a dry flood water control reservoir on Duna stream	Krowiarki Mountain Range PLH020019	Area located in the vicinity of the development, the nearest place, approx. 1.4 km from the boundary of the site.
2B.1 - Flood protection of Nysa Kłodzka River Valley	Krowiarki Mountain Range PLH020019	Area located in the vicinity of the development, the nearest place, approx. 40 m from the boundary of the site.
	Valley of Bystrzyca Łomnicka River PLH020083	Area located in the vicinity of the development, the nearest place, approx. 4 km from the boundary of the site.
2B.2 - Flood protection of Ścinawka River Valley	Gorge of Nysa Kłodzka River near Morzyszowo PLH020043	Area located in the vicinity of the development, the nearest place, approx. 4 km from the boundary of the site.
	Stołowe Mountains PLB020006	Area located in the vicinity of the development, the nearest place, approx. 2.7 km from the boundary of the site.
2B.3 - Flood protection of Biała Łądecka River Valley and Morawka River	Biała Łądecka River PLH020035	Area coincides with the area of the development.
	Białskie Mountains and Śnieżnik Massif PLH020016	Area coincides with the area of the development.
	Złote Mountains PLH020096	Area located in the vicinity of the development, the nearest place, approx. 50 m from the boundary of the site.
	Śnieżnicki Landscape Park	Area coincides with the area of the development (section of work km 34+500 to 35+012 is located within the area, also the Morawa River is located within the area).
2B.4 - Flood protection of Bystrzyca Dusznicka River Valley and Kamienny Potok River	Stołowe Mountains PLB020006	Area coincides with the area of the development.
	Stołowe Mountains PLH020004	Area located in the vicinity of the development, the nearest place, approx. 2.7 km from the boundary of the site.
	Piekielna Valley near Polanica PLH020010	Area coincides with the area of the development.

With regard to five nature conservation areas, possibility of occurrence of adverse impacts associated with implementation of particular tasks was confirmed. They will in the first place result from planned flood protection projects such as: construction and modernization of flood embankments, regulatory and maintenance works within riverbeds and terrace areas, construction of flood water reservoirs. Impacts that may occur on nature conservation areas were analyzed in detail in chapter 10 and annex 1-3 to this document. For the majority of areas expected adverse impacts will be of little range and intensity. Particular attention should be paid to Natura 2000 site Biała Łądecka PLH020035, where the objects of

protection are valuable natural habitats and animal species directly associated with the riverbed.

7.1.4.4 COMPONENT 3: UPPER VISTULA RIVER

The Upper Vistula River water region is an area of extraordinary natural values, which is confirmed by a significant number of forms of nature protection. Due to the specific nature of the project special attention should be paid to those which are spatially or functionally related to river Valleys. The largest protected Valley area is represented by those important to the Community – e.g. Tarnobrzaska Vistula River Valley PLH180049, Valley of Lower San River PLH180020, Raba River with Mszanka River PLH120093, Tarnawka River PLH120089, - established for the protection of habitats that are characteristic for the Valleys: riparian communities (forests and scrubland), meadows, oxbow lakes, herb fringe, pioneer, as well as xerothermic vegetation or compilation of both. These precious pieces of watercourse beds - sometimes unregulated or poorly transformed - are also a place of rare species of plants and animals occurrence, including representatives of the avifauna, herpetofauna, ichthyofauna and lepidopterofauna and serve as nature passages. Protection of valuable habitats - though generally on a smaller area - is also fulfilled through setting of the nature reserves. One of them is "Vistula River near Zawichost" established for the preservation of the breeding refuges, feeding and resting places during migration of rare and typical for the Valley of Vistula River birds, especially *Charadriiformes*. A different role in the protection of ecosystems of the river Valleys is assigned to landscape parks (e.g. Bielańsko-Tyniecki Landscape Park), which generally protect not only natural but also landscape, historical and cultural qualities of the area. Particular protection is applied to the Valley of San River – the majority of its length is included in Natura 2000 sites. Apart from the Lower San River Valley PLH180020 natural habitats and species associated with the river – in particular valuable fish species – are protected by San River PLH180007 and Upper San River Basin PLH180021, and above Solińskie Lake in Bieszczady Mountains PLC180001. The list of sites designated for the protection of natural or slightly modified sections of San River is supplemented by among others, natural reserves: Krywe, Przełom Sanu near Grodzisk or a Natura 2000 site Sanisko in Bykowce PLH180045.

Also in the catchment area of Dunajec River many sections of River Valley are subject to nature conservation. Natura 2000 sites somewhat dedicated to these ecosystems (or their species) include: Górny Dunajec River PLH120086, Środkowy Dunajec River with tributaries PLH120088, Dolny Dunajec River PLH120085, Biała Tarnowska River PLH120090, Łososina PLH120087, Dolina Białki PLH120024 (particularly significant due to protection of gravel-bank fish and habitats). Due to natural, cultural and landscape qualities of, among others, picturesque Valleys of Dunajec, Popad rivers and maintained natural Valley of Muszynka River, Popradzi Landscape Park was established. Among many natural reserves established in the catchment area of Dunajec River, special attention should be paid to, e.g. „Biała Woda” or „Przełom Białki pod Krempachami”. Natural habitats and species associated with Wisłoka River and its tributaries are protected within Natura 2000 network, from Źródlika Wisłoki PLH120057, through Ostoja Magurska PLH180001, Wisłoka with tributaries PLH180052, to end with Dolna Wisłoka River with tributaries PLH180053. In order to protect

fresh and wet Meadow over Młynówka stream habitat area Łąki nad Młynówką PLH180041 was designated. Landscape parks do not occupy too much space in the catchment area of the Wisłoka River, and among natural reserves, forest reserve „Przełom Jasiołki” and landscape reserve „Źródlika Jasiołki” were designated, in order to protect watercourses and associated natural resources

Table 12. Nature conservation areas within the project site, the surroundings and vicinity of the tasks implemented under Component 3 (only for clearly defined tasks within Subcomponents 3A, 3B).

Task	Name of the area	Spatial relation (coincides with, in the vicinity < 500 m, in the surroundings < 5 km)
Subcomponent 3A – Flood Protection of Cracow and Wieliczka		
1. Upgrading Embankments		
3A.1 Finishing reconstruction of flood embankments of the Vistula river in Cracow: -Section1 – left-hand side embankment of the Vistula river from Wanda bridge to Przewoz barrage together with backwater embankments of the Dłubnia river	Łąki Nowohuckie PLH120069	in the surroundings, at a distance of approx. 1,0 km
-Section 2 – left-hand side embankment of the Vistula river from Przewóz barrage to Suchy Jar	rez. Bonarka	in the surroundings, at a distance of approx. 3,3 km
3A.2 Finishing reconstruction of flood embankments of the Vistula river in Cracow: -Section 3 – right-hand side embankment of the Vistula River from Dąbie barrage to Przewóz barrage	Bielańsko-Tyniecki Park Krajobrazowy	in the surroundings, at a distance of approx. 4,5 km
2. Flood Protection in Serafa Valley		
3A.3 „Increase flood protection in Serafa Valley in the city of Cracow and in the city of Wieliczka: Stage II Serafa 2 retention reservoir, dam at chainage 9+223 km, Stage III Malinówka 1 retention	rez. Groty Kryształowe	in the surroundings, at a distance of approx. 2,9 km
	rez. Bonarka	in the surroundings, at a distance of approx. 4,2 km

reservoir, dam at chainage 0+220 km, Stage IV Malinówka 2 retention reservoir, dam at chainage 2+320 km, Stage V Malinówka 3 retention reservoir, dam at chainage 3+017 km”		
Subcomponent 3B – Protection of Sandomierz and Tarnobrzeg		
1. Protection for Sandomierz		
3B.1 Flood protection within estuary section of the Atramentowka river, construction of new pump station “Kocmierzów” and gravitation luice on Koćmierzo (on the right-hand side embankment of the Vistula River) and draining channel carrying water from Atramentówka to the pump station	Tarnobrzaska Dolina Wisły PLH180049 Góry Pieprzowe PLH260022 rez. Góry Pieprzowe	coincides
	Góry Pieprzowe PLH260022	in the surroundings, at a distance of approx. 3,7 km
	rez. Góry Pieprzowe	in the surroundings, at a distance of approx. 4,0 km
3B.2 Flood protection within Struga A watercourse together with recosntruction and expansion of “Nadbrzezie” pump station	Tarnobrzaska Dolina Wisły PLH180049	adjacent to, approx. 350 m
	Góry Pieprzowe PLH260022	in the surroundings, at a distance of approx. 1,4 km
	rez. Góry Pieprzowe	in the surroundings, at a distance of approx. 1,4 km
	Dolina Dolnego Sanu PLH180020	in the surroundings, at a distance of approx 3,0 km
3B.3 Expansion of the embankment protecting from flood Huta Szkła and housing estate in the city of Sandomierz	Tarnobrzaska Dolina Wisły PLH180049	coincide
	Góry Pieprzowe PLH260022	in the surroundings, at a distance of approx. 2,2 km
	rez. Góry Pieprzowe	in the surroundings, at a distance of approx. 2,6 km
3B.4 Securing embankments of the Koprzywianka river - left-hand side embankment on km 0+000 – 12+900, right-hand side embankment on km 0+000 – 14+400	Tarnobrzaska Dolina Wisły PLH180049	adjacent to, approx 50 m
	Góry Pieprzowe PLH260022	in the surroundings, at a distance of approx. 2,8 km
	rez. Góry Pieprzowe	in the surroundings, at a distance of approx. 4,0 km

3B.5 Construction of water pump station in the city of Szewce	Tarnobrzaska Dolina Wisły PLH180049	in the surroundings, at a distance of approx. 3,3 km
3B.6 Expansion of water pump station in the city of Zajeziórze	Tarnobrzaska Dolina Wisły PLH180049	in the surroundings, at a distance of approx. 3,3 km
2. Protection for Tarnobrzeg		
3B.7 Vistula Stage 2 – expansion of the right-hand side embankment of the Vistula river on 13,959 km section, right-hand side embankment of the San river on 2,193 km section, and left-hand side embankment of the Łęg river on 0,112 km section on the territory of Gorzyce and Radomyśl on the San river, podkarpackie Voivodeship	rez. Wisła pod Zawichostem	coincide
	rez. Pniów	in the surroundings, at a distance of approx 1,1 km
	rez. Góry Pieprzowe	in the surroundings, at a distance of approx 600 m
	Tarnobrzaska Dolina Wisły PLH180049	coincide
	Góry Pieprzowe PLH260022	adjacent to, approx 450 m
	Dolina Dolnego Sanu PLH180020	coincide
	Uroczyska Lasów Janowskich PLH060031	in the surroundings, at a distance of approx 1,8 km
	Przełom Wisły w Małopolsce PLH060045	in the surroundings, at a distance of approx 1,3 km
	Lasy Janowskie PLB060005	in the surroundings, at a distance of approx 1,4 km

Within Subcomponents 3A, 3B at a distance of 5 km from proposed development are: 6 natural reserves, 1 landscape park and 7 Natura 2000 areas. This refers only to areas designated for protection of natural habitats and habitats of species associated with river Valleys: Tarnobrzaska Vistula River Valley PLH180049, , Lower San River Valley PLH180020 and Vistula River pod Zawichostem reserve. Scope and scale of potential impacts are dependent on adopted solutions and minimizing and compensatory measures. Subcomponents 3C and 3D need further clarification to allow analysis of their potential impacts on conservation areas.

7.1.5 FLORA AND FAUNA

7.1.5.1 POLAND

On the territory of Poland, in comparison to other countries of Central Europe, there is a high degree of biodiversity and fairly well preserved structure of habitats. For the most part it is due to the high diversity of ecosystems beginning with the mountains in the south of the country, through broad river Valleys (of Vistula and Odra rivers) to Pomerania and the Baltic Sea. Throughout the whole country there have been very well-preserved fragments of natural systems, including fragments of lowland forests with natural features located in the Białowieża Primeval Forest National Park. In the south biodiversity is mostly represented by the areas of the mountain ranges of the Sudety and the Carpathian Mountains (*Karpaty*), in the central part by a vast river Valleys, and in the northern parts the natural conditions are primarily determined by the proximity of the Baltic Sea.

One of the distinguishing features of Poland are well preserved river Valleys with a distinctive system of plant accumulation, changing along with the distance from the riverbed and diverse impacts of water flooding. These ecosystems are subject to regionally various, but fairly low anthropic pressure. They belong to area of particular responsibility of Poland in the context of conservation of European natural heritage.

7.1.5.2 COMPONENT 1: LOWER AND MIDDLE ODRA RIVER

Tasks planned under Component 1 are located within the middle and lower part of the Valley of Odra River. In this area the river flows in a wide Valley and in a number of sections it is characterized by well-preserved natural habitats system and related to them species. The riverbed, although some regulation was done in the past, is the refuge of many rare species of fish and also plays an important role as a migration passage for diadromous fish. The first flood terrace is covered with riparian forests and alluvial meadows. An important element of this part of the Valley is oxbow lakes characterized by specific communities of flora and fauna, some of which are the result of natural process. The others are the effect of the old regulation work. In the areas which are subject to occasional floods hornbeam forests have evolved. Currently the tens of meters high slopes on the edges of the Valley are covered in many places with rare communities of thermophilic vegetation.

7.1.5.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

Tasks under this component will be implemented in areas of moderate and high nature qualities. Watercourses within which the passive and active flood protection will be implemented are characterized by fairly well (although highly diverse in each section) preserved structure of habitats related to the riverbed. Riverbeds of courses such as Nysa Kłodzka, Biała Łądecka, Bystrzyca Dusznicka in which the substrate is dominated by rocks and gravel, carry well-oxygenated water of a high flow rate. That is why they are places of occurrence of species such as *Salmo trutta fario*, *Cottus gobio*, *Cottus poecilopus*, *Thymallus thymallus*. Most species in the area under Component 2 belong to the typical fauna representing the foothills and lower mountain zone (e.g. bird species: *Motacilla cinerea*, *Cinclus cinclus* related to the swiftly flowing water rich in various species of aquatic invertebrates). Within the Kłodzko Valley most watercourses are inhabited by the otter, presence of which is conditioned by the right ichthyofauna and batrachofauna and the presence of sections of rivers with natural boundary slopes.

The boundary slopes, in areas where mountain watercourses do not flow through developed areas are covered by riparian forest communities (willow riparian woodland and alder-ash type) and in some parts by herb fringe communities. The flood plains of rivers are dominated by grassland, mainly fresh meadows, smaller areas by alluvial meadows. Valuable forest communities are clustered in the higher parts of the mountain ranges, where generally work will not be performed. Valuable plant species are associated with natural or semi-natural vegetation enclaves under extensive agricultural use. Areas fulfill such function in many places in immediate vicinity to the rivers. The most valuable flora in the area, covered by the planned work is the Valley of the Biała Łądecka River. Along several kilometers of the river there are located communities of *Batrachium penicillatum*, species occurring only at two sites in Poland.

7.1.5.4 COMPONENT 3: THE UPPER VISTULA RIVER

The Upper Vistula River water region is an area of highly diverse morphology. This area includes mountain, sub-mountain, highland and lowland land-forms. This great diversity of abiotic factors is reflected in the diversity of the animated nature: natural habitats, flora and fauna. Numerous rare and protected habitats are related to the river Valleys of the region (including the ones being subject to Community's interest). Some of them occurred due to proximity of the watercourse and impacts associated to it. Riparian communities belong to this category: riverside riparian willow and poplar with accompanying riverside wicker, lowland, foothill and mountain riparian alder forests, ash-alder forests and elm-ash forests, moors as well as wet meadows and of variable moisture content (including alluvial meadows related to the Valleys of the great rivers), wet and fresh meadows, riverside herb fringe communities, "veil" shrubs communities and also the communities of therophytes on the muddy banks of rivers. The second group consists of Valleys associated habitats. However

they are not directly related to the presence of Valleys and environmental conditions related to that. Within this group can be mentioned, e.g.: calcareous grasslands, thermophilic thickets and subcontinental hornbeam, located on the edges of Valleys and highlands. With such variety of habitats this area is a place of occurrence of many valuable species of plants and animals. In the case of fauna, special attention deserve representatives of birds and fish, for which the river Valleys and streams - especially those not significantly modified by man - are not only natural habitat of living, but also the migration passages. In this region such passage (particularly important for the continuity of river morphology for *Acipenser sturio* or *Salmo salar*) is the Vistula River (from the estuary of Skawinka downstream) together with San and Dunajec rivers, and for the salmon – Vistula River (from the estuary of Skawinka River to the estuary of Soła) together with San, Wisłok, Wisłoka, Raba, Soła and Skawa rivers.

7.1.6 SOIL

7.1.6.1 POLAND

Thick layers of fertile river alluvial deposits are present in the Valleys of Odra and Vistula rivers. On those, the fluvial muds (alluvial soils) have developed. Due to the granulometric composition the alluvial soils contain: light sandy soils, medium sand-clay soils and heavy clay soils. In majority these are the clay-silt formations containing high level of fine fractions, with strong clayey sands interbed. The share of each fraction varies, depending on the shape of the Valley, height above river level, distance from the riverbed, etc., and also on the degree of hydrotechnical constructions. Development of the fluvial muds at areas of the low terraces was related to deforestation of the catchment area and increased supply of fine fractions to riverbeds. Rivers containing high level of these structures show tendency to meander and lateral migration of the riverbed. Seasonal flooding lead to constant increase of the soils levels. Inhibition of flood water flow leads to a sudden change of soil moisture conditions and degradation. Fluvial muds are characterized by high productivity and are included in II and III valuation class. Peat soils and loamy soils can be found in the tunnel Valleys of oxbow lakes and depressions in which the groundwater table is near the surface and where plants preferring very moist soils occur. The higher floodplain terraces are dominated by podsols and pseudo-podsols. They got developed at least rich, sandy or loose poorly clayey grounds. In terms of valuation classes they are in V and VI class. These soils have no significant meaning for agriculture and are mainly covered by forests. Brown soils are characterized by high value that is why they are included in II, III and IV Class of valuation.

7.1.6.2 COMPONENT 1: LOWER AND MIDDLE ODRA RIVER

The area of the Odra river basin is adjacent to: in the east - the Vistula river basin, in the south - the Danube river basin, in the west - the Łaba river basin. Its area can be divided into three major parts:

- Upper Odra river (from spring to Wrocław)
- Middle Odra river (from Wrocław to the estuary of Warta River)
- Lower Odra river (from the estuary of the Warta River to Szczeciński Lagoon).

Soil conditions are varied due to the variability of the geological structure and topography of the area. In the area of river valleys there are mainly alluvial soils, fluvial muds (of light, medium and heavy type), peat soils and podsols. It is worth noting that there is a large area of marsh soils and black earth (near Starogard Szczeciński, Pyrzyce). The basin area is dominated by glacial soils, primarily podsols and brown soil. The least fertile soils include the one developed on sandy dunes or outwash sands: podsols and pseudo-podsols.

7.1.6.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

The soils occurring in the Kłodzko Valley are conditioned by geology of the terrain. In the area of river valleys alluvial soils have developed. In valleys of Nysa Kłodzka and its tributaries there are medium and heavy alluvial soils, stony fluvial muds, silt and peat soils. In the zone of upper Pleistocene terrace and glacial tills areas podsols, gleysols and brown soils have developed. In the zone of steep slopes on the rock rubble (waste of rock) there have developed shallow deluvial soil levels classified as mountain soils: leached brown soils, brown acidic soils, podsols. Higher parts of the hills include initial soils and poorly developed types (rocky and quartz-flint). Over a large area there are also loess and loess-like formations. In the build-in area the soils got degraded.

7.1.6.4 COMPONENT 3: THE UPPER VISTULA RIVER

Area of Component 3 includes river Valleys, where the dominant fluvial mud soils developed on river alluvial sediments. The ground contains different types of formations: from sands, loamy sands, through dust and clay to the medium and heavy clays. In the upper parts of the Valleys of tributaries e.g. Raba, Wisłoka, Dunajec, San rivers and outside the Valleys, there occur brown soil and in some places even black earth, gray soil and loess formations.

The wide Valleys of Vistula and San rivers are mostly covered by grassland of different quality and arable land classified as mostly wheat and rye complexes. The large part of Raba, Wisłoka, Dunajec and San catchments are used for forestry.

The types of soil in the catchment area is important in modeling of flood events. Permeability of the soil determines i.e. retention properties of the site and catchment response time during rainfall. These data are used to estimate flood risk ratio, especially in mountainous catchments where the steepness of the slopes of the Valley increases the rapid inflow of water from areas of low permeability of soil (especially agricultural) into the riverbed.

7.1.7 AIR QUALITY

7.1.7.1 POLAND

Factors affecting the air quality in Poland are industry, transport, agriculture and municipal sources of pollution (e.g. individual heating of houses). The largest share in emissions of sulfur dioxide (SO₂) in Poland has the energy sector (52.1%), which also generates 33.1% of the annual emissions of nitrogen oxides (NO_x) and 7.6% of PM10 (particles). Transportation is mainly responsible for emission of NO_x (31.6%) it also emits 9.1% of PM10. Residential and commercial sector emits the most of particles into the atmosphere (46.2% of the annual emissions) and its share in annual emission of NO_x equals 9.5%. Industry is responsible for the 19.2% of emission of SO₂, 11.9% of NO_x and 5.9% of PM10 emission.

Air quality in Poland varies, depending on the proximity to industrial and power plant centers, type and concentration of industry, the size of the transport in the area and density of the road network, as well as the concentration of the population.

The air quality assessment in Poland is conducted by the Province Inspectorates for Environmental Protection (VIEP) as part of the annual assessments of air quality in assigned zones throughout the whole country. For the purposes of air quality assessment Poland was divided into 46 zones (in accordance with Art. 87 item 2 of Environmental Law). Monitoring is carried out by stationary or mobile measuring stations using mathematical models of the pollution spreading and objective methods of estimation. It measures the following compounds: SO₂, NO_x, PM10, lead (Pb), ozone (O₃), benzene (C₆H₆), carbon monoxide (CO), arsenic (As), cadmium (Cd), nickel (Ni) and benzo[a]pyrene. These air pollutants are emitted into the atmosphere mainly in the combustion process.

7.1.7.2 COMPONENT 1: LOWER AND MIDDLE ODRA RIVER

The area covered by the tasks under Component 1 is located within the 3 zones designated for assessment of air quality in Poland: lubuska zone, zachodniopomorska zone and Agglomeration of Szczecin. According to the characteristics of the main sources of air emissions, affecting the concentration of compounds covered by VIEP annual assessment of air quality, atmospheric pollutants are emitted:

- in lubuska zone primarily from fuel combustion in individual furnaces and transport,
- in zachodniopomorska zone from surface sources (sources of communal living nature, individual fuel combustion in furnaces), point sources, i.e. large power plants, thermal power plants and industrial facilities (chemical, shipbuilding and wood), as well as transport,
- in Agglomeration of Szczecin from fuel combustion in individual furnaces, large industrial centers and transportation.

The concentrations of most of the compounds being monitored within the zone fully meet the criterion of protection of human health: in lubuska zone (except PM10, As, benzo[a]pyrene) in zachodniopomorska zone (except benzo[a]pyrene) and in Agglomeration of Szczecin (except benzo[a]pyrene).

The sanitary condition of the air along the valley of The Odra river is diverse, as a result of uneven concentration of population, the density of the road network, as well as the location of industrial and energy centers, manufactures (on both the Polish and German side). The main direction of air flow in these areas is west, which favors transport of atmospheric pollutants from behind the western border of the country).

7.1.7.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

Kłodzko Valley is located in Lower Silesian zone designated for the purposes of air quality assessment in Poland. According to the characteristics of the main sources of air emissions, affecting the concentration of compounds covered by VIEP annual assessment of air quality, atmospheric pollutants are emitted by burning fossil for energy purposes and individual heating and transport. The concentrations of most of the compounds being monitored within the zone fully meet the criterion of protection of human health (except PM10, As, benzo[a]pyrene and ozone).

In Kłodzko Valley one automatic station for measurement of concentrations of atmospheric pollutants is located. Monitoring is supplemented by mobile measurements. Air quality within location of each task under Component 2 varies due to uneven concentration of population,

the location of industrial centers and manufactures, as well as the course of the main transport routes. In close vicinity of the development site can be observed exceeded levels of particulates (PM10) and benzo[a]pyrene, which are mainly emitted in the process of heating homes. The morphology of the terrain (a significant land decrease, the surrounding mountain ranges) also cause increase of the concentration of atmospheric pollutants by creating local hollows.

7.1.7.4 COMPONENT 3: THE UPPER VISTULA RIVER

Area of Component 3 includes both dense developed areas – e.g. Cracow and undeveloped areas – e.g. location of some of dry polders in the catchment of Raba and San rivers. Hence, the sanitary condition of the air is different depending on the particular location. The most unfavorable situation is in Cracow, where in regards to so-called low emission during the heating season, along with the location of the town and unfavorable meteorological situation, the norms for particulates concentration are often greatly exceeded.

Such situation also occurs in developed mountain Valleys, where the movement of air masses is difficult. Low emissions during the heating season, along with a temperature inversion phenomenon also causes periodic exceeding of air pollution in these areas.

7.1.8 NOISE

7.1.8.1 POLAND

Environmental standards for the acceptable levels of noise are regulated by the regulation pursuant to the delegation included in Art. 113 par. 1 of the Act of 27 April 2001 - Environmental Law (Journal of Laws of 2013 Pos. 1232 as amended). The law differentiates acceptable intensity levels depending on:

- 1) The type of settlement (housing, buildings associated with youth stay)
- 2) Type of area (health resorts, cities of more than 100 thousand citizens, recreation areas)
- 3) Time of day (day, night).

For the projects potentially or always affecting the environment, consisting in renovation, construction, reconstruction or modernization it is necessary to examine the impact of their implementation on the acoustic environment during the administrative procedure finalized by

obtaining the decision on the environmental conditions. In justified cases, the investigating authority may, after obtaining the opinion of the competent sanitary inspector, order in the decision:

- a. The preparation of a full environmental impact assessment including predicted acoustic environment impact;
- b. The evaluation of environmental impact assessment including predicted acoustic environment impact on the stage of obtaining by the investor a construction permit or equivalent;
- c. The post-completion analysis of the effectiveness of environmental protection equipment

In addition, within the government administration functions the Inspection for Environmental Protection. It controls the implementation of environmental laws and rational use of natural resources. State Environmental Monitoring is carried out as part of this activity along with the subsystem which controls noise emissions and assessment of the acoustic climate.

The tasks of Inspection for Environmental Protection are performed at two levels:

- a) National – by General Inspector for Environmental Protection (GIEP),
- b) Regional – by Provincial Inspectors for Environmental Protection (VIEP).

7.1.8.2 COMPONENT 1: LOWER AND MIDDLE Odra RIVER

Developments carried out under Component 1 are located in the Zachodniopomorskie and Lubuskie Provinces. As indicated by the strategic documents of these regions and their projects, the main negative impact on the acoustic environment is caused by the transport (road and rail types) and the industry. Particularly vulnerable to exceeding of environmental standards in this area are cities and urban areas. This means that the sources of the noise along Odra River coincide with the routes and the location of urban centers. There are port complexes (Szczecin-Świnoujście) located on the discussed watercourse including related infrastructure. The functioning of this strategic (from national economy point of view) transshipment terminal is also associated with higher level of road and rail traffic. What is more, due to attractive location at the crossroads of transport routes, proximity to a large logistics bases it is associated with the operation of industrial facilities which are also the source of the negative acoustic impacts.

Some large industrial centers near Odra River are also located outside of Szczecin (as a metropolitan area). These are:

- Lower Odra Power Plant near Gryfino;

- Mineral Resources Mine near Bielinek;
- Kostrzyn-Słubice Special Economic Zone including subzones in the cities of Kostrzyn, Nowa Sól, Bytom Odrzański and Słubice;
- Steel mill in Eisenhüttenstadt (Germany).

Regarding traffic noise - its sources cross the Odra River in few points - at bridges (road and rail transport). These structures are located mostly in the vicinity of urban centers, which means that the negative acoustic impacts and norms exceeding cumulate in urban areas rather than the entire length of the river.

7.1.8.3 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

In accordance with the strategic documents for the Kłodzko district the main source of noise is the industry and transport. Due to the relatively small area of the district and low degree of industrialization of the region, the number of objects particularly affecting the acoustic is small:

- Timber-sawing Carpentry Export-Import Company in Nowa Bystrzyca;
- Boiler room in residential area of Kłodzko at 1 Dąbrówki Str.;
- Rock Minerals Mine "Świerki" in Świerki;
- The Art Glasswork "Barbara" in Polanica.

Due to the development of public transport, an important source of noise is traffic, which is also related to the increasing number of cars. In addition to strictly local transport, the region is subject to continuous tourism. Depending on the time of year and the weather can occur periods of increased interest. This is due to the proximity of Wrocław and well-developed and diverse tourist base: health resorts, hiking, biking, skiing, which increases the attractiveness of the area. Lack of convenient rail transport between Wrocław and cities-spas results in increased car traffic, and this reflects in higher acoustic impact. It is important to note that Polish law establishes more stringent acoustic standards for health resort areas.

7.1.8.4 COMPONENT 3: THE UPPER VISTULA RIVER

In this area noise is mostly related to transport, operation of factories and airports. Due to the spatial scale, the most troublesome is the noise generated by motor vehicles. It covers spatially the largest population and area. The problem concerns not only highly urbanized areas, e.g. Cracow, but also places like the Valleys of Raba, Dunajec, Wistoka and San rivers and their tributaries, where the main roads run mostly at the bottom of the Valley near the riverbed. Due to increasing number of vehicles and the increase of traffic, noise standards in the areas adjacent to roads are often exceeded, even at night.

7.2 VARIANT'S ANALYSIS

Variant's Analyses are particularly important in view of Water Framework Directive (WFD) which stipulates that projects posing potential threat to achieving environmental goals SWBs (body of surface water) and GWBs (body of groundwater) (mainly hydrotechnical) show that there is no other, more environmentally advantageous option which could be used to achieve the project objective. The range of alternatives has to be as wide as possible and needs to be determined by the project goal, not limiting the scope to a given protected area. This approach meets another objective of WFD, i.e. catchment approach to water management. What it means is that it is not necessary to affect the river in section A in order to protect it against flooding, but the retention in the upper part of the basin of section A should be increased by building a dry reservoir and causing fewer changes in water habitats. It is also important not to cause damage to adjacent territories while a flood protection project is implemented in terms of both environmental protection and flood risk in adjacent territories. Those aspects have been integrated into Components 1, 2, and 3 in the course of Variant's Analyses.

7.2.1 COMPONENT 1: LOWER AND MIDDLE Odra RIVER

The project goal as for Component 1 is flood protection of selected parts of the Lower and Middle Odra basin. The actions taken within Component 1 are one of many groups of tasks aimed at improving flood protection of Lower and Middle Odra.

With these conditions in mind, the objective of Variant's Analysis was finding the preferred variant from a specific number of investment planning options: limiting flood risk to a various extent, characterized by different investment and maintenance costs, its impact on environment and changes in inhabitants' social life. It was determined that the preferred

variant for Lower and Middle Odra Project, in view of flood risk connected with runoff from the upper (upstream) basin as well as ice backup risk, should include reconstruction and modernization of the present infrastructure and river regulation.

SUBCOMPONENT 1A – FLOOD PROTECTION OF AREAS IN ZACHODNIOPOMORSKIE PROVINCE

The main goal in West Pomeranian Province is creating an integrated water resources system on Odra River, which will encompass such aspects as flood protection of the adjacent land, preparing preventive area development plan, river purity, environmental and cultural protection.

According to the assumptions, the undertaken actions are long-standing tasks, dealing with flood protection of flood zones comprehensively.

Subcomponent 1A consists of the following tasks:

- 1A.1 - Chlewice-Porzecze. Backwater embankment of Odra River at Myśla River,
- 1A. 2 – Flood Protection of Ognica Village,
- 1A. 3 – Osinów – Łubnica. Modernization of Inter-embankment,
- 1A. 4 – Flood protection of Radziszewo and Daleszewo on Odra River at 726+400 - 727+960km
- 1A. 5 – Modernization of Marwicki Polder, including:
 - STAGE I – Krajnik – Marwice. East Odra at 712+100 - 708+862 km;
 - STAGE II – Mniszki – Gryfino. East Odra at 720+935 - 718+850 km;
 - STAGE III – Modernization of Krajnik Pump Station;
- 1A. 6 – Restoring natural values of the Lower Odra Valley by improving retention and flood protection capacities of Międzyodrze area .

Variant creation related to modernizing flood embankments lies in analyzing solutions concerned with modernizing actions performance so that the negative impact is minimized. The options that were selected for the performance:

- involve the minimum scope of cutting trees and shrubs
- don't require or minimize the new access road infrastructure
- involve limited actions and presence of construction equipment only to the crest of the embankment;

The reason behind erecting new embankments is usually not having the possibility to find new solutions which guarantee an equal level of safety for the protected community and infrastructure. Thus, variant creation becomes technical in nature and concerns the course and parameters of the embankment in order to minimize the negative impact both during the construction and later use.

The options that were selected for the performance:

- don't (or almost don't) cause the reduction of the protected habitats;
- don't (or almost don't) cause the separation of as few habitats as possible from the river;
- don't affect location of protected plants and animals.

Furthermore, similar criteria as for embankment modernization variant selection are adopted for the construction stage.

Construction schedule takes into account the breeding season of birds and other animals.

Subcomponent 1B – FLOOD PROTECTION OF MIDDLE AND LOWER ODRA RIVER

Reducing flood risk in the area of Lower and Middle Odra mainly constitutes in reducing risks from jam floods – accumulation of ice at the section from estuary of the river in the vicinity of Dąbie Lake and on other ice-jam-prone places or places where the ice flow on the river is difficult.

In the scope of preventing occurrence of jam-generated floods, several alternative options of counteracting this phenomenon include:

- 1) permanent barriers,
- 2) floating barriers,
- 3) icebreaking with the use of hovercrafts,
- 4) icebreaking with explosives,
- 5) removing the ice with ice-breakers.

These options vary as to their effectiveness and possibility of using them in given conditions of flow and system of river network.

Permanent barriers

Made of steel or reinforced concrete stakes fixed in the bottom, which cause the ice jam to accumulate in a designated place, where it does not create losses in material goods and at the same time prevents ice-jam below, e.g. in a place where such jam could have adverse impact on housing estates and existing infrastructure. The place where the dam is located requires strengthening the bottom and construction of a relief channel for draining the surplus of water. It is not possible to construct this type of dam within Lower Odra since it would cause accumulation of ice on long sections and lack of control over the process. This type of dam may only be used on rivers of relatively low flow and low amount of ice flowing down the river.

Floating barriers

Barriers created by wooden stakes or steel pontoons floating on the surface of the water, connected with a rope and anchored at the bottom. The barrier may be installed at the beginning of jam period and dismantled after it is over. Its main task is to create a jam at a designated place. When the accumulated ice-cover overweighs buoyancy force its elements sink and part of the accumulated ice flows down the river. Next, the barrier surfaces again and continues to block the ice flow. Use of this method is limited in the valley of Odra, and potentially may cover only selected estuary sections of several tributaries. Potential installation of barrier of this type has to be preceded by relevant mathematic modeling so that validity of costs is checked each time.

Breaking the ice with hovercrafts

In this method, air flow produced by hovercrafts rips the ice cover on which it moves. The method can be used mainly on water reservoirs with even and uniform ice cover. It is not applicable to Lower and Middle Odra.

Breaking the ice with explosives

This method was to a limited extent used in the past, mainly for point threats for valuable object such as bridges, hydrotechnical structures, etc. However, it is not as efficient as it should be, causing solely breaking the jam without really creating conditions for its flow down the river. In 1982 explosives were used to prevent ice-jam flood on Vistula in the area of Płock, which did not have any influence on lowering the level of water. The threat was eliminated by ice-breakers and clearing the entire waterway. Also, this method has highly adverse social and natural impacts.

Removing the ice with ice-breakers

Most commonly used and safest method of removing ice-jam on large rivers. Ships of specific construction are used for this purpose, with large mass and low immersion. Ice-breakers crush the ice using their mass and start a wave on the river, which causes further crushing. One of the most important features influencing efficiency of this method is creating a clear waterway for the ice to gradually flow down the river, once the ice is crushed. In the case of Middle and The Lower Odra, clear way must be ensured on the entire section (which obviously does not meant that the works have to be carried out on the entire section of Odra), so that the ice crushed in the upper parts o the watercourse can flow freely in the direction of Dąbie Lake and further, to the Vistula.

Therefore, reducing ice-jam generated flood risk is most effective when the ice-breakers are used. Because the analyzed section of Odra was regulated as early as in the 19th century in order to enable sailing, solutions considering this premise and constituting in improving sailing conditions in the area of Middle and The Lower Odra were also adopted.

Variants for selected investments included in the Subcomponent will be drawn in detail in the scope of technologies and scope of works at the stage of preparing details EMP.

- 1B.1 – Repair and modernization of regulatory infrastructure on the free-flowing Odra - reconstruction and modernization of regulatory infrastructure - in order to adapt section of Odra from Malczyce to the estuary of Nysa Łużycka to class III waterway
- 1B.2 – Modernizing the border part of Odra River:
 - STAGE I – modernizing the border part of Odra River in order to ensure ice-breaking in winter
 - STAGE II – renovation and modernization of regulating system of border Odra
- 1B.3 – Building parking and mooring infrastructure:
 - STAGE I – building parking and mooring infrastructure for ice-breakers;
 - STAGE II – building parking and mooring infrastructure on the Lower Odra and bordering part as well as new signage to navigable waterways.
- 1B. 4 – Improving the flow of Flood Water from Dąbie Lake in Winter
- 1B.5 – Dredging of Klucz-Ustowo Ditch
- 1B.6 – Reconstruction of Bridges to Ensure Minimum Clearance

The actions planned in this Component are the key factor in ice backup flooding prevention. These actions are mainly concerned with implementation phase. Therefore, in this Component new alternative solutions limiting the negative impact during construction phase are considered. The subject of the analysis was mainly comparison between the impact of construction-phase related activities, modernization of the wet side from the land side area. The option of construction works on the wet side of the embankments was recommended for implementation, which limited the impact on natural habitats and species present in the river valley. As far as dredging was concerned, different forms of extracted material use were considered so as to show the most beneficial solution or solutions for the environment. As far as regulating actions were concerned, variant method at this stage related to the smoothest conveyance and navigability possible on the modernized section.

Subcomponent 1C –FLOOD PROTECTION OF ŚLUBICE CITY

Ślubice flood protection is one of the most important aspects of the Lower and Middle Vistula flood protection.

With the multi-criteria analysis for this Subcomponent, the adopted benchmark was a variant of "zero", i.e. variant showing the current status and allowing the identification of facilities and people at risk of flooding, should the investments be absent. Subcomponent consists of the following tasks.

- 1C.1 – Extension and Construction of Flood Embankments
- 1C.2 – Reconstruction of Czarny Kanał and Racza Struga.

The following alternative categories of technical activities seemed to be applicable:

- construction of polders and dry reservoirs
- modernization and construction of other embankments
- construction of floodway.

A series of options of planned developments as well as all catchment area related development ideas, including polder and flood control reservoir construction, floodway construction, modernization and construction of embankments, regulating and draining works. Environmental criteria included: impact on conservation area, natural habitats, protected species of plants and animals, and water environmental objectives described in Water Framework Directive. New tasks have been formulated in compliance with the preferred option. The tasks envisage modernization of existing embankments in sections, new embankment construction, modernizing and clearing works in the channels. Variants of tasks related to the modernization of the levees was based on a review of technology solutions for the implementation of the modernization so as to minimize negative impact. Options for building new embankments took the form of technical options, concerning the course and the parameters of embankments so as to minimize the negative impact during both construction and operation.

7.2.2 COMPONENT 2: FLOOD PROTECTION OF THE KŁODZKO

The scope of protection against flood of Kłodzko Valley residents include flood protection of the people (about 234 thousand people) and developed areas with a total area of approximately 497 hectares, including the protection of human and animal lives as well as material values. The protection of about 250 households on an individual basis is also envisaged. Kłodzko Valley flood risk is primarily due to the insufficient capacity of rivers, streams and transport facilities, insufficient polders, insufficient number and height of embankments. On top of that, the technical condition of existing flood protection facilities is very poor and it does not ensure flood protection for the residents inhabiting the bank areas. The extent of the works related to Kłodzko Valley includes active (Subcomponent 2A) and passive (Subcomponent 2B) defense actions.

The final group of tasks in a component is the result of carrying out a series of analyses and consultations over many years as well as making a series of selections by performing the following multi-criteria analyses.

7.2.2.1 SUBCOMPONENT 2A - ACTIVE PROTECTION

The range of active protection includes the construction of four retention reservoirs and include the following tasks:

- 2A.1 - Construction of "Boboszków" – a dry flood control reservoir on Nysa Kłodzka River.
- 2A.2 - Construction of a retention reservoir "Glen Bystrzyckie" on the stream Goworówka.
- 2A.3 - Construction of "Szalejów Górny" – a dry flood control reservoir on Bystrzyca Dusznicka River.
- 2A.4 - Construction of "Krosnowice" – a dry flood control reservoir on Duna stream.

The purpose of the proposed reservoirs is to reduce the culmination of flood waves, the size of flows, and the flood risk in the valleys of the rivers where they are localized, as well as to indirectly reduce the flood risk also on Nysa Kłodzka River and thus the entire Kłodzko Valley. There are currently two detention reservoirs operating in the area of Kłodzko Valley: Międzygórze on the stream Wilczka, with a maximum capacity of 0.83 million m³ and flooding surface of 6.6 ha at the maximum damming, and Stronie Śląskie on the Morawa river with a maximum capacity of 1.4 million m³ and flooding surface flooding of 25.0 ha. at the maximum damming. The number and capacity of existing reservoirs is insufficient and it is necessary to take active measures to increase the Kłodzko Valley active flood protection.

Set of tasks eventually included in the Subcomponent is a result of multi-criterion analysis and consultations which led to the final selection of the scope of active flood protection in Kłodzko Valley.

The final group of tasks in a component is the result of carrying out a series of analyses and consultations over many years as well as making a series of selections by performing the following multi-criteria analyses.

The starting point for the analyses was a group of storage reservoirs developed in 1978 by Hydroprojekt Wrocław: 30 reservoirs with the parameters and functions of mainly multi-purpose reservoirs.

The University of Agriculture scrutinized previous locations of the reservoirs in six former Provinces: Wrocław, Opole, Zielona Góra, Jelenia Góra, Wałbrzych and Legnica, including all locations in the Kłodzko Valley reservoirs proposed by Hydroprojekt Wrocław.

A ranking list of 17 reservoirs in the Kłodzko Valley was selected in the analysis. The top ten constituted all reservoirs which are included in Subcomponent tasks, with three of them filling the top four spots.

Additional analyses and the research conducted at the University of Agriculture led to the creation of a new list of 13 reservoirs. It was assumed in the course of the analysis that flood protection of the polders "dry flood control reservoirs" should be built. The reservoirs of this type are present currently e.g. in the upper catchments of the rivers in the Sudetes in the number of 10 and they work perfectly if they have capacity sufficient to efficient reduction of flood wave in a given catchment

Final selection of reservoirs for implementation was subject to the following criteria:

- Possibility of protecting large human agglomerations that suffered in previous floods, in particular in 1997 and 1998,
- Size and nature of catchment areas, expressed by proportion of capacity of the reservoir to the catchment area, indicating reduction capacity of given reservoir,

- Topographic possibility of locating reservoirs with as little collision with land development as possible,
- Positive attitude of local governments, expressed by including the investment in local spatial development plans.

Given the above, ranking list of reservoirs was prepared, that acted as basis for selecting investments most optimal from the point of view of efficiency of the tasks.

Construction of dry flood reservoirs in Kłodzko Valley is compliant with passive protection tasks, i.e. section works improving flood security along the watercourses (see below).

7.2.2.2 SUBCOMPONENT 2B – PASSIVE PROTECTION

The scope of passive protection covers flood protection areas along the four major rivers of Kłodzko Valley: Nysa Kłodzka, Ścinawka, Biała Łądecka the main left tributary of the Morava River and Bystrzyca Dusznicka with the main left tributary of the Kamienny Potok River. Built-up areas will be protected with structures of the second or third class of validity according to Polish law¹¹. Passive protection includes: reconstruction and renovation of existing bank revetments, the increase in flow capacity of rivers and streams, the construction of new or refurbishment of existing embankments and protective walls, the increase in flow capacity of existing dams and regulatory levels, the increase in flow capacity of the existing bridges and pedestrian bridges, individual security of households or transferring the household that are impossible to protect outside the flood inundations. 2B Subcomponent includes the following tasks:

- 2B.1 – Flood Protection of Nysa Kłodzka River Valley.
- 2B.2 – Flood Protection of Ścinawka River Valley
- 2B.3 – Flood protection of Biała Łądecka River Valley and the River Morava.
- 2B.4 – Flood protection of Bystrzyca Dusznicka River Valley and the Kamienny Potok River.

Three variants of the program implementation of the Kłodzko basin flood control were analyzed, differing in the approach and, thus, the scope of the project.

Option I comprising mainly of increasing capacity and clearing waterbeds, construction of new embankments and modernization of existing embankments and retaining walls in the valleys of the largest rivers: Nysa Kłodzka, Biała Łądecka, Bystrzyca Dusznicka, and Ścinawka and within 12 smaller tributaries.

It is a variant of the smallest range of investment and a very limited impact in achieving the strategic objective, which is ensuring the full flood protection in Kłodzko Valley.

¹¹ The Construction Law (Dz. U. 1994 Nr 89 oz. 414)

Due to the need to obtain the maximum effect of flood protection intensification and concentration of activities in the river beds would be required. This is an environmentally unfavorable variant as it is involved with the transformation of existing habitats.

Option II consists of using only the active protection solutions involving the implementation of the flood control reservoirs in the following locations:

1. Boboszów reservoir on Nysa Kłodzka River
2. Nagodzice reservoir on Nysa Kłodzka River
3. Roztoki Bystrzyckie reservoir on Goworówka Stream
4. Goszów reservoir on Biała Łądecka river
5. Bolesławów reservoir on Morava river
6. Krosnowice reservoir on Duna stream
7. Szalejów reservoir on the Bystrzyca Dusznicka River
8. Tłumaczów reservoir on Ścinawka River
9. Sarny reservoir on Włodzica River

It is a variant of the biggest scope of investment and very large effects in achieving the strategic objective, which is full flood protection of the Nysa Kłodzka River basin. It is also a variant causing social conflicts because 4 of the above flood protection reservoirs are not accepted by the local community. Those reservoirs include: Nagodzice on Nysa Kłodzka, Goszów on Biała Łądecka, Bolesławów on Morava and Tłumaczów on Ścinawka. The areas where reservoirs would be located are planned for residential developments, but also technical infrastructure developments [roads, power lines, etc.]

This is an environmentally moderately favorable option as it allows to minimizing riverbeds activities; however, it does not allow for the achievement of the strategic objective, as it can be carried out only in 50%, i.e. only 4 reservoirs: Szalejów, Krosnowice, Boboszów, and Roztoka Bystrzycka achieved a social consensus.

Option III involves the use of active and passive protection measures, i.e. the implementation of both flood protection reservoirs and regulating riverbeds and embankments (flow capacity increase).

The material scope of this option involves the use of flood protection solutions covering 16 Kłodzko Valley streams the most significant valleys and 4 flood control reservoirs. Therefore, it is divided into stages and tasks according to the following schedule:

Stage 1 comprises of the following tasks:

- Boboszów reservoir on Nysa Kłodzka River
- Roztoki Bystrzyckie reservoir on Goworówka stream
- the valley of Nysa Kłodzka River from Bardo Śląskie to the estuary of Biała Łądecka River,

- the valley of Bystrzyca Dusznicka River with Szalejów Górny reservoir
- Krosnowice reservoir on Duna stream
- the valley of Biała Łądecka River (part I).

Stage 2 comprises of the following tasks:

- the valley of Nysa Kłodzka River above the estuary of Biała Łądecka River,
- the valley of Ścinawka River,
- the valley of Biała Łądecka River (part II),
- the valley of Morawa River,
- the valley of Kamienny Potok stream.

7.2.2.3 SUMMARY

Option 3 is a variant of compromise as it is economically, socially and environmentally feasible. It enables to achieve the strategic objective due to the balanced approach to the social and natural aspects. This variant became the basis for defining the tasks of Component 2.

Conducted analyses of efficiency of reduction of flood wave show that the efficiency is highest within Kłodzko Valley when solutions constituting in combining construction of dry reservoirs with section construction and modernization of flood embankments and liquidating other obstacles prohibiting free flow of flood waters. Approved final scope of the project ensures the highest efficiency taking into account number of protected inhabitants and impact on reduction of flood risk within the capital of the region – Kłodzko (situated below the majority of larger tributaries of Nysa Kłodzka River in the mountain part of the catchment area). These developments have also obtained preliminary social acceptance and in some cases (dry reservoirs, selected section of river) are minutely recognized in the scope of possible impacts on the environment (they will not have significant impacts on conservation areas and other elements of the environment).

Therefore, projects with the highest efficiency as regards reduction of flood risks and lack of reservations associated with social and environmental aspects were selected for implementation.

7.2.3 COMPONENT 3: UPPER VISTULA RIVER

As it was mentioned in the previous section, the aim of the Project in terms of Component 3 is flood protection of selected areas of the Upper Vistula basin. These areas were selected regardless of damages caused by flood in 2010. These areas included the area of Cracow (protection of the city against floods generated by the upper part of the Vistula basin), catchments of Raba, Dunajec, Wisłoka and San and the Vistula valley between Tarnobrzeg and Sandomierz, together with a section of the San estuary. The actions taken under Component 3 are among many groups of activities aimed at improving flood protection of the Upper Vistula basin.

Given the above conditions, the purpose of carrying out variants' analysis was to find a option of implementation of the project that would optimally balance such factors as:

- Flood protection as the main purpose of works
- Costs of implementation of works and maintenance of buildings
- Impact on cultural environment and social life of residents
- Impact on natural environment.

Among the analyzed options solutions constituting in removing part of buildings outside the area of flooding were also considered – the documents indicated places where technical protection (flood development) is not rational.

Thus, the decision-maker or the relevant institutions, municipal and regional authorities would be left to decide on the possible further reduction of flood risk by the transfer of residents outside the risk zone.

However, it should be noted that due to the nature of the protected areas, e.g. some of the largest cities in Upper Vistula River valley with Cracow, the options associated with the transfer of building investments outside the flood risk zone could pertain to only some parts of the analyzed area.

Supplementary to variants' analyses supporting non-technical means were also considered, in the form of, for instance, financial or legal incentives, educational activities, etc.

Subcomponent 3A – Flood Protection of Cracow and Wieliczka

Variants' analysis for Subcomponent 3A was determined by existing configuration of flood devices within zone of strict city development. Flood embankments of the Vistula river together with backwater embankments on tributaries and retaining walls on the area of city of Cracow were constructed at the beginning of 20th century and in the interwar period. Threats for Cracow and the vicinity are in the first place caused by too little capacity of some sections of the terrace area and by poor technical condition of the embankments (e.g. by existing preferential ways of filtration, improper inclination of slopes and lack of thickening of the soil under the embankments). Moreover, flood risk is also generated by tributaries of Vistula on the area of Cracow, e.g. Serafa River.

In the process of selecting optimum option of set of developments implemented within Subcomponent 3A aimed at flood protection of Cracow, the following options of developments together with conditioning factors were considered:

1) Increasing the embankments within the city in accordance with requirements for class I of hydraulic structures.

Variant Analysis for Component 3.1 was determined by the existing configuration of protective devices in the rigid conditions of the city. Embankments (including The Vistula river embankments on tributaries) and the protective fortresses of the city of Cracow were built in the early years of the 20th century and in the interwar years. Although there was no need for the construction of sections of embankments during the passage of the flood wave of 2010, the main problem and the risk was the existence of privileged ways of filtration, improper inclination of slopes, lack of sealing the substrate under the ramparts, and poor technical condition of buildings, which at that point were not thoroughly modernized after the 1997 flood.

A parallel issue is the level of the existing flood protection system in the city. According to the regulation, proper grade of embankment crown must meet the specifications for class I structure, i.e. for water $Q_{0,1\%}$ of approx. $3600 \text{ m}^3 / \text{s}$. The average height of the Cracow embankment in meters ranges from 1.0 m to 7.0 m. It is estimated that raising the embankments and Vistula boulevards to the extent specified in the regulation would amount to between 2.3 and 4.0 m above the status quo. Due to architectural and landscape reasons as well as social and economic concerns, there is no consent to implement such a large increase in the embankments and boulevards. This condition was included in the currently implemented and planned projects and investments, and the degree of the flood protection of the city corresponds to the largest documented historical high water levels, where the conveyance of high waters of the Vistula in the area of Cracow is provided.

It should be emphasized that such a height that is theoretically required for embankments and boulevards in Cracow, is due to insufficient width of the great water river bed flowing through the city center. The distance between embankments in their downtown section from the mouth of the Rudawa River to a railroad bridge of Cracow-Tarnow line is only 145 m. The distance between the embankments of the Vistula above this section is 350 m and below 420 m. There was an idea in the past to construct a bypass channel for the section with insufficient riverbed width of the great water. As a result of the expansion of the city center along the river and the natural terrain, the channel cannot be rerouted so that its mouth was located below the section with insufficient width. In addition, it is not allowed in the area reserved for the construction of the channel to build the facilities having the conveyance balancing insufficient riverbed width.

Analysis of the effectiveness of the protective activities of the existing volume of water retention on all the major tributaries of Vistula River mainstream (147 million m^3 in reservoirs at the Little Vistula, the Sola, and the Skawa), did not confirm the expected level of protection impact for the city itself with flows higher than the capacity of passive protection in the city.

These factors determine the direction of the search for the best possible actions to improve the prevention of the city from flooding. Their effect is to be able to maintain the lowest

possible states of the great water within the city. Therefore, these factors need to be focused on the modernization of the embankments to improve the technical condition, the local embankment heightening, and looking for opportunities to retain water above the big city.

In accordance with aforementioned conditions, the modernization of those sections of embankments which still remained to be rebuilt after the floods in 1997 and 2010 was proposed in the Component.

The second task is to improve safety within and in part (Wieliczka municipality) of Cracow agglomeration in Serafa River valley through the construction of four flood control reservoirs with the necessary works accompanying it. Due to the frequency of flood events in the Serafa River catchment area, the task was considered a priority at this stage of the tasks associated with flood protection of Cracow from Vistula River and flood risk reduction in the backwater of the river.

The third proposed task is to prepare documentation for the planned construction of a system of dry polders above Cracow with an estimated capacity of 90 million m³. As a result, an adequate flow regime of Vistula River should be maintained for the sake of the city's protection from flooding as required.

2) Construction of a relief channel for Cracow

Another solution addressing too little capacity of the riverbed within the city was supposed to be construction of a relief channel draining surplus of flood water at the section where the terrace area of the Vistula River is too narrow.

Distance between the embankments in the downtown section from the estuary of Rudawa River to the Cracow – Tarnów railway bridge is only 145 m. Above this section the distance amounts to 350 m and below it – 420 m. However, because of development of the city center along the river and natural topography, no location that would ensure voiding the narrow section of the terrace area and appropriate capacity was found for the potential channel. Therefore, **implementation of option comprising of construction of a relief channel provide to be impossible.**

3) Modernization of existing embankments of the Vistula River in Cracow

Due to lack of possibility of implementing tasks described in points 1-2 and because of poor technical condition of the embankments, **implementation of modernization of embankments was selected, in the following scope:**

- Strengthening of the body of existing embankments by their compaction and construction of filtration barriers in the body and in the soil under the embankment in order to eliminate filtration through the body and soil under the embankment,
- Repair of embankment structures (culverts, passages),
- Raising sections of the crown of the embankments with correction of ordinates of 0.15-0.5 m,
- Unification of width of the crown of the embankments with its hardening, construction of service roads with adjustment to the existing communication routes.

This option was accepted as optimal in combination with remaining tasks from Subcomponent 3A described in subsequent points. It should be added that planned modernization of the embankments constitutes next stage of modernization of all the embankments of Vistula River and its direct tributaries within Cracow.

4) Increasing retention of Vistula River catchment area above Cracow

Given the conditions described in previous points it should be concluded that it is not possible to increase the capacity of the terrace area within Cracow itself. Therefore subsequent steps should concentrate on finding a solution that would allow for stopping part of the flood wave before Cracow.

Analysis of efficiency of flood protection impact of existing retention reservoirs on all large tributaries of the Upper Vistula (147 million m³, in reservoirs on Little Vistula, Sola, Skawa) shows that protection of Cracow is insufficient when flows exceed those that fit the existing terrace area within the city. This means that during flood reservoirs of the Upper Vistula basin located on Vistula tributaries above Cracow hold too little water to successfully lower flood wave on Vistula in Cracow in the present condition of the embankments.

Proposed solution included construction of system of controlled polders above Cracow. This solution is currently formed as general concept and detailed analyses, including variant analyses of location and size of polders will be carried out within the present Project.

5) Limiting flood risk on Vistula River tributaries within Cracow – Serafa River valley

Taking into account tasks supporting lowering flood risk in Vistula River backwater zone in the vicinity of Cracow, this task proved to be a priority at this stage of implementation of tasks associated with flood risk protection of Cracow from Vistula River side together with lowering flood risk in the river's backwater zone. On the other hand, implementation of the task will significantly reduce flood risk within Cracow and part of Wieliczka municipality located in Serafa River valley.

Regardful of the aim of the task – reduction of flood risk from Serafa River three options of implementation of works were analyzed:

- Regulation of Serafa riverbed. For the riverbed to contain flood waters, refurbishment is required, to create a deep artificial riverbed of regular shape, which was rejected due to environmental reasons. Moreover, this option would require construction of part of embankments and refurbishment of all the bridge structures.
- Construction of flood embankments. Implementation of this option, due to its location in an urban area would require expropriation on a large scale as well as significant refurbishment of technical infrastructure. This option of works was therefore rejected.
- Construction of dry reservoirs. Dry reservoirs will be used only during floods and their implementation will not result in significance intervention in the riverbed. The option also assumes construction and modernization of embankments only in selected sections. Because of conditions associated with natural and cultural environment this option proved to be optimum and approved for implementation.

Summing up, Subcomponent 3A will include implementation of the following tasks:

- Modernization of embankments within Cracow and documentation associated with construction of system of dry polders above Cracow. Due to the lack of possibility of obtaining relevant capacity of the terrace area within the city by adopting other solutions (raising the embankments or construction of a relief channel) and too little existing retention on Vistula River and its tributaries above Cracow this option of scope of works proved to be optimal;
- Construction of 4 dry reservoirs on Serafa – one of tributaries of the Vistula River in Cracow as means of reduction of flood risk in the river valley and at the same time in the backwater zone of the Vistula. Since this variant is most advantageous from environmental, social and economic points of view, construction of a system of dry reservoirs was accepted as optimal option of the scope of works in the valley of Serafa,

All the implemented tasks should significantly improve flood protection within Cracow and its vicinity.

Subcomponent 3B –Protection of Sandomierz and Tarnobrzeg

In 2010 and 2011 in the vicinity of Sandomierz and Tarnobrzeg numerous breakdowns within the embankments took place (Vistula embankments in Koćmierzów and on other watercourses in the area). Afterwards, substantial analysis of causes of breakdowns was carried out, as well verification of available hydrological historical data; necessary hydraulic modelling research was carried out for the flow of great waters on the section of Vistula from bridge in Nagnajów to Zawichost. On these grounds capacity of the terrace area was determined, so as to enable safe passage of waters of particular likelihood of occurrence. In order to achieve relevant capacity of the inter-embankment area between Tarnobrzeg and Sandomierz, and at the same time increase the level of flood security in these two cities several options were considered:

- Option I: Removing plants from the terrace area – option rejected due to: (a) significant adverse impact on Natura 200 sites; (b) lack of sufficient lowering of the table of water despite significant intervention in the environment, therefore refurbishment of the embankments would also be necessary; (c) future costs of maintenance of the embankments;
- Option II: Increasing the distance between Vistula River embankments in the section between bridge in Nagnajów to Łęg estuary – option rejected due to: (a) large scale of resettlements; (b) significant refurbishment of infrastructure (c) occupying new lands – large environmental, economic and social costs; (d) topography of land preventing obtaining relevant capacity;
- Option III: Lowering Q1% water table by constructing relief channel in a section from bridge in Nagnajów to Łęg estuary – option rejected due to topography and development of the land and associated large economic, social and environmental costs;
- Option IV: Deepening and increasing cross-section of Vistula riverbed – option rejected due to large environmental costs (intervention in the riverbed in the conservation

area) and economic costs, as well as lack of stability of the results of implementation of the task resulting from hydro-morphological processes (section of Vistula River of predominant sedimentation), which is associated with large costs of maintenance at the stage of operation;

- Option V: Raising the crown of the embankments for achieving capacity of the inter-embankment for $Q_m = Q_{1\%}$ with existing state of plants in the terrace area – option rejected because of: (a) too large raising of the ordinate of embankments that would lead to increasing risk on the land side of the levee in case of emergency, (b) occupying vast space in the terrace area associated with implementation of works – large environmental costs in a Natura 2000 site; (c) necessity of additional significant refurbishment of the embankments in all tributaries of Vistula River, which generates large economic costs and causes many technical problems,
- Option VI – raising flood embankments taking into account polder retention and keeping the riverbed and the terrace area in a condition not worse than current – **option approved for implementation because of the following factors:**
 - raising the embankments by max 1.4 m, which is acceptable from the point of view of flood protection of the land side of the bank,
 - combining modernization of the embankments with polder retention above Tarnobrzeg proposed for implementation within stage 2 of works, not covered by the this Project,
 - proposed construction of polders will also allow for reducing intervention into the terrace area of Vistula River in conservation areas (Natura 2000 sites) – the option assumes maintaining current condition of the terrace area, and if this proves to be impossible, increasing polder retention so that lower capacity of the terrace area is compensated for.

Therefore Option VI combines different forms of flood protection, allowing for adopting optimum model of protection for the area of Tarnobrzeg and Sandomierz.

The Option also included unification of height ordinates of flood banks on Vistula River tributaries in the analyzed area. The Option was also supplemented with flood protection of the dry side of the embankment by construction or modernization of the pumping station together with accompanying structures.

Subcomponent 3C - Raba Sub-basin Passive and Active Protection

For the multi-criteria analysis for Subcomponent 3C - Raba Sub-basin Passive and Active Protection the benchmark adopted was “zero” variant i.e. option showing current condition and allowing the identification of facilities and people at risk of flooding, if development does not take place.

The following alternative categories of technical activities were assumed:

- Construction of reservoirs,
- Construction of dry reservoirs,

- Construction of polders,
- Increasing flood reserves in the existing reservoirs,
- Modernization and construction of embankments,
- Construction of relief channels,
- Relocation of embankments,
- Reconstruction of the boulevards,
- Restoring the equilibrium conditions in the river bed with the exploration of natural retention and maintenance of the watercourse migration passage.

Model of selecting the most favorable option for the entire catchment area of Raba River was based on the following assumptions:

1) The catchment area of Raba River was divided into smaller task units (e.g. catchments of tributaries) marked as Z01-Z18, within which location of particular categories of technical tasks were analyzed, using a multi-criteria analysis methods. The following criteria were taken into consideration (Tab. 13)

Table 13.Criteria for multi-criterion analysis in the catchment area of the Raba River

Group of criteria	Criterion no	Criterion
Flood criteria	1	Reduction of value of potential losses within the reach of water 1% [PLN]
	2	Reduction of risk for people within the reach of water 1% [number of inhabitants]
	3	Reduction of culmination of the flood wave (reduction of flow in the cross-section of the estuary of a given catchment for Q1% flow)
Social criteria	4	Occupancy of land for the entire option [ha]
	5	Number of resettlements associated with implementation of the option [number of inhabitants]
	6	Sum of protected public buildings of particular significance for Q0.2% water [number of facilities]
Environmental criteria	7	Impact on conservation areas (national parks, natural reserves, Natura 2000 sites) [grading in points]
	8	Risk to natural habitats and (if recognized) to protected species [grading in points]
	9	Impact on national and regional ecological passages [grading in points]
	10	Impact on aims of water protection in the meaning of

		Water Framework Directive [grading in points]
Economic and implementation criteria	11	Capital expenditures [PLN]
	12	Average value of maintenance costs (calculated on the basis of a 100 years period) [PLN]
	13	Technical level of difficulty of implementation [grading in points]

2) The following types of options were used in the analyses within particular tasks:

- „W0” – option presenting current condition, lack of projects, reference level,
- „WI” – option including developments based on existing plans and programs, compilation of all the development ideas in the catchment area;
- „WIIA”, „WIIB”, „WIIC” – planning options of the Contractor, including those incorporating elements of option “WI”.

3) Selection of particular options was done on the basis of multi-criterion analysis using chosen research methods, e.g. comparative analysis (each criterion was allocated a significance, and then calculations were conducted in spreadsheets)

4) Results from particular tasks were then applied to the level of the entire catchment area of Raba River, with division into the following options:

- **Option „W0”** (existing flood protection),
- **Option „WP”** (including implementation of preferred options selected during multi-criterion analysis for particular task)
- **Option „WP+”** (including top rated tasks located within particular task units, improved with selected retention tasks located in Z02-Z18 catchment areas resulting from intended reduction of risk in Z01 catchment area and having additional positive impact on Vistula River).
- **Option „WP++”** („WP+” option additionally enriched with tasks reducing flood risk from the main watercourse – Raba River, that could not be analyzed previously, without taking into account real impact of all tasks in the entire catchment area)

Because the number of combinations of comparable options for particular tasks at the level of the entire catchment area of Raba River would be very large, the selection was limited in the course of design consultations, in accordance with criterion presented in Point 4. Currently, SEIA for the Project Program in Raba River catchment area takes place. During the procedure preliminary options were modified and their final scope will be approved after the SEIA procedure is completed.

Within the preferred option, the tasks were formulated, in which systematic modernization of the existing embankments, construction of new embankments, construction of dry reservoirs, and construction of polders were proposed. The program of the preferred option was

additionally strengthened through activities limiting the flood risk of the main stream by the modernization of the main principles of water use in the Doboszyce storage reservoir and by increasing the flood reserve for the improvement of flood protection in the river valley during the flood.

Subcomponent 3D - San, Wisłoka and Dunajec Sub-basins Passive and Active Protection

Schematic model of optional designs for the catchment area of San River is very similar to the model for the catchment area of Raba River. Catchment area of San River was also divided into tasks, and selection of particular options was made on the basis of multi-criteria review, using groups of criteria presented in Table 13.

Variant analyses regarding catchments of Wisłoka and Dunajec are currently in the preparation phase.

7.3 ENVIRONMENTAL IMPACTS

The Projects which comprise of all three Components represent different types of hydraulic developments associated with construction of new and improvement of existing flood protection systems in the area of Upper Odra River basin – Kłodzko Valley (Component 1), Middle and Lower part of Odra River basin (Component 2) and upper part of Vistula River basin (Component 3).

Therefore, all proposed tasks are similar in terms of potential environmental impacts resulting from features of areas of implementation of the project. All the developments will be situated within river valleys, and the implementation and impact zone will cover particular elements of the environment in the area – most often riverbeds and, to different extent, functionally or spatially associated areas.

Analysis of particular developments led to selecting the following types of tasks that will be implemented within particular projects constituting part of the Components: construction of dry retention reservoirs (front dams, side dams, relief-overflow sections,

- renovation of retention reservoirs,
- changing the way of water management on the storage reservoir,
- construction of embankments/boulevards, modernization of embankments/boulevards,
- construction of polders,
- regulation and maintenance works in riverbeds and terrace areas of natural and artificial parts of water or strongly changed parts of water and drainage ditches,
- modernization of pumping stations,
- refurbishment of bridges,

- demolition of structures,
- dismantling and modification of colliding infrastructure elements (e.g. water supply system, sewage system, roads, etc.),
- construction and renovation of elements of navigation infrastructure (groins, stop and mooring bay and marking the sailing route,
- reconstruction and renovation of hydraulic structures (automatic gates, embankment sluice and culverts, weirs, water barrages).

Environmental impacts generated by particular types of tasks are similar as regards manner and mechanisms of impact within each Component.

However, depending on their scale and location, they will be of different significance and likelihood of occurrence. Categories of significance and likelihood of occurrence are presented in tables 14 and 15.

Table 14. Impact assessment - Significance

Significance	Comments
Significant	Most severe, alternative will be proposed through environmental hazard risk management
Important	Severe, alternative/avoidance will be proposed through environmental risk management
Moderate	Less severe, measures will be proposed to minimize impact
Little	Less severe, mitigation measures will be proposed
Present – insignificant	Less severe. Mitigation and enhancement measures will be prepared if possible
N/a	No impact, enhancement measures will be prepared if possible
Positive	Positive impact

Table 15. Impact assessment - Likelihood

Likelihood	Definition
Certain	The activity will occur under normal operating conditions.
Very likely	The activity is very likely to occur under normal operating condition.
Likely/possible	The activity is likely to occur at some time under normal operating conditions.
Unlikely	The activity is unlikely to but may occur at some time under normal

	operating conditions.
Very unlikely	The activity is very unlikely to occur under normal operating conditions but may occur in exceptional circumstances.

On the basis of documentation available at present stage of implementation of the Project, framework environment impact assessment was conducted for specified tasks for each Component of the Project. Adequate measures minimizing and compensating for adverse impacts were proposed as well as ways of conducting environmental monitoring within each Component (data presented in Annexes 1-3 to the EAMF).

8 SOCIAL MANAGEMENT

The most significant project-related social impact is linked to land acquisition and involuntary resettlement. To mitigate this risk the project has developed a Resettlement Policy Framework (RPF) based on Polish law and the World Bank's Involuntary Resettlement Policy (OP 4.12). Below is a summary of the key principles and elements RPF.

8.1 VALUATION METHODS

8.1.1 VALUATION PRINCIPLES

The owner, holder of perpetual usufruct and other legal holder of land or a part of land on which flood management investment is carried out is entitled to compensation for the transfer of ownership of the real property to the State Treasury or a local government entity.

In all cases compensation must meet the principle of replacement value, which means the market value of the land, assets and other (e.g. crops) plus any transactions costs required to replace it, such as taxes and registration fees. Compensation is determined on the basis of a valuation by a valuation expert, and other experts (e.g. agricultural expert) as required.

According the OP 4.12, with regard to land and structures, "replacement cost" is defined as follows: a) for agricultural land, it is the pre-project or pre-displacement, whichever is higher, market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes; b) for land in urban areas, it is the pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes; and c) for houses and other structures, it is the market cost of the materials to build a replacement structure with an area and quality similar to or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labor and contractors' fees, plus the cost of any registration and transfer taxes.

In determining the replacement cost, depreciation of the asset and the value of salvage materials are not taken into account, nor is the value of benefits to be derived from the project deducted from the valuation of an affected asset. Where Polish law does not meet the standard of compensation at full replacement cost, compensation under Polish law is supplemented by additional measures so as to meet the replacement cost standard, such as support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living, etc.

The amount of compensation paid by the State Treasury or the local government entity, respectively, is determined by the investor and the current owner, holder of perpetual usufruct or other legal holder through negotiations based on a valuation conducted by a

certified real estate and assets valuation committee/expert appointed by PIU.As stated above. **In all cases the process should result, at least, in compensation at replacement value.**

Should the investment concern garden allotments established pursuant to the Act on Family Garden Allotments, the investor shall:

- pay the garden allotment holders compensation for the plants, assets and objects belonging to the allotment holders and located in the allotment;
- pay the garden allotment holders' association compensation for assets, buildings and structures located in the family allotment for the purpose of shared use by the allotment users and ensuring the proper functioning of the allotment;
- secure replacement real property for the purpose of restoration of the family allotment.

The amount of compensation in the case of flood protection measures is determined according to the state of the real property as of the day of the investment realisation permit issued by the body of first instance and according to the real property's value as of the day on which the amount of compensation is determined; which is also the cut-off date after which no further occupation or improvements on the land is not eligible for compensation and/or resettlement assistance. Compensation is subject to indexation as of the day of payment according to the principles applicable in the case of return of expropriated property.

8.1.2 REAL PROPERTY VALUATION

The amount of compensation is determined on the basis of the market value of the real property. While ascertaining the market value of the real property, the following factors in particular are taken into consideration: its type, location, use and zoning, existing technical infrastructure, overall condition and current market prices. Should the change of zoning and land use for the purpose of the investment decrease the real property's value, its market value will be ascertained according to pre-rezoning and pre-project use. If the data from the local or regional real property market allow the valuer to ascertain the market value of the property, they should apply one of the market approaches, i.e. the sales comparison approach, the income capitalisation approach or the combined approach. Should the zoning in accordance with the purpose of the investment increase the real property's value, its market value is ascertained according to the alternative use resulting from the new zoning. If the data from the local or regional real property market does not allow the valuer to ascertain the market value of the property, they should ascertain the replacement value of the real property on the basis of the cost approach.

Should the current owner or holder of perpetual usufruct rights of the affected property agrees to deliver the property and vacate the premises within 30 days the amount of compensation is increased by 5% of the value of the real property or of the value of the title to perpetual usufruct.

8.1.3 VALUATION OF MOVABLE ASSETS

Movable assets will also be compensated in cases where: a) they are not fit for the purposes of the new location and/or b) the affected persons will no longer use it as a result of the resettlement (e.g. moving from a rural to an urban dwelling). The valuer appraises movable assets (e.g. machines and appliances) on the basis of the following data: brand, model and type, year of production, producer, place and date of production, as well as other data necessary to identify the object.

The book value of such movable assets may increase or decrease in the process of valuation. The causes of the decrease may be in particular technical (wear and tear), functional (modifications in terms of material or construction) or economic (lack of particular material or workforce, changes in legal provisions, decreased demand). The valuer shall apply the cost approach or the sales comparison approach. In this case the replacement value applies and must allow to allow for the object to continue providing the service it provided pre-project.

8.1.4 VALUATION OF PLANTS AND CROPS

The valuation of tree stand or tree cover, if the tree stand includes usable resources, it will involve the valuation of timber in the tree stand. If the tree stand includes no usable resources or if the value of timber is exceeded by the costs of reforestation and maintenance of the tree stand, the valuation concerns the costs of reforestation and maintenance of the tree stand until the day of expropriation.

The valuation of fields of perennial plants involves the valuation of the costs of establishing the field and its maintenance until the first crop as well as of the lost profit in the period from the day of expropriation until the completion of the full yield. The aggregate of costs and the value of lost profits are reduced by the sum of the yearly depreciation charge resulting from the period of using the field from the first year of yield until the day of expropriation. The valuation of crops, cultivation and other yields of annual plants involves the valuation of the expected yield according to the current market prices, reduced by the value of necessary expenditures related to the harvest of the crops.

8.1.5 VALUATION OF THE REMAINING ASSETS

The remaining assets related to real property are civil profits, that is profits from real property gained on the basis of a legal relationship. When valuating rights under contracts (including the rights of lease, usufruct, tenancy, lending and life annuity) and their impact on the real property, the valuer may in particular consider the following elements:

- type, nature, scope and duration of the contract,
- relevant provisions of the law,
- form of payment of consideration,
- type and amount of other payments,
- method and dates of payment of rent and other payments,
- rights and obligations arising out of contracts,
- the parties' claims related to the settlement of expenditures on the real property, and
- available information concerning the valuated real property and the particular section of the market involving obligations.

8.2 ELIGIBILITY CRITERIA AND CATALOGUE OF BENEFICIARIES

8.2.1 ELIGIBILITY

Each Project Implementation Unit (PIU) must follow the eligibility criteria of affected persons for compensation and other assistance in connection with the expropriations described in this Framework which is based on Polish regulations and the WB OP 4.12. This criteria must be included in each RAP required for the subprojects and it must be disclosed through consultations with individual PAPs, households, leaders of the local communities and, where appropriate, NGOs.

According to the policy of the World Bank, the following two groups of people are eligible for compensation and assistance in connection with land acquisition resulting in loss of assets and economic and/or physical displacement:

- (a) those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);
- (b) those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets--provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan and
- c) those who have no recognizable legal right or claim to the land they are occupying.

Persons under paragraph (a) or (b) above should receive compensation for the land they lose, and other assistance. Persons under paragraph (c) should be provided resettlement assistance in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives of OP 4.12, if they occupy the project area prior to a cut-off date. Persons who encroach on the area after the cut-off date are not entitled to compensation or any other form of resettlement assistance. All persons included in paragraphs (a), (b), or (c) are provided compensation for loss of assets other than land.

Thus the lack of a title in land as such should not preclude the eligibility for compensation or other assistance offered in connection with the acquisition of land.

It ought to be noted that persons who have no title in land are few. Moreover, persons who use land without a title are aware of the illegality of their actions and of the fact that the property may return to the rightful owner at any time and without financial compensation. However it should be noted, that It is allowed to apply nonfinancial supporting measures, like in the case of people holding legal title to the real estate.

The following sections determine the categories of adverse impact on PAPs, the categories of PAPs and the eligibility criteria for each category. In addition, the rights of each category of PAPs have been set forth. Principally the central eligibility criterion is the location of the PAPs' real property or other goods within the area of the Project prior to the cut-off date, which is determined following the completion of the census.

Particular attention ought to be paid to the verification of claims which might result in harm to particularly vulnerable groups of PAPs. In the case of any doubt, local authorities or leaders of the local community ought to be consulted.

Eligible for compensation are persons present in the area of the project's implementation before the cut-off date, unless it is proven that the owners of real property in the area or the farmers who have their crops in the area have already received adequate compensation, according the rules of OP 4.12. The cut-off date will be communicated to the public through direct mail to those affected, flyers and posters in local municipality, website, newspaper advertisement, site notice).

The following groups of PAPs are also deemed eligible for compensation or protective measures in connection with the implementation of the Project:

- a) owners and holders of perpetual usufruct rights of real property (including buildings) and owner-like possessors without legal land titles,
- b) lessees, tenants, life annuitants and other dependent possessors of real property and persons who hold real property like dependent possessors, yet without a legal title,
- c) persons who have a limited property right in the real property, such as easement, mortgage, pledge, usufruct and a cooperative member's ownership right to premises, as well as persons who exercise such rights in real property without a legal title,
- d) owners of crops, plants, structures and other constructions attached to the land,
- e) PAPs who lose their income, workplace, pay or ability to carry out business activity as a result of Project-related land requirements.

Eligibility for compensation shall be limited by the cut-off date determined for each task separately and approved by the World Bank. The cut-off date shall be set on the day when the census is finalized and shall be publicly announced. While determining the cut-off date, it ought to be taken into consideration that under Polish law PAPs who have legal titles in the expropriated real properties are entitled to compensation in the form of monies or according to the rule "land for land" under the condition that they held these legal titles on the day on which the investor submitted the application for the investment realisation permit.

Again, persons who possess real property in the project's area, yet whose current place of residence or location cannot be known remain eligible for compensation. Therefore all possible and legally permissible measures shall be taken in order to ascertain their location to offer them compensation. Should it be impossible to ascertain their location, the compensation will be placed in a special account (i.e. escrow) , whence it can be retrieved by the entitled person at any time.

8.2.2 ENTITLEMENTS

Project-affected people will be entitled to receive compensation and additional assistance according to the following principles:

- legal possessors of real property in the project's area shall receive full compensation with due account of the rule "land for land",
- lessees, tenants, life annuitants and other dependent possessors of real property in the project's area shall receive full compensation for the loss of these rights,
- possessors of limited property rights in real property in the project's area shall receive full compensation for the loss of these rights,
- owners of crops, plants, structures and other constructions attached to the land shall receive compensation for the crops, plants, structures and constructions,
- residents of houses and flats subject to Resettlement shall receive compensation according to the rules specified above as well as assistance in the Resettlement, adequate access to social infrastructure and, if necessary, a package of individually selected protective measures,
- PAPs who lose their income, pay or ability to carry out business activity shall receive adequate compensation and, if necessary, a package of individually selected protective measures,
- illegal possessors of real property in the project's area who have no legal title and no expectant right to obtain a legal title in the property shall receive no compensation for the expropriation from the real property, as that is not possible under Polish law. Yet these persons shall receive compensation for plants and constructions owned by them and, if necessary, a package of assistance required to improve, or at least restore, living conditions and livelihood.

PAP will be entitled to receive compensation for the following categories of effects/losses:

- **Permanent loss of land:** - where possible and where PAP express such a will, the loss will be compensated in the form of "land for land" by way of granting the real property of a similar value, location and functions as the expropriated real property. If finding a real property that meets the criteria of adequate compensation is not possible, PAP will not express an intention to receive compensation in the form of "land for land", or if only a small part of the plot is subject to attachment, the compensation will be paid in cash and will correspond to the market value of the expropriated real property or any part thereof. In addition, for the immediate release of the property it will be

possible to increase the compensation by an amount corresponding to 5% of the value of the expropriated property under the terms of the Special Flood Act. PAP not being owners or holders of perpetual usufruct rights, but having legal title to the property will receive compensation corresponding to the value of the expropriated rights. At the request of PAP, the investor takes over the real property in its entirety and compensate for the acquisition of the property according to the aforementioned principles. Any and all transaction costs, including taxes related to the granting of compensation for expropriation, will be covered by the investor. PAP who possesses properties within the area covered by the project without any legal title (illegally) shall not be granted any compensation for the expropriation of the land. However, they will receive compensation for plants, plantings and structures belonging to them and, if necessary, the package of assistance required to improve, or at least restore, living conditions and livelihood.

- **Permanent restriction of land use** as a rule, it will be compensated in cash, taking into account the loss of the market value of the real property. Depending on the case, specially selected protective measures will also be offered. At the request of PAP, the property, where permanent restriction of use of real property for project purposes is to occur, is expropriated and PAP will receive compensation under the terms applicable to the permanent loss of the property;
- **Residential buildings** – compensation will be carried out on the same basis as for permanent loss of the property. In addition, the relocated PAP will receive an additional payment in the amount of PLN 10 000. Depending on the case, such people can opt to receive replacement residential accommodation by the Investor. As for squatters, they are not entitled to compensation for land, however, in certain cases the investor will grant them adequate replacement accommodation. Such persons will be offered a package of protective measures, including assistance in finding their place of residence, and if they are unemployed or addicted, they will be offered actions supporting their position in the labour market and they will receive a proposal of appropriate treatment;
- **Buildings and non-residential structures (stables, fences, technical infrastructure)** – as a rule, owners and users of these buildings and structures are compensated on the basis applicable to the permanent loss of property. Within the framework of the protective measures the investor will propose the reconstruction of infrastructure networks - and where appropriate – of structures and buildings at the expense of investor. In addition, in the case of local government units which have implemented or are implementing the affected buildings and structures by use of funds from the budget of the European Union or other foreign sources, financial compensation will be increased by the amount of the refundable funds of co-financing together with accrued interest;
- **Loss of crops** will be compensated to the benefit of PAPs in cash, taking into account the costs of making and maintenance of plantings, as well as the value of lost fruits in the period from the date of expropriation until the end of the full yield,
- **Loss of tree stand** will be compensated on the basis applicable to the loss of plantings. Depending on the case, compensation may also be made according to the estimate of the value of wood that could be obtained;

- **Impact on enterprises** will be compensated in cash by compensation for the damage actually incurred by an enterprise and a profit lost as a result of the Project. Billing and accounting documents or corporate income tax returns should be the grounds for the determination of such values. Should employees lose their work, they will receive unemployment benefits. Both employees as well as contractors working under civil-law contracts, in case of loss of earning capacity, will receive free-of-charge health insurance, assistance in search for work and help in the form of retraining vocational training aimed at finding new employment;
- **Loss or limitation in access to the social infrastructure (e.g. parks)** will be compensated as much as possible by restoring the infrastructure in the new appropriately located site. In the absence of possibility or the lack of the need to restore the infrastructure in the new site, PAP will have access to existing social infrastructure;
- **Cost of moving to a new location** – in order to cover the costs of household resettlement, PAPs will receive the amount of PLN 10 000. They will also be offered the package of protective measures including, if necessary, assistance in search for the transport company and coverage of transport costs exceeding the amount of PLN 10 000;
- **Vulnerable groups** will be covered by protective measures specially adjusted to their needs (schedule of measures' implementation in this field will be determined individually). With reference to children and school teenagers, the assistance will cover help in finding a new resettlement site which will enable them to continue education in the current school; the same rule applies for children attending nurseries and kindergartens. The elderly will be relocated to places devoid of architectural barriers which hinder movement and have equal or better access to health care, and which at the same time make it possible for the elderly to preserve their existing habits and lifestyle. The poor will be offered assistance in obtaining additional institutional support from government agencies, local government units and from non-governmental organisations competent in the scope of their problems.
- **Temporary loss of land** will be compensated in cash through the payment of monthly amounts corresponding to market prices of tenancy or lease of the real property. Moreover, in the case when due to the temporary occupation of the property PAP incur a loss; such a loss will be separately compensated according to the aforementioned principles. After the completion of implementation activities, all properties will be restored to their original state;
- **Damage to houses, buildings and structures due to construction works (e.g. vibration, accidents, etc)** will be compensated according to their nature in order to make the restoration of the full substance of the affected object or the purchase of a new one possible. Depending on the situation, appropriate rules for the payment of compensation to the above influences will be applied.

8.2.3 MATRIX OF COMPENSATION MEASURES

Impact / damages	Elegibility	Compensation / Solution
Permanent loss of land	Legal land owners and owner-like possessors of properties that can receive title	<ul style="list-style-type: none"> •“Land for land” compensation •If “land for land” compensation is not feasible or not wanted then cash compensation for replacement value of land •Coverage for all transactional costs •Coverage for move’s costs, •Support in moving.
	Vulnerable groups	<ul style="list-style-type: none"> •Resettlement to a location not affecting the availability to the previous school, •Eventual support in finding a settlement site with a similar availability to the school, as in case of the expropriated site. •Resettlement to a location with equal or easier access to medical care, as in case of expropriated household, eventual support in finding a household with such a location, •Resettlement to a location without architectural barriers or support in finding a proper house •Support in obtaining additional institutional support for the purpose of improving living conditions. •Resettlement to a location with equal or easier access to medical care, as in case of expropriated household, eventual support in finding a household with such a location, •Resettlement to a location without architectural barriers or support in finding a proper house, •Resettlement to a location allowing for keeping the previous lifestyle or support in finding a household with such a location.
	Holder of usufruct rights	<ul style="list-style-type: none"> •Compensation for loss of usufruct right

		<ul style="list-style-type: none"> •Help in receiving a new usufruct right in similar land
	Leaseholders, users of properties	<ul style="list-style-type: none"> •Cash compensation for losses incurred due to the termination of the contract, •Coverage for all transactional costs
	Illegal possessors	<ul style="list-style-type: none"> •No compensation for value of land
	Holders of easement, mortgage, lien upon properties	<ul style="list-style-type: none"> •Cash compensation for loss of right •For land easement holders – support in finding a solution allowing for using their property (holding the expropriated property), for example in establishing another right of way. •Coverage for all transactional costs
	Illegal easement holders	<ul style="list-style-type: none"> •For illegal easement holders - support in finding a solution allowing for using their property (holding the expropriated property).
Permanent limitation in using properties	Legal land owners and owner-like possessors of properties that can receive title	<ul style="list-style-type: none"> •Cash compensation for losses caused by the limitation •Coverage for transactional costs, •Proposing an institutional support and advising in the scope of possibilities of other use for properties
	Holder of usufruct rights	<ul style="list-style-type: none"> •Compensation for loss of right
	Illegal holders of properties	<ul style="list-style-type: none"> •Proposing an institutional support and advising in the scope of possibilities of other use for properties,
	Leaseholders, legal users of properties	<ul style="list-style-type: none"> •Cash compensation caused by limitation, •Coverage for transactional costs, •Proposing an institutional support and advising in the scope of possibilities of other use for properties

	Easement holders	<ul style="list-style-type: none"> •Support in finding a solution allowing for using their property (holding the expropriated property), •Cash compensation for losses caused by limitation of use, •Coverage for transactional costs
	Illegal easement holders	<ul style="list-style-type: none"> •Support in finding a solution allowing for using their property (holding the expropriated property)
Residential buildings	Legal owners	<ul style="list-style-type: none"> •“Land for land” compensation •If “land for land” compensation is not feasible or not wanted then cash compensation for lost land •Coverage for all transactional costs, •Coverage for costs associated with resettlement process, •Support in finding resettlement site or assurance of an apartment by the investor, •Institutional and social support for resettled people.
	Illegal possessors	<ul style="list-style-type: none"> •Support in legalizing property, if possible, to compensate as legal owner •Assistance and resources to find new adequate residence •Support in finding resettlement site or assurance of an apartment by the investor, •Institutional and social support for resettled people.
	Leaseholders, tenants, users of properties	<ul style="list-style-type: none"> •Cash compensation for loss of the right, •Coverage for all transactional costs, •Coverage for costs associated with resettlement process, •In case of cash compensation – support in finding settlement site or assurance of an apartment by the investor, •Institutional and social support for resettled people.

	Illegal squatters	<ul style="list-style-type: none"> •Support in legalizing property, if possible, to compensate as legal owner •Assistance and resources to find new adequate residence •Support in finding resettlement site or assurance of an apartment by the investor, •Institutional and social support for resettled people.
	Holders of easement, mortgage, lien upon properties	<ul style="list-style-type: none"> •Cash compensation for loss of right, •Coverage for transactional costs, •For possessors of right of habitation: <ul style="list-style-type: none"> ○support in finding settlement site or assurance of an apartment by the investor, ○Institutional and social support for resettled people.
Non-residential buildings and structures (stables, fences, technical infrastructure, etc.)	Owners, perpetual users, owner-like holders of buildings and structures	<ul style="list-style-type: none"> •Cash compensation at replacement value for lost assets •Replacement or reconstruction of lost asset •Establishing methods for demolition and redevelopment with the owner / user of the network and facilities, •Handing over the redeveloped network and facilities to their previous owner / user
	Holders of usufruct rights	<ul style="list-style-type: none"> •Cash compensation at replacement value for lost assets •Replacement or reconstruction of lost asset
	Illegal squatters	<ul style="list-style-type: none"> •Cash compensation at replacement value for lost assets

		<ul style="list-style-type: none"> •Replacement or reconstruction of lost asset
	Leaseholders, tenants, users of buildings and structures	<ul style="list-style-type: none"> •Cash compensation at replacement value for lost assets •Replacement or reconstruction of lost asset
Loss of plants	Owners, owner-like possessors of properties	<ul style="list-style-type: none"> •Cash compensation, including costs for arranging and curing of the planting and for lost crops, •Allowing for collection of crops
	Holders of usufruct rights	<ul style="list-style-type: none"> •Cash compensation, including costs for arranging and curing of the planting and for lost crops, •Allowing for collection of crops
	Leaseholders, tenants, users of properties	<ul style="list-style-type: none"> •Cash compensation, including costs for arranging and curing of the planting and for lost crops, •Allowing for collection of crops
	Illegal squatters	<ul style="list-style-type: none"> •Allowing for collection of crops
Loss of trees	Owners, owner-like possessors of properties	<ul style="list-style-type: none"> •Cash compensation, including costs for arranging and curing of trees and for lost crops, if necessary
	Holders of usufruct rights	<ul style="list-style-type: none"> •Cash compensation, including costs for arranging and curing of trees and for lost crops, if necessary
	Leaseholders, tenants, users of properties	<ul style="list-style-type: none"> •Cash compensation, including costs for arranging and curing of trees and for lost crops, if necessary
	Illegal possessors of properties	<ul style="list-style-type: none"> •Allowing for cutting of trees and for collection of crops, if necessary

Impact on business and employment due to land acquisition	Sole traders	<ul style="list-style-type: none"> •Cash compensation for lost income during the period of transition, •Institutional support for people closing their business. •“Land for land” compensation under conditions allowing for continuing agricultural / orchard business or cash compensation, •Cash compensation allowing for undertaking agricultural / orchard business actions within a new property.
	Non-governmental organizations	<ul style="list-style-type: none"> •“Land for land” compensation or cash compensation, •Awarding cash compensation in an amount allowing for undertaking actions within a new property.
	Micro-enterprise (employing up to 10 employees)	<ul style="list-style-type: none"> •“Land for land” compensation under conditions allowing for continuing business or cash compensation, •Cash compensation allowing for undertaking business actions within a new property.
		<ul style="list-style-type: none"> •Cash compensation, •Institutional support for people liquidating their business.
		<ul style="list-style-type: none"> •“Land for land” compensation under conditions allowing for continuing agricultural / orchard business or cash compensation, •Cash compensation allowing for undertaking agricultural / orchard actions within a new property.
	Small enterprises (employing from 10 to 50 employees)	<ul style="list-style-type: none"> •Cash compensation.

	People working under civil-law contracts	<ul style="list-style-type: none"> •Awarding entrepreneurs with compensation allowing for maintaining the highest possible number of work places, •Institutional and social support for unemployed people.
	People working under employment contracts	<p>Awarding entrepreneurs with compensation allowing for maintaining the highest possible number of work places,</p> <p>Institutional and social support for unemployed people,</p>
Loss of or limited access to social facilities	All PAP living in the area covered with project implementation effects	<ul style="list-style-type: none"> •Reproduction of social facilities within another area, •If reproduction of facilities within another area is not feasible or groundless, then assure the access to the existing social facilities.
		<ul style="list-style-type: none"> •Temporary assurance of recreational sites
Community Assets	Community	<ul style="list-style-type: none"> •Reconstruction or replacement of the lost structure in consultation with community

Temporary acquisition of properties	Owners, perpetual users, owner-like possessors of properties	<ul style="list-style-type: none"> •Cash compensation, •Reinstate the property to its previous status.
	Illegal possessors of properties	<ul style="list-style-type: none"> •Reinstate the property to its previous status
	Leaseholders, users of properties	<ul style="list-style-type: none"> •Cash compensation, •Reinstate the property to its previous status.

8.3 DEVELOPMENT OF RESETTLEMENT PLANS (RAP)

8.3.1 INSTITUTIONAL STRUCTURE AND IMPLEMENTATION TEAM RAP

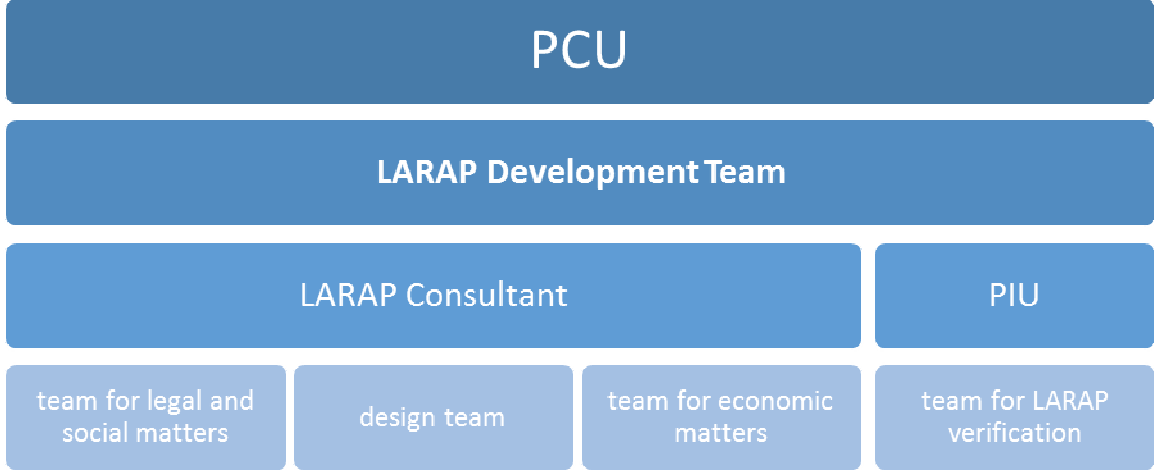
In order to use the knowledge and experience obtained during the implementation of the Odra River Basin Flood Protection Project, all the work on RAP should be consulted with the Project Coordination Unit (PCU), which boasts extensive experience in implementing flood projects in Poland with the use of resources from the World Bank as well as in-depth knowledge of the procedures in place at the World Bank.

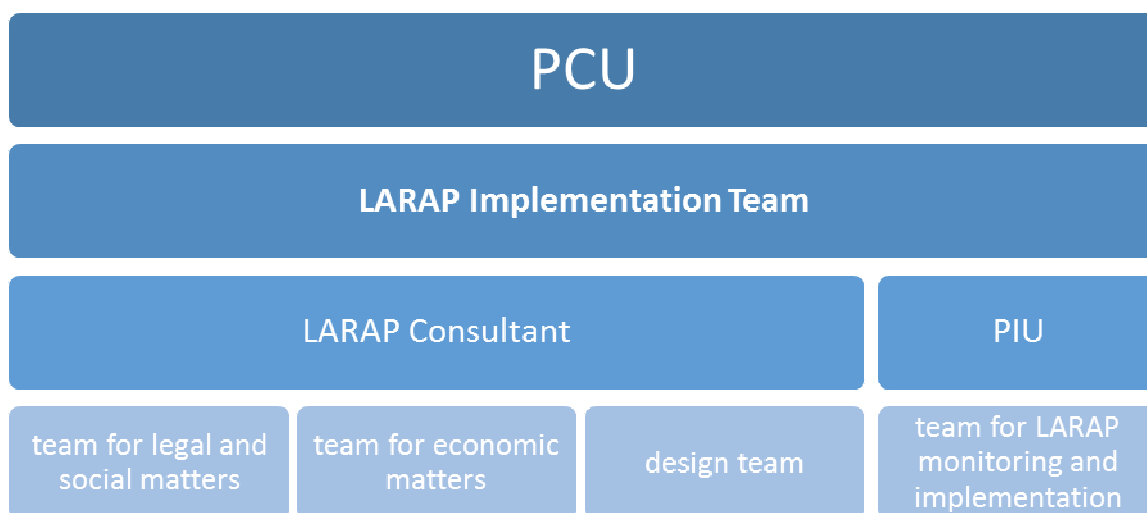
PCU will be cooperating with the relevant Project Implementing Units (PIU). The Project Implementing Units will be responsible, among others, for the preparation of the entire investment process, including RAP, formal and legal documents related to the undertaking implementation (including obtaining the necessary permits and administrative decisions), preparation and tendering for work and services, entering into contracts for work and services, monitoring progress in implementation, financial management and accounting, preparation of necessary reports for monitoring the implementation, and coordination of the work of all services involved in the preparation and implementation of the undertaking to its final implementation, settlement and commissioning.

In order to effectively prepare and implement RAP there will be separate organisational cells established within PIU to handle RAP verification, and then to implement and perform it. In the process of RAP development and performance, PIU will be supported by a Consultant selected in line with the relevant procedure of the World Bank.

The Consultant will support PIU at all stages of RAP- related work – from its development to completion and settlement. In order to effectively support PIU, it will be necessary to establish a project team in the Consultant structure along with a team for legal and social matters and a team handling economic matters.

The institutional structure of the RAP implementation and performance is presented on the graphs below. They take into account the PCU role as an entity coordinating the development of RAP documents, their implementation and their submission to the World Bank.





8.3.2 THE PROCESS OF RAP DEVELOPMENT AND APPROVAL

DEVELOPMENT OF RAP			
Steps	Action	Responsibility	
1	Preliminary social impact estimation	RAP Consultant - team for legal and social matters	PIU – team for RAP verification
2	Determination of the final scope of expropriation and development of a construction plan	RAP Consultant - design team	
3	Development of a socio-economic study (census and baseline)	RAP Consultant - team for legal and social matters, team for economic matters	
4	Determination of coordination framework for RAP implementation with relevant government administration bodies		PIU – team for RAP verification
5	Collection of written and graphic extracts from land and building register and from spatial management plans	RAP Consultant - team for legal and social matters	PIU – team for RAP verification
6	Preliminary social impact assessment	RAP Consultant - team for legal and social matters	
7	Estimation of loss and damage as well as replacement value thereof in line	RAP Consultant - team	PIU – team for RAP

	with the relevant regulations	for economic matters	verification
8	Verification and update of collected materials, impact analyses and economic analyses (Detailed Measurement Survey)	RAP Consultant - team for legal and social matters, team for economic matters	PIU – team for RAP verification
9	Development of RAP project	RAP Consultant - team for legal and social matters, team for economic matters	PIU – team for RAP verification
10	RAP public consultations	RAP Consultant - team for legal and social matters, team for economic matters	PIU – team for RAP verification
11	Introduction of changes into the construction plan as a result of the consultations with the public	RAP Consultant - design team	PIU – team for RAP verification
12	In the scope resulting from taking into consideration comments and motions to RAP - verification and update of collected materials, impact analyses and economic analyses	RAP Consultant - team for legal and social matters, team for economic matters	PIU – team for RAP verification
13	In the scope resulting from taking into consideration comments and motions to RAP - introduction of changes to RAP	RAP Consultant - team for legal and social matters, team for economic matters	PIU – team for RAP verification
14	Submission of RAP to the World Bank	JRP – team for RAP verification	PCU
15	World Bank's no objection	WB	
16	Publishing of RAP locally (Note: The RAP will also be disclosed in the WB's website)		PIU – team for RAP verification
RAP IMPLEMENTATION			
Steps	Action	Responsibility	
1	Determination of a detailed RAP implementation schedule	RAP Consultant - team for legal and social matters	PIU - team for RAP monitoring and implementation
2	Filing motions for Building Permit		PIU - team for RAP monitoring and implementation

3	Informing persons affected by the undertaking about the possibilities of compensation and buyout of real properties which are not planned to be taken up by the investment		PIU - team for RAP monitoring and implementation
4	Processing of the motions to buy the real properties under BP and - respectively - update of the construction plan and update of RAP	RAP Consultant - team for legal and social matters, team for economic matters, design team	PIU - team for RAP monitoring and implementation
5	PIU's acquisition of real property that will be handed over as replacement	RAP Consultant - team for legal and social matters	PIU - team for RAP monitoring and implementation
6	Obtaining of BP		PIU - team for RAP monitoring and implementation
7	Informing the persons affected by the project implementation about obtaining of BP, its ratifications and the investor's planned actions		PIU - team for RAP monitoring and implementation
8	Appraisal of real property by independent and objective auditors, in line with the law in force, and appraisal verification	RAP Consultant - team for legal and social matters, team for economic matters	PIU - team for RAP monitoring and implementation
7	Delivery of the appraisal studies to the expropriated persons and performance of negotiations	RAP Consultant - team for legal and social matters, team for economic matters	PIU - team for RAP monitoring and implementation
8	Should negotiations fail – obtaining a decision from the province governor on compensation		PIU - team for RAP monitoring and implementation
9	Payment of compensation or handover of replacement property, commencement of other compensation and protection measures stipulated in RAP		PIU - team for RAP monitoring and implementation
10	Physical takeover of expropriated property and commencement of work		PIU - team for RAP monitoring and implementation
11	Evaluation of RAP implementation	RAP Consultant - team for legal and social matters, team for economic matters	PIU - team for RAP monitoring and implementation
12	Evaluation of RAP	Independent external auditor	

CYCLIC TASKS			
Step	Action	Responsibility	
1	Internal permanent monitoring of RAP implementation	RAP Consultant - team for legal and social matters	PIU - team for RAP monitoring and implementation
2	Reporting to the World Bank	RAP Consultant - team for legal and social matters	PIU - team for RAP monitoring and implementation
3	Permanent coordination with the bodies of state and local government administration		PIU - team for RAP monitoring and implementation
4	Permanent communication with the persons affected by the project implementation	RAP Consultant - team for legal and social matters	PIU - team for RAP monitoring and implementation
POST-IMPLEMENTATION TASKS			
Step	Action	Responsibility	
1	Evaluation of RAP implementation	Independent external auditor	

8.3.3 CRITERIA AND PROCESS OF REAL PROPERTY INVENTORY

Inventory will be taken on the real property situated in the area of the project implementation and the property whose owners applied for buyout on the grounds that they lost the possibility to use the property as usual due to the implementation of the project. The real property will be inventoried for both temporary and permanent occupation.

Before inventory commences, data on the real property will be obtained from the land and mortgage register and the real property cadastre (register of land and buildings). A land and mortgage register is maintained separately for each real property, while the basis for marking thereof is the data in the cadastre. The data from the register of land and buildings include the following information:

- 1) about lands – their location, boundaries, area surfaces, types of arable land and soil classes, marking of the land registry or collections of documents, if they are maintained for the property comprising the land in question
- 2) about buildings – their location, purpose, utility functions, general technical data;
- 3) about premises – their location, utility functions and floor space.

The register of land and building also indicates the owner (and the owner's place of residence). Also information about entry into the register of monuments and about property value is included.

Having obtained the data from the land and mortgage register, from the register of land and buildings as well as from BP, the inventory of the factual property condition will be performed. The real property condition will be assessed based on the level of management, legal status, technical and utility condition, amount of available technical infrastructure devices. The current real property classification will be established on the basis of the local spatial plan, or, if none exists, on the basis of the study of conditions and directions of spatial development for the municipality, or on the basis of a planning permission. Should no study or permission be available, the actual method of the real property utilisation will be taken into account. Moreover, the condition of the real property surroundings will be taken into account, including the size, features and degree of urbanisation of the town where the real property is located. Such inventory will be required to establish the real property value by the appraiser.

On the basis of the appraiser's opinion the amount of compensation will be established which should correspond to the real property market value, i.e. the value obtainable on the market. If the data from the local and regional market are insufficient to determine the real property market value, then the value will be determined in the cost approach, i.e. based on the costs of its replacement less the real property wear value.

In applying this valuation to meet the replacement cost criteria, depreciation of structures and assets should not be taken into account.

8.3.4 CRITERIA AND PROCESS OF CENSUS AND SOCIO-ECONOMIC STUDIES FOR THE PURPOSE OF RAP

The resettlement plan should be based on the up-to-date information about the anticipated scale and type of Project impacts on the public involved (affected by the Project implementation), and in particular – the affected population. Therefore, for the purpose of accurate forecasting of such impact and for the purpose of determining the adequate and effective compensation, protection and – where applicable – preventive measures (as regards the impact on the public involved), it will be necessary to carry out socio-economic studies. The studies should allow one to describe the standard features of the resettled households. In addition, such studies are to provide the following information:

- exact size of resettlement,
- full information about the basis of population affected by the Project impact, including their sources of income from agricultural and non-agricultural activity,
- determination which groups within the population will be affected by the total or partial loss of property
- indication which public and social infrastructure will be affected by the Project impact,
- determination of formal and informal organisations (such as local organisations, religious associations, etc.) that may be involved in the development and implementation of resettlement plans,
- attitude of the people affected by the impact of the Project to proposed resettlement options.

Therefore the socio-economic study will be divided into two parts. The first part is to recognise the economic and social situation of PAP in detail. It will comprise Project-affected people (PAP), i.e. persons residing, owning land, or companies in the investment area or its vicinity. The questionnaire comprising parts 1, 2, and 3 will be performed by pollsters, during direct interviews with household members.

The second part of the survey will cover the local communities among which households will be randomly chosen; the household will be sent part 2 and 3 of the questionnaire with a reply paid envelope. Given the low reply rate of mail questionnaires, the number of the questionnaires in question will be three times higher than the size of the representative research sample.

8.3.5 CONSULTATIONS WITH THE PUBLIC

The undertakings resulting in physical or economic resettlement must include consultations with those affected and other stakeholders. Consultations held at the earliest possible stage will help determine the expectations related to the project implementation and the benefits thereof. Consultations also offer the opportunity to negotiate contents of the compensation package, eligibility criteria for receiving compensation, scope of assistance during resettlements and optimum time of their execution. Consultations for the purpose of RAP development and implementation are obligatory.

8.3.5.1 STAKEHOLDERS

For the purposes of the resettlement plan, the term “stakeholder” is understood as an entity or group of entities within the project impact that may have a significant, positive and negative effect on the shape or the implementation of the project.¹²

Taking any of the project activities will require the identification of stakeholders, determination of their attitudes to planned activities and of conduct paths available to them, as well as attempts to predict their behaviour. To analyse the stakeholders and their significance for the project we recommend applying the stakeholder matrix. In the matrix the number of stakeholders should be indicated with a certain attitude towards the Project and the impact of its implementation, in line with the example below:

The most important groups of stakeholders that should be considered when developing a resettlement plan include:

¹² The concept of the stakeholder should be distinguished from the narrower concept of the party, which under Polish law is an entity which has legal interest in securing an advantageous outcome of the procedure in question.

- Project-affected families, land users and business
- Public authorities (decision-making, opinion-making and reconciling), with particular emphasis on the local authorities,
- Local community – people directly affected by the impact of the project, as well as, for example:
 - neighbours,
 - community leaders,
 - farmers and entrepreneurs,
 - church representatives,
 - hobby associations, sports associations, youth associations, etc.
- Non-governmental organisations – environmental, social, and other, of international, national and local operation range.

8.3.5.2 INFORMING THE PUBLIC

The flow of information between the investor and the stakeholders is essential to ensure high efficiency of public consultation and community involvement in the project, and thus – it is essential for achieving the objectives of the resettlement plan. For this reason, the investor should take action to identify the stakeholders (see above), and then perform the information process with the following steps:

- Informing the local authorities, community leaders and local community organisations about the planned project as early as possible, along with asking them to further disseminate the information,
- Presentation of all project managers and people who will be in constant contact with the community remaining within the expected impact of the project and of mitigation measures,
- Development of an illustrated newsletter with information about the resettlement, containing details on eligibility criteria, rates of compensation, other rights, as well as presenting the time frame to implement the plan and the relevant procedures.
- Development and regular publishing of information about the issue of resettlement.

Informing the public remaining within the impact of the project about their rights and obligations is crucial for the successful implementation of the plan. Transmitted information must be accessible and understandable for the intended recipients. If necessary, they should be translated into local dialects and languages spoken in the area and disseminated via the available media, both for literate and illiterate recipients (radio, TV, announcements, newspapers, leaflets). One should also take into account the vulnerable groups that do not have access to public media and information exchange.

8.3.5.3 PARTICIPATION OF THE PUBLIC IN THE PROJECT DEVELOPMENT AND IMPLEMENTATION

It is the investor's obligation to initiate the series of consultations with stakeholders throughout the entire time of development and implementation of the resettlement plan. The purpose of the consultation is to provide stakeholders with information about the project and its impacts, as well as providing them with the opportunity to express their concerns about the project and to propose alternatives, which are favourable from their point of view.

The consultations should involve persons representing the investor, project managers, competent authorities, and members of both resettled and hosting communities, and if considered necessary, representatives of relevant local NGOs. The talks should concentrate on the project effects and on the measures that could help mitigate them. The focus should be on common concerns related to the implementation of the project, with particular emphasis placed on vulnerable groups. These concerns should be addressed in the resettlement plan. The aim of consultations should be to provide opportunities for participation of all people affected by the project, particularly with regard to the following areas:

- Alternative paths to implement the project,
- Investment impact assessment,
- Resettlement strategy,
- Compensation rates and eligibility criteria for requesting compensation,
- Selection of the target area and time of resettlement,
- Development of possibilities and initiatives,
- Development of compensation procedures and complaint processing procedures, and
- Development of mechanisms for monitoring and evaluating the impact of the plan implementation, including the implementation of corrective measures.

Regular consultations with stakeholders will allow one to monitor the effectiveness of the compensation package implementation under the resettlement plan as well as of the efforts made to restore means of support, etc. Depending on the investment size and scope the investor may appoint a specialist in charge of liaising with the public and assign to him or her a budget to manage the process of public consultations. An alternative solution is to engage a recognised NGO to perform this function. In each case the investor must make sure that the public remaining within the project impact range is informed about the project and the possibility to obtain compensation due to its implementation. Moreover, project managers should document the flow of information and activities with respect to public consultations. The documentation should allow one to identify the consultees, the subject matter of the talks and their outcome.

8.3.6 GRIEVANCE REDRESS MECHANISM

Objections and comments to the resettlement plan and any reservations with respect to the implementation of resettlement in accordance with the Polish law are classified as complaints and motions. They are decided in a formal procedure stipulated in the CAP. The CAP has been in force in Poland, with some modifications, since 1960. Therefore, citizens and businesses expect from the authorities and other entities obliged to apply the provisions of the CAP that they will examine their comments and motions and provide a response in accordance with the provisions of CAP. In order to supplement the legislation regulations, it is planned that a person will be appointed within the RAP implementation and monitoring unit in PIU responsible for handling public consultations, resolving disputes and communicating information.

Everyone has the right to file a complaint or motion. Filing complaints or motions is not subject to fees. 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. Complaints and motions may be filed in writing, orally or in an electronic form. They may be filed at the body's headquarters or sent by snail mail. If the complaint and a motion are filed with the wrong body, the body is obliged to send the complaint or the motion to the competent body that will consider them.

Depending on the type of investment and the expected range of expropriation, there will also be a consultation point established at the investment venue. There the persons affected by the project implementation can obtain information about the project and its implementation. Complaints and motions may be filed there too.

Complaints and motions will be archived in a separate register, with the dates of their submission, dates of providing answers, and the method of resolving.

If processing of a complaint or motion requires a prior review and clarification of the matter, other materials will be collected, research analyses will be performed, etc.

A complaint or a motion will be dealt with immediately, which entails the obligation to communicate to a party, without delay, the official notice on how the complaint or motion has been dealt with. Such a notice should include the data of the unit that sent it, an indication of how the complaint was handled and a signature with the name and position of the person authorised to deal with the complaint or motion. Notice of refusal to settle a complaint or motion must exhaustively explain the applicable rules and the facts on the grounds of which refusal was based.

In particularly complex cases, as well as in cases where the examination of the complaint or motion requires changing RAP, the term allowed for answering a complaint or motion will be extended to 30 days. If the term is too short, the party will be notified of the cause for not receiving the reply to the party's complaint or motion on time; also the term for providing such an answer should be stated.

Comments and motions made by the parties during the RAP public consultation will be processed in accordance with the above-mentioned procedure.

Reservations submitted by the Parties at the stage of negotiations after the BP issuance will be archived in the minutes of negotiation meetings. Minutes and other documents sent to

one another by the parties during the negotiations, if no agreement concerning the compensation is reached, will be submitted to the competent province governor. On the basis of the documents and the appraisal study the decision on compensation will be issued.

Should the parties be dissatisfied with the decision issued by the province governor, they will have the right to appeal to the minister competent for construction. All statements, motions and evidence submitted in the proceedings before the minister responsible for construction will need to be taken into account when issuing the decision on compensation.

Should the parties be dissatisfied with the minister's decision, they will have the right to appeal to the Regional Administrative Court. The RAC will examine whether the province governor and minister conducted the proceedings in an appropriate and fair manner – also with respect to taking into consideration the observations, conclusions and evidence submitted by the parties to proceedings. In case the decision by RAC is unsatisfactory to the parties, each of them has the right to file a complaint in cassation to the Supreme Administrative Court (SAC). The SAC will examine not only the correctness and legality of the proceedings conducted by the province governor and the minister, but also the decision made by the RAC.

8.4 MONITORING AND EVALUATION OF RAP IMPLEMENTATION

The primary objective of RAP is to ensure that the situation of people affected by the effects of the project is improved or at least that their social and material level before the project implementation is restored. Properly implemented RAP should ensure that this objective will be achieved. Therefore, it is necessary to design a RAP monitoring system, taking into account the specific social impacts of the planned project and the effectiveness of compensatory and shielding measures. Proper implementation requires cooperation between RAP Consultant and PIU. Hence, these individuals should also be closely involved in the RAP monitoring process.

Monitoring is a continuous process of data collection, which should then be analyzed to provide a basis for assessing the level of RAP implementation. The purpose of RAP monitoring is not only to acquire knowledge as to its actual implementation. Current knowledge on the RAP implementation allows you to provide relevant information to people affected by the project, which contributes to reducing uncertainty and allows them to plan their daily activities. It also allows for early risk identification and implementing the methods that allow for the risk elimination or at least limiting.

As part of the monitoring, the progress in acquiring the property for the purposes of the project and the payment of compensations will be evaluated.

Monitoring will be conducted by a team of Consultant and by the PIU on the basis of indicators of the amount of acquired properties and the amount and type of compensations provided. The following parameters will be closely monitored:

- a) the number of real estate for expropriation and expropriated,
- b) the number of people in need of resettlement and displaced,
- c) the number of real properties temporary seized (planned and achieved)
- d) the amount of all expenses for resettlement (planned and achieved)
- e) compensation paid for loss of right to real property (land and/or buildings),
- f) compensation paid for loss of income,
- g) compensation paid for other assets
- g) acquired and allocated real estate,
- h) the extent and status of implementation of protective measures,
- i) the number of complaints versus number resolved.

At the level of the project-affected unit (e.g. family) that are physically or who lose agricultural land, the following indicators will be monitored and evaluated ex-post, as applicable, to ensure that the key objective of restoration, or improvement, of living conditions is met:

- Value of assets lost vs compensation received
- Pre and post displacement income
- Pre and post agricultural productive area
- Pre and post agricultural production
- Pre and post residential building (area, materials, utilities, rooms)
- Pre and post displacement access to education, health and public transportation

The parameters will be monitored on the basis of the information gathered by the Consultant, the information held by the PIU and based on interviews with people affected by the effects of the project, reported complaints and requests, business consulting activities, and consulting meetings with members of the community concerned.

Monitoring results will be presented in the monthly and quarterly reports. The quarterly report will be forwarded to the PCU and the World Bank.

The ex-post evaluation will be conducted six months after the RAP is fully implemented and its objective will be to assess and provide documented evidence that all the commitments/actions in the RAP were implemented and that each affected unit (e.g. family, individual, business) received compensation and that its living conditions have been improved, or at least restored.

8.5 RAP BUDGET AND FINANCE IMPLEMENTATION

All costs associated with the preparation and implementation of RAP, including compensation costs and the costs of staff and administering the RAP, as well as monitoring its implementation will be an integral part of the costs of the Project.

A special account will be established for the Project. This account will be opened by the Ministry of Finance at the NBP. Measures of loan will be transferred from the World Bank and the Special Account be converted into gold, and then combined with other budgetary resources at the appropriate budgetary account.

Then the funds will be made available in the form of the PIU budget transfers. PIU will submit monthly reports on the use of funds in accordance with the normal procedure for reporting to the budget.

The World Bank will be sent requests for disbursement of the loan along with the settlement monies already received and used to finance expenditure under the Project, including the financing costs associated with the implementation and RAP monitoring . This will be done on a quarterly basis. Financial Monitoring reports describing the types of expenditure, together with the applied percentages of individual funds and a request for payment of further measures based on the spending forecast for the next 6 months will be attached to the application. PIU is responsible for keeping complete documentation in the field of project expenditure; this documentation will be subject to annual review and revision by the auditor.

8.6 LIST OF SCHEDULES

8.6.1 SCHEDULE NO. 1. OUTLINE OF “RESETTLEMENT ACTION PLAN” NECESSARY FOR THE IMPLEMENTATION OF THE INVESTMENT

Introduction

Short description of proposed Project (type of infrastructure which should be built within the framework of the Project and which requires the acquisition of land, recovery of land or acquisition of the rights to dispose of the land) and units responsible for its execution and a short statement concerning the fact that “the framework rules of land acquisition” are consistent with the Polish provisions and operational policy of the World Bank WB OP 4.12 and that pursuant to the credit Agreement, the requirements stipulated in the WB OP 4.12 prevail over the national provisions.

The map of an area affected by the Project and the estimation of the number of necessary real properties (with the percentage division into private real property and public real property), area in hectares and the number of persons which would have to resettle and/or in the case of whom the execution of the Project would exert a significant impact on their financial situation.

RAP Objectives

Basic objectives and rules of RAP (compatible Resettlement Policy Framework and WB OP 4.12)

Minimisation of the impact

Description of potential effects of the project.

Description of investment variants in terms of their impact on the society concerned.

Description of any activities taken in order to minimize the impact connected with the land acquisition / resettlement for the purposes of the implementation of the investment.

Socio-economic research

Presentation of the result of sociological and socio-economic research, real property inventory.

Identification of all categories of effects and affected persons.

Summary of consultations carried out within the scope of the research with the members of the society in question.

Description of the necessity to update sociological and socio-economic study, real property inventory.

Description of issues connected with particularly vulnerable social groups.

Description of problem issues connected with obtaining information about the real property (lack of land and mortgage registers, lack of cadastre data) or with the conduct of sociological and socioeconomic study (lack of the owners of the real property, dispute regarding the real property ownership, etc.).

Applicable provisions of law and methods of evaluation

Short description of the applicable provisions of law and key activities to be taken in order to level the differences between Polish provisions and WB OP 4.12;

Description of the evaluation method adopted in respect of structures, land, trees and other assets affected by the implementation of the Project (i.e. the manner of achieving its replacement value);

Specific procedures which will be applicable in particular cases, such as the following, should be determined: owners who are absent, expropriation of land subject to legal dispute, actions to be taken in order to carry out expropriation in the case where negotiations with the owners should end up in failure (e.g. escrow account).

Eligibility criteria and catalogue of beneficiaries

Eligibility criteria should be described (who is authorised to obtain compensation) and a catalogue of beneficiaries should be presented.

A chapter should include a detailed matrix of compensating activities (a beneficiary, kind of compensation/solution to be applied pursuant to eligibility criteria as well as the type and magnitude of the impact).

Places of resettlement

Determination whether a project requires the resettlement of the society in question.

Description of the engagement of local society and particular households in the process of the selection of the resettlement place, evaluation of strong and weak points of a considered place, description of the rules and criteria of the selection of the resettlement place.

Description of the engagement of the society in question in the development of the resettlement strategy and description of this strategy.

Description of the feasibility studies evaluating the adequacy of selected localizations with the consideration of the issues of natural resources (e.g. soil and possibilities of the use of the land, access to technical infrastructure, access to social infrastructure, etc.), evaluation of localization in terms of the impact on the environment and social effects.

Description of legal mechanisms connected with the resettlement: 1) orders, 2) construction, 3) granting resettled persons legal titles to the real property.

Social consultations and participation of the society

Description of various stakeholders, process of participation of the society in social consultations which will be conducted among the population and stakeholders affected by the implementation of the Project in the course of the elaboration of RAP and during the preparation and planning of the resettlement.

Description of the manner of engaging societies affected by the implementation of the Project and other stakeholders in the process of realization and monitoring of the Project.

Description of the plan of disseminating information concerning the RAP's among the societies and stakeholders affected by the implementation of the Project, including information concerning compensation for the lost property, rights to compensation, assistance in the resettlement and appeal procedures.

Mechanism of complaint management

Detailed description of the procedure of complain management and applications filed in the course of the preparation and implementation of RAP.

Step by step description of the registration procedure and the procedure of handling complaints and an appeal procedure.

Description of the manner in which a given case may be brought before civil courts if other options fail.

Institutional structure and implementation team

Detailed description of the team managing the preparation and implementation of the RAPs for particular investments, including team structure and liability of the team members;

Specification of the unit which will coordinate the activities of all implementation units;

Description of external institutions engaged in the process of reinstatement of the level of population (site development, allocation of lands, credits and trainings) and mechanisms which will assure appropriate activities of these institutions;

Discussion about institutional possibilities connected with the process of land acquisition/resettlement and engagement of particular institutions in this process;

Description of mechanisms aiming to assure an independent monitoring, evaluation and final audit of the implementation of the RAP's as well as an assurance that the corrective measures will be taken in due course.

Monitoring and evaluation

Description of the internal process of monitoring of the realization and effects of these plans.

Description of the key monitoring indicators elaborated on the basis of the study of the initial situation and the list of monitoring indicators which will be applied in order to conduct an internal monitoring.

Costs and budget

Estimated costs of land acquisition for specific investments and estimated costs of resettlement and sources of financing.

Schedule of RAP implementation

Chronological list of the steps of RAP implementation with the consideration of the units responsible for each activity and a short description of each activity.

Preparation of the schedule of RAP implementation presenting month after month activities which will be taken within RAP implementation (e.g. with the use of a Gantt chart).

8.6.2 SCHEDULE NO. 2. DESCRIPTION FORM FOR CHARACTERIZING THE INITIAL SOCIO-ECONOMIC SITUATION AND MONITORING INDICATORS

Due to the size of the population in the areas where the investments are planned, it is not possible to question each and every member of the local communities. Thus, the study will be divided into two parts. The first part of the study is intended to analyse the socio-economic situation of PAP. It will include PAP, i.e. persons residing, owning land or an enterprise within the investment site or in its vicinity. Pollsters will conduct direct interviews with households members using a questionnaire that has three sections: I, II and III.

The second part of the study will include local communities. Households will be randomly selected to receive sections I and III of the questionnaire with a return envelope. Due to a low return rate of questionnaires sent by mail, the number of questionnaires sent will be three times the size of the representative study sample. (Annex 9)

9 LIST OF ANNEXES

Annex 1. Environmental impact, mitigation measures and monitoring plan. COMPONENT 1 – LOWER AND MIDDLE ODRA RIVER

Annex 2. Environmental impact, mitigation measures and monitoring plan. COMPONENT 2 – FLOOD PROTECTION OF THE KŁODZKO

Annex 3. Environmental impact, mitigation measures and monitoring plan. COMPONENT 3 – UPPER VISTULA RIVER

Annex 4. Administrative boundaries

Component 1 Lower and Middle Odra – 1 - administrative boundaries

Component 1 Lower and Middle Odra – 2 - administrative boundaries

Component 1 Lower and Middle Odra – 3 - administrative boundaries

Component 1 Lower and Middle Odra – 4 - administrative boundaries

Component 1 Lower and Middle Odra – 5 - administrative boundaries

Component 2 Flood protection of the Kłodzko – administrative boundaries

Subcomponent 3A Cracow – administrative boundaries

Subcomponent 3B Sandomierz, Tarnobrzeg – administrative boundaries

Subcomponent 3C Raba – administrative boundaries

Subcomponent 3D Dunajec – administrative boundaries

Subcomponent 3D1 San – administrative boundaries

Subcomponent 3D2 San – administrative boundaries

Subcomponent 3D Wisłoka – administrative boundaries

Annex 5. Surface Water Body

Component 1 Lower and Middle Odra – 1 - Surface Water Body

Component 1 Lower and Middle Odra – 2 - Surface Water Body

Component 1 Lower and Middle Odra – 3 - Surface Water Body

Component 1 Lower and Middle Odra – 4 - Surface Water Body

Component 1 Lower and Middle Odra – 5 - Surface Water Body

Component 2 Flood protection of the Kłodzko – Surface Water Body

Subcomponent 3A Cracow – Surface Water Body

Subcomponent 3B Sandomierz, Tarnobrzeg – Surface Water Body

Subcomponent 3C Raba – Surface Water Body

Subcomponent 3D Dunajec – Surface Water Body

Subcomponent 3D1 San – Surface Water Body

Subcomponent 3D2 San – Surface Water Body

Subcomponent 3D Wisłoka – Surface Water Body

Annex 6. Designated areas

Component 1 Lower and Middle Odra – 1 - Designated areas

Component 1 Lower and Middle Odra – 2 - Designated areas

Component 1 Lower and Middle Odra – 3 - Designated areas

Component 1 Lower and Middle Odra – 4 - Designated areas

Component 1 Lower and Middle Odra – 5 - Designated areas

Component 2 Flood protection of the Kłodzko – Designated areas

Subcomponent 3A Cracow – Designated areas

Subcomponent 3B Sandomierz, Tarnobrzeg – Designated areas

Subcomponent 3C Raba – Designated areas

Subcomponent 3D Dunajec – Designated areas

Subcomponent 3D1 San – Designated areas

Subcomponent 3D2 San – Designated areas

Subcomponent 3D Wisłoka – Designated areas

Annex 7. “Odra-Vistula” Flood Management Project – List of tasks as of March 2015

Annex 8. Reports from the procedure of public disclosure of Environmental Assessment and Management Framework document (EAMF) (including relevant attendance lists)

Annex 9. Reports from the procedure of public disclosure of Land Acquisition & Resettlement Policy Framework document (LARPF) for Odra-Vistula Flood Management Project (including relevant attendance lists)

Annex 10. PAP’s Socio-Economic Survey Questionnaire