

PLANNING DECISIONS AND THE RISK OF CHANGE TO THE INVESTMENT ASSUMPTIONS ON THE EXAMPLE OF MULTI-FAMILY BUILDING CONSTRUCTION DESIGN ON SNIADECKICH/GLOGOWSKA STREET IN POZNAN

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Abstract

In the process of implementation of the building construction design environmental issues are often treated by a potential investor as the necessary evil. This hostile attitude is often due to the fact that environmental factors may significantly affect on the nature of the investment, or even pause it for some period, as we recently witnessed especially during the realizations in the road industries. Above mentioned environmental factors may also cause the unpredictable investment costs which in turn can significantly increase the risk of cost-effectiveness of the specific implementation. In the case of the projects that do not require obtaining environmental decisions or preparing an environmental impact report, potential environmental restrictions can be defined not until the stage of completion of design work, and after incurring defined expenses. Whereas, some of the environmental conditions could be from beginning translated directly into the land zoning and included in planning decisions that would significantly speed up the investment process and improve the design work.

Streszczenie

W całym procesie realizacji inwestycji budowlanej kwestie środowiskowe traktowane są przez potencjalnego Inwestora jako zło konieczne. To nieprzychylnie nastawienie często wynika z faktu, że uwarunkowania środowiskowe w znacznym stopniu mogą zdeterminować charakter inwestycji, a nawet ją wstrzymać na jakiś okres, czego jesteśmy ostatnio świadkami zwłaszcza przy realizacjach z branży drogowej. Niepokój w tym wypadku budzi duża doza niewiadomej oraz czynnik nieprzewidywanych kosztów inwestycji, co może znacznie podwyższyć ryzyko opłacalności danej realizacji. W przypadku projektów nie wymagających uzyskania decyzji środowiskowych czy sporządzenia raportu pewne ograniczenia środowiskowe mogą zostać zdefiniowane dopiero na etapie znacznego zaawansowania prac projektowych i już po poniesieniu nakładów finansowych. Natomiast niektóre z warunków środowiskowych byłyby możliwe do przełożenia bezpośrednio na warunki zabudowy i ujęte w decyzjach planistycznych co znacznie przyspieszyłoby proces inwestycyjny oraz usprawniło prace projektowe.

Keywords: Planning decisions; Environmental conditions; Geotechnical conditions; Plant protection; Investment costs.

1. INTRODUCTION

In the contemporary urban areas it can be noted the increasing demand for new investment areas. Due to their deficiency finding the new buildings development areas is often limited to the areas with already existing city spatial development method or operated the building plot already managed. In both cases, the areas of new investments are existing in a specific and pre-defined spatial context, neighboring to the urban development, communication and greenery system that significantly determines the manner of planned development.

All future projects, regardless they concern only the renovation, modernization, or lead to major changes in the spatial arrangement, require the implementation of specific projects that will undoubtedly impact the nearest environment. When analyzing this matter in terms of possible changes of local conditions the environmental aspect should be also considered, as in therein regard the effects of hazards may be irreversible.

Evidently, the scale of intervention in the environment may not always have serious consequences, usually though it will depend on the size and complexity of the project. Nevertheless, in each case of ongoing work the aim should be to limit the potential negative impact on the environment in accordance with the principle “prevention is better than cure”.

2. TWO DIMENSIONS OF ENVIRONMENTAL HAZARDS

Due to the complexity of the construction process, the environmental protection issues as well as vegetation should be provided both during exercising of the project and during the time of the construction works. At each of these stages two possible dimensions of the impact of the planned investment should be taken into account: direct dimension, which may cause possible mechanical damage such as damage in the root zone and indirect dimension – associated with habitat changes, e.g. due to the changes in groundwater levels.

Basically, all issues concerning the design, implementation and the responsibility for the building construction works are clearly governed by Polish law:

- Art. 82 of the Nature Conservation Act of 16 April, 2004 – “Earthworks and other works associated with the use of mechanical and technical equipment carried out within the root block of trees, shrubs or the green areas or in the woodland



Figure 1.
Direct threats to vegetation during construction works, Poznań [Own photograph]



Figure 2.
Construction of collector sewers, Poznań [Own photograph]

- should be executed in a manner least detrimental to trees or plants”. [1]
- Sec. 3 Art. 22 of the Construction Law of 7 July, 1994 – states that the obligation to protect the natural environment in the course of the works lies with the contractor. However, the investor should



Figure 3.
Direct threats to vegetation during construction activities i.e. the street repairing, Kochanowskiego Street, Poznan. [Own photograph]



Figure 4.
Earthworks within the root system. There has been a disclosure and damage of the roots and soil chemistry change as a result of long-term retention of alkaline soil materials, Kochanowskiego Street, Poznan. [Own photograph]

result from improper use of design solutions or inappropriate preparing of the building site. Merely in some cases, it may occur that the special actions prior to the execution phase are necessary, e.g. related to the transplanted or logging.

Movement of construction equipment around the root system leads to their tearing and cutting. Exposed roots are drying and freezing. In addition, soil compaction occurs due to the storage of heavy ceramic and concrete elements. The straw mats used for protection of trees trunks are insufficient, because the most important parts of trees in the view of the physiology of trees (root hairs) are destroyed.

In the intermediate dimension the environmental hazard issue is more complicated and not so apparent to predict. It often requires a number of geotechnical and hydrogeological studies, which is extremely important in relation to the permanent consequences of these risks. It may turn out though that environmental conditions significantly reduce the potential of defined building plot and thus decrease its attractiveness to a potential investor.

Therefore, the environmental aspect can be determining when deciding whether to launch an investment project in defined area and it is fully justified to take it into account during the preparatory phase of the project.

The point of reference in this case can be issued planning decisions and the conditions resulting from [3]:

- Nature Conservation Act of 16 April, 2004 [1],
- Act of July 18, 2001 – Water Law [4],
- Regulation of the Minister of Interior Affairs and Administration of 25 April, 2012 on establishing the geotechnical conditions for the buildings foundation [5],

which, nevertheless, without carrying out further research and analysis may not give the required and detailed answers at the stage of launching the investment.

3. IMPLEMENTATION OF THE PROJECT

The complexity of the raised environmental issue may be reflected in the particular investment of the multi-family housing buildings in Poznan, PL. The project was planned in the city center, between the Glogowska Street and Sniadeckich Street, for plots registration no. 1/12, 49, 50.

The foresaid investment was enriched by very attrac-

exercise control over the implementation of the above works. A failure resulting in the destruction or significant deterioration or of the health condition of trees may lead to the imposition on the contractor by the Department of Environmental Protection penalty calculated in accordance with the provisions of the Nature Conservation Act (Article 88 paragraph. 1 and paragraph. 3 and Article 89 paragraph. 1 above Law) [2].

In the situation stated above, the security and protection of vegetation are rather temporary, i.e. in the course of the construction works. Any damage will

tive neighborhood i.e. the downtown compact construction of the early twentieth century on the side of the Głogowska Street and Sniadeckich Street and one of the most beautiful parks in the city of Poznan which from 1925 served as a botanical garden (*Wilson Park* – now in the register of monuments), together with the unique palm house was the ideal context for this type of investment.

The additional marketing advantages of the subject plot were the neighbourhood of the Poznan International Fair as well as the direct access to the city's public transport.

Despite this particularly favorable location the investment area was heavily degraded in the terms of the urban development which was the direct result of long-term operation of chemical plant Pollena Lechia at this place. Therefore, the planned investment also gave the opportunity to create the public space suitable for this part of the city.



Figure 5.
View of the Wilson Park. [Own photographs]



Figure 6.
View of the Wilson Park. [Own photographs]

High potential of the discussed land was utilized already at the stage of case design by planning multi-family residential buildings with a total usable area of 12 500 m², located on the north-south axis, along the border of the *Wilson Park*. Due to this obliging proximity the designers proposed the simple forms of building with high-standard construction i.e.: light-weight block and wide illuminates glazing that allows exposure to the surrounding greenery of *Wilson Park*.

For to the most efficient use of commercial values of the land it was assumed that the most architectural-ly and economically reasonable solution would be to design the underground car parking thus releasing space for main development. This resulted in the fairly dimensional arrangement of the buildings and gave the usable amount of surface intended by the investor [6].

In accordance with the city's parking policy, to meet the required number of 216 parking spaces there has been provided the two-storey underground parking lot. Number of parking spaces resulted from the current ratio of 1 to 1 (one parking space / one apartment) [7].

Implementation of the parking lot required pursuing an earthworks at a depth of 11.0 m below ground level. The analysis of geotechnical conditions of the building's foundation showed that the ground soil had quite complex ground water conditions as well as the level of ground water that imposed the necessity to perform the construction of an underground garage in the form of cavity/slot walls erected on the slab base [8].

Generally, the investment required complicated and expensive design solutions. However, preliminary analysis of soil and water conditions made on the basis of archival material before the purchase of the property suggested the possibility of such a situation, allowing the investor calculate these unexpected expenses in the overall cost of construction.

These water factors, together with the decision on building conditions were the main parameters of the investment.

Since the construction of the family residential buildings was not likely to have significant effects on the environment, there was no need for obtaining the environmental decision and report, but due to the unique proximity of the historic *Wilson Park*, the investor applied to local Environmental Authorities to identify the specific conditions resulting from environmental protection requirements [9].

The received official guidelines concerned mainly



Figure 7.
Visualization of the investment. View from the Wilson Park. Performance Pentagram Architects LLP [6]

security resulting from the course of the construction and regulation concerning logging and replanting the trees, but the office did not refer to soil and water conditions.

In the face of such circumstances the design works were continued in order to take advantage of extremely favorable situation on the real estate market at the time.

Simultaneously, shortly before filing the documentation for a building permission, the decision on building conditions issued for the property was contested by palm house Management, as the party of the administration proceeding (borderer).

Management of the palm house feared that the earthworks conducted within the property may result in a change of water level, which in turn could lead to the destruction of the historic forest stand adjacent to the *Wilson Park*.

The principal argument of opponents was that during the congruent investment which took place in Krakow (the southern Poland), as a result of deep basements construction ongoing in the area of the *Botanical Garden* the level of groundwater dropped about 3.0 m beyond the reach of root zone of the substantial part of trees. Consequently, the old and valuable specimens of trees that were no longer able to develop new root systems were in hazard. Other trees showed the signs of accelerated drying, that besides the reduced aesthetic value required costly care treat-

ments. Currently, above mentioned area requires a very expensive replenishment of water deficiency, which would not provide stabilized groundwater level in whole.

In the aspect of Poznan investment there was also a concern that project design of an underground garage in the form of cavity walls could bring possible barrier to the free movement of groundwater, and thus interfere with the management of water in the *Wilson Park*.

Consequently, a number of additional hydrogeological studies has been carried out that appeared to be favorable for the planned investment. The measurements showed that the water has a general flow from the west and north-west to the east and south-east i.e from the *Wilson Park* to the proposed investment area, and finally there was no risk in the reduction ground water level in the park as a result of the erection of the object.

Nevertheless, considering the location of the building, the proposed levels of underground parking and ground water, it turned out that the main problem in the implementation of the investment may be the accumulation of water levels in the aquifer layer that could have an impact on the vegetation, but also on the foundation of the neighboring buildings. Therefore, some adequate provisions were provided during construction and subsequent exploitation of buildings. At the time of foundation works lowering the water level



Figure 8 .
Map showing the location of measurement marks defining the geotechnical and hydrogeological conditions in the area of the planned investment. The red color indicates the proposed buildings. Performance Geoprojekt-Poznan [8]

in the trench was recommended e.g. through the application of wellpoints, as well as using of drainage facilities along the critical parts of buildings that would facilitate the flow of water in the ground and have negative impact on the environment [8].

The above example shows that the standard approach applied in such a complex investment turned out to be insufficient, and the planned construction works could cause irreparable consequences for the environment, as significantly shifted over time, that actually would make impossible to take any preventive action.

Only performing the additional hydrogeological study gave a full picture of the situation. It was also presented that the results of the study may question the financial legitimacy of the implementation, as in the case of negative results the complete change of profile of the investment would be necessary. In fact

without an underground garage residential development would probably be unprofitable especially in the view of high costs incurred for the purchase in such a strategic location in the city.

At this point the question of the proper time to perform additional analyzes emerge. It is obvious that the construction project is formed on the basis on appropriate planning decisions (local development plan, location and zoning decisions) and more complex geotechnical and geological engineering documentation. However, due to the fact that environmental factors can have such detrimental influence on the nature of the investment, the proper research should be done at the stage of conception or even before the transaction of buying the plot, which requires the consideration and awareness on the side of the investor as well as designer.

In the face of such complex investment designer is

not able to analyze all the required conditions itself, because they often required highly specialized knowledge, e.g. in the field of historic preservation, archeology, or on the point of the environment. Therefore, to the apply the correct solutions it is necessary to appeal to the relevant consultative bodies for help in determining the specific conditions of the investment in order to develop such information into further sector publications.

With the described implementation, it was not necessary to obtain environmental decision, and the opinion of the Department of Environmental Protection lacked the information about the potential indirect risks arising from the carried out works therefore significant difference for the designer and the investor could make some environmental details provided in the content of planning decisions, especially related to such strategic points on the city map as the a historic city park.

4. SUMMATION

Presented paper showed that the essential design guidelines regarding the investment were actually environment parameters of the underground building that dominated the possibility of the investment and were not defined in the content of any administration decisions that generally regulated the size, height, form and area of the building. Apparently though the nature of the investment can completely dominate its development or even stop it that has usually the serious financial consequences for the investor. Early preparation of specific parameters under the environmental conditions of a particular investment, which also could be directly translated into the building size limit, would greatly accelerate the investment process, and thus give a better control over the correctness of the design solutions especially for such a valuable object in the history of the city.

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