

## Selection Scheme for Public Art Center among Abandoned Buildings Applying GIS

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**Abstract.** Growing worldwide movement of abandoned buildings redevelopment shows that demolition is not the only way to solve the problems they cause. Using GIS strategy in the article was made an attempt to review abandoned buildings situated in Khabarovsk city, analyze them and their surroundings in terms of present condition, pedestrian accessibility and location in the urban space to select appropriate site for creating Public Art Center where citizens could develop and share their art skills. On the base of city map was prepared attribute table with various criteria and their characterizations, which are important for studied urban spaces analyses. The paper presents a principle of data gathering and further possibility of model creation as basic steps of GIS work.

**Keywords:** redevelopment, abandoned buildings, public center, GIS.

### 1 Introduction

In the structure of high developing modern cities and fast changing economic situation rises the number of abandoned buildings and territories. Most of them are factories that lost their city-forming role and could not adapt to new technological processes, some are residential and administrative facilities which construction was stopped due to the economic crisis and they remained unfinished. All this buildings contribute neighborhood decline and do not meet modern ecological, economic and esthetic requirements anymore.

Through the physical and theoretical research the study attempts to analyze abandoned territories of Khabarovsk city and detect among them the most appropriate places for further architectural design. Physical data is represented by the land-use characteristics of the city, location, condition and accessibility of abandoned facilities and criteria used for their defining. Theoretical research includes evaluations of chosen criteria, model and map created on the principles of GIS work. All the data focused to find a facility most suitable for public building reconstruction.

Current project is preparation step based on which could be proposed architectural design idea for abandoned building adaptive reuse into Public Art Center.

## **2 Theoretical Research**

### **2.1 Public Art Center**

Modern art is different from traditional one and require different creative approach in architectural and design solutions. Abandoned buildings are excellently suitable for these objectives as an objects even reconstruction process of which could be transformed into art. At the moment, abandoned buildings are used by young artist to demonstrate and develop their creativity that is accepted by society as an act of crime. Purpose of this project is attempt to elevate this creativity from vandalism to higher standards level by creating the public vital space that citizens could use freely to share ideas, practice their art skills, teach and learn from others.

### **2.2 Redevelopment and adaptive reuse**

Redevelopment is the process of reconstruction and designated purpose transformation of facilities and territories for their most effective use. Namely, redevelopment involves the comprehensive solution of issues that require specialists capable to solve challenging problems at the interface of the different areas, such as coordination, construction, engineering, economic analysis, logistics and marketing.

Nowadays redevelopment grows in popularity. Former factories and military facilities, damaged historical buildings in different countries become residential complexes, offices, museums and art centers. However, redevelopment of abandoned constructions is not isolated. It affects all the surrounding area. The best example is the High Line project in New York City, which transform old railway into beautiful park creating the new center of attraction. Thanks to High Line park in that area appear many new high-grade architecture. Thus, from the 2009 there was started the new residential complex of Zaha Hadid and by the end of 2015 is planned to create Whitney Museum building by the Renzo Piano project.

### **2.3 GIS**

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data. GIS lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends. GIS is the go-to technology for making better decisions about location. Common examples include real estate site selection, route/corridor selection, evacuation planning, conservation, natural resource extraction, etc. Making correct decisions about location is critical to the success of an organization. However, due to absence of part of basic data in the study used only methodology and principles of GIS work in solving certain problem.

### 3 Project process

#### 3.1 Data gathering

First step of the project was collecting all the necessary for research physical data. Than all the buildings were mapped and reviewed which allowed revealing the correspondence between selected places and city urban space.

#### 3.2 Attribute tables description

City map attribute table contains following fields and criteria: number of the building, name, location, present condition, public transport and pedestrian accessibility, presence of educational facilities in the area, existence of newly constructed or in the process of construction facilities.

Present condition criterion defines building's quality level. 'Good' and 'medium' means that facility is not fully destroyed, almost remained in its original look and do not need any extra structural stability control. 'Bad' and 'critical' represent almost destroyed buildings that need special examination.

Public transport and pedestrian accessibility (PPA) criterion evaluate the pedestrian shed from the public transport stop to the chosen place. It is rated from '0' to '5', where '0' means walking distance over 2500 m and '5' less than 500 m.

Primary audiences that will use Public Art Center are children, teenagers and students. In the educational facilities criterion (EF) counted the amount of schools, universities/kindergartens in the radius of 1500 m from the studied building.

Newly constructed facilities and the ones under construction might be sign of area vitality and continuous development. In the field reviewed constructions in the radius of 2000 m.

**Table 1.** Attribute table

№	Name	Condition	PPA	EF	NCF
1	179 Khabarovsk ship-repair facility	good	4	2/1	+
2	Kirov shipbuilding facility	bad	4	4/3	+
3	Infidel tower	medium	5	3/5	-
4	Bogdanov manor house	critical	5	-/1	+
5	"Daldizel" Factory	medium	5	3/5	+
6	Milling plant	critical	5	6/4	+
7	Training complex	good	5	6/4	+
8	Unfinished building	medium	5	11/11	+
9	Gorky Khabarovsk Factory	critical	5	3/3	-
10	Oil and Fat Plant	critical	5	6/7	+
11	Structural aluminum factory	bad	5	-/-	-
12	Khabarovsk brick factory	good	5	5/6	-
13	Concrete products plant 154	medium	5	1/1	-

### **3.3 Model creation**

After collecting all the necessary data and defining criteria and their evaluation was created the model that shows process of GIS work. With the selection tool were chosen abandoned buildings in good and medium condition. Than public transport stops were buffered with the radius 1000 m. Also using buffer tool were defined educational facilities in the radius of 1500 m. Next step was selection of buildings on the borderline with newly constructed facilities. Buildings situated on the industrial, cemetery and health facilities zones were erased and remained abandoned buildings examined one more time.

## **4 Results**

During the study process were selected three abandoned territories, which respond to performed objectives. However for more impartial assessment should be done complex analysis of area potential factor, infrastructure, ecological situation and territory urban development plan. In addition, more detailed analysis needed for the industrial zones of the city. Most of them have lost their primary function but remained potential for adaptive reuse and revitalization.

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