

Terms of Reference

Regarding

**Geographical Information System (GIS) development in EUACI’s partner cities: Nikopol and Mariupol**

Date: 30-NOVEMBER-2022

## Background and context

**The European Union Anti-Corruption Initiative (EUACI)**

The European Union Anti-Corruption Initiative (EUACI) in Ukraine is a joint EU and Government of Denmark financed programme aimed at supporting Ukraine in its efforts to reduce corruption at the national and local level through the empowerment of citizens, the civil society, businesses and state institutions. In May 2020, the EUACI entered into its phase II that runs till mid-2024.

The EUACI has three components supporting anti-corruption reforms from different angles:

Component 1, supporting key state anti-corruption agencies in improving their effectiveness and independency;

Component 2, supporting selected integrity cities in the efforts to strengthen their integrity, transparency and accountability; and

Component 3, supporting Ukraine’s civil society, media and business community in the efforts to increase awareness of and engagement in anti-corruption activities.

This specific assignment concerns the EUACI’s support to integrity cities (Component 2). The component aligns with the government’s encouragement of the adoption of e-government functions by using ICT to improve the efficiency, effectiveness, transparency and accountability of government at all levels.

In this context, the EUACI is seeking a Contractor that can work closely with the EUACI and its partner cities in GIS development and implementation.

Current situation in the cities is described below.

The on-going war has left Nikopol and Mariupol cities with partially or completely destroyed infrastructure. These are several medical institutions, schools and pre-schools, residential buildings as well as industrial premises and commercial buildings. The water-supply-, electrical- and heating systems have been severely damaged. In summary, Nikopol continues to function, although in an emergency mode, where focus and resources are directed towards ensuring that basic humanitarian needs are met, before attention is given to development activities, including the planning of reconstruction and renovation activities. The situation in Mariupol is worse, it is under occupation, remaining residents having no access to basic amenities. The water-supply-, electrical- and heating systems have been severely damaged.

EUACI provided Mariupol city administration with a tool for accounting damages and destoyed objects. Now it is necessary to develop a separate module "Accounting and maintaining a register of subordinate objects", i.e. non-residential premises, including commercial premises, as part of facilities (pharmacies, libraries, etc.), for excisting GIS system «Objects of destruction and reconstruction projects».

In Nikopol subsystem “Objects of destruction and reconstruction projects” has not been needed until recently. EUACI envisions it will be developed within the functioning of the existing geographic information system.

Due to extraordinarity of the situation, EUACI imagines communication with beneficiaries will happen online only, trainings on use of the module in Nikopol to be conducted online as well.

These Terms of Reference (ToR) provide more details about the assignment.

**The partnership with Integrity Cities**

The five integrity cities with which the EUACI has entered into a partnership under its component 2 are: Chernivtsi, Chervonohrad, Mariupol, Nikopol, and Zhytomyr. In 2022 the Mykolayiv city council became the new partner.

During phase 1, the EUACI worked with these cities to strengthen their systems and tools to enhance integrity, transparency, and accountability. The partnership will continue in the current second phase of EUACI, focusing on the continued development of the various integrity tools launched during phase one.

One of the integrity tools promoted during the first phase was the Geographic Information System (GIS).

**The Geographic Information System (GIS)**

The GIS designed with the Іntegrity Cities aims to capture, store, analyze, manage, and present all types of spatial or geographical data. The GIS as a tool for strengthening integrity rests on the idea that a well-designed GIS (based on actual, high-quality, standardized geospatial data) can be a strong foundation for more efficient and effective municipal management of public resources, and increasing citizen engagement and participation in public planning and decision-making processes.

A reason for this potential is that GIS makes it possible to combine the simultaneous analysis of statistical-, demographical-, and geographical data; and for excellent visualization of the results. In particular, the ability to visualize the results of often very complex analyses of large amounts of data has been shown to help decision-makers and ordinary citizens better understand these results and how public plans and decisions will affect them.

Hence, a “Geo-Portal” understood as a publicly accessible module of geo-information system can help increase transparency and accountability on municipal management because it is quite difficult to manipulate open map data and facilitate increased citizen awareness of and e-participation in public planning and decision-making processes.

The EUACI supported the five partner cities in developing and implementing GIS modules during phase І. This has resulted in functioning GIS in two cities that now needs to be updated and developed in accordance with the requests of city councils and their executive bodies.

**Technical Assistance**

These Terms of Reference (ToR) are intended to meet the partner cities’ need for technical assistance with the development and improvement of GIS.

## Purpose

The purpose of the assignment is to provide a sound technical foundation for the EUACI's support to its partner cities in further development and expansion of GIS functionality.

The assignment aims to provide services for the GIS development for Nikopol and Mariupol City Councils.

## Objective

The objective of the assignment is to provide services required for the GIS development in the five partner cities according to the technical requirements annexed to this Terms of Reference.

## Scope of work

The scope of work includes all the activities necessary to ensure the achievement of the objective above, including, but not necessarily limited to:

**Kick-Off:**

1. Present updated work plan and assignment implementation strategy and considerations to EUACI Component Team during Kick-Off meeting.

**GIS modules development**:

1. Based on the technical requirements (Annexes 1-2) approved by Integrity Cities to draft terms of references (technical specification) for the development of each GIS subsystem (module) for 2 partner cities;
2. Present terms of reference (technical specifications)the to EUACI Component Team and representatives of Integrity Cities;
3. Develop the beta-version of subsystems (modules) of GIS, and create databases based on the approved detailed technical requirements (technical specification) on Objects of destruction and reconstruction projects in Nikopol and Mariupol.
4. To organize the process of testing the beta versions of the developed subsystems (modules) in the city councils and address the comments received from the municipalities at the testing stage
5. Update the subsystems (modules) based on the test results and transfer the subsystems (modules) to cities;
6. Collect data for subsystems (modules) from municipalities, clean the data received and geocode it, refine it and upload in subsystems;
7. Provide training to local officials on how to work with, and administer the developed subsystems (modules);
8. Conduct a basic technical assessment of the developed subsystems (modules), develop and present basic technical assessment report to EUACI Component Team and partner cities;
9. Prepare technical documentation, instructions, manuals, prepare training videos and provide them to municipalities.

**Presentation of developed GIS:**

1. Participate in public presentations of the developed GIS subsystems (modules) organized by EUACI and Integrity Cities.

## Deliverables (output)

The deliverables are presented in Table 1 below along with a tentative timeline.

All deliverables are expected to be delivered in soft and hard copies unless otherwise agreed upon. Soft copies shall be submitted via email to the indicated EUACI contact person.

**Table 1: Summary of deliverables/outputs and the tentative timeline for delivery.**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Deliverable/Output** | **Timeline** | **Note** |
| 1 | **Updated work plan**, showing the timing for the GIS development with detailed terms of reference, beta-version development, testing, training and public presentations  | 2 weeks after the contract signing | To be submitted to the EUACI contact person by email during the Kick-Off meeting ahead of the presentation. |
| 2 | **Detailed terms of reference (technical specifications)** for the GIS development and approved by partner cities | 1 month after contract signing | These should be separate detailed terms of reference (for each partner city) presenting how the GIS subsystems (modules) shall function, reflecting both business processes agreed with cities and technical requirements. |
| 3 | **Data management:** сollection, processing, cleaning, geocoding and uploading of data in the GIS module | 2 months after detailed terms of reference approval | It should be formed qualitative and structured sets of geospatial data based on data transferred by partner cities |
| 4 | **The beta-versions of 2 GIS subsystems (modules)** are developed for each of the partner cities and data is collected, refined, geocoded and uploaded in subsystems. | 3 months after detailed terms of reference approval | The beta-versions of GIS subsystems are developed for each city and presented to them.Note: All subsystems should be developed according to the detailed terms of reference (specifications) based on technical requirements and approved by EUACI and cities. |
| 5 | **The updated version of 2 GIS subsystems (modules) installed on cities’ servers and put into operation (productive)** | 4 months after detailed technical reference approval | After testing the beta version of the developed subsystems (modules) and addressing the comments received from municipalities, the updated version of subsystems should be installed and configured on the municipalities’ servers, all documentation provided.  |
| 6 | **The basic technical assessment of the developed GIS subsystems (modules) is conducted.**  | 3 weeks after the modules are put into operations | The basic technical assessment of the developed and installed GIS subsystems (modules) in Integrity Cities is conducted, and a report is provided to EUACI staff and Integrity Cities. |
| 7 | **Preparation of training plan and at least 4 training sessions provided** for public officials responsible for working in developed subsystems (modules)of the partner cities | 3 weeks after the beta version is developed and tested | A contractor is expected to develop training materials and a plan that includes at least 4 training sessions for public officials responsible for working in GIS subsystems (modules).A training plan is a subject for EUACI and municipalities approval. Training sessions are conducted, the list of participants and trained officials are provided to the EUACI staff with training materials. |

The timelines indicated in the table above are indicative. The contractor will reflect on and update the timelines for different activities during the preparation and updating of the contractor’s work plan. During the Kick-Off meeting with the EUACI Component Team, the contractor’s updated work plan will be discussed, including the proposed timeline for the different activities and the submission of deliverables.

##  Timing

The expected duration of the assignment is 4 months, with a tentative start in December 2022 and completion in April 2023.

##  Methodology

The contractor will work under the supervision of the EUACI Team Leader for Component 2.

Based on the consultations with the EUACI staff and the needs identified in the documentation provided from partners, the contractor will prepare the work plan and send it to the EUACI Team Leader for Component 2 for approval at least a full work week ahead of time.

The contractor's work plan shall be output-based, specifying the outputs the Consultant will be delivering or contributing to, the activities carried out, and the input required in terms of workdays.

**Table 2: Tentative activity phases and estimated required workdays**

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase** | **Activity** | **No. of days** | **Note** |
| 1 | Preparation of work plan | 2 | Including analysis of technical requirements and communication with partner cities |
| 2 | Development of 2 detailed terms of reference (technical specifications) | 5 | Including analysis of technical requirements, collection of requests from partner cities, approval of final versions of ToR by executive bodies of city councils |
| 3 | Development beta-versions of 2 GIS subsystems (modules) | 25 | Including building architecture, design, coding and basic testing |
| 4 | Collection, processing, geocoding, cleaning and uploading of data in the GIS modules | 20 | Including data collection from cities’ administrations, data analysis, data processing, data cleaning, data geocoding, data analysis, testing and feedback from partner cities |
| 5 | Development of final version of 2 GIS subsystems (modules) and launch on city servers, put into operation (productive) | 30 | Module upgrades including testing and collected feedback from partner cities |
| 6 | Conducting a basic technical assessment of the developed GIS subsystems (modules) | 5 | Including general external independent code quality assessment, user-friendly design requirements, general analysis of product compliance with basic cyber security standards and preparation of a detailed report |
| 7 | Development of training plan and provide 4 training sessions | 6 | Including curriculum preparation, training materials and conducting offline seminars in cities |
|  | **Total** | **93** |  |

The contractor should appoint a responsible project manager for communication with the EUACI Component Team and responsible managers for communication with each of two cities.

The contractor reports monthly about the work plan implementation and plans to EUACI Team Leader for Component 2.

## Payment

Payment will be made in a maximum of two instalments.

The first instalment, representing a maximum of 30% of the total contract value, will be made after receipt of the contractor’s updated work plan.

Second, and final payment will be made upon receipt and approval by the executive bodies of city councils and all other supporting documents, including a Final Invoice.

Payment will be based on the actual days worked, the agreed daily fee rate and the expenses incurred by the contractor during the period. Payment will require verification of completion of deliverables and approval by the Team Leader for Component 2 of the Contractor deliverables and expense outlay.

## Qualifications and Competence of Staff

The assignment described above is expected to be carried out by a qualified Contractor.

The contractor has to meet a minimum of the following requirements:

* official registration of legal entities or individual entrepreneurs according to the legislation of Ukraine;
* minimum 3 years of experience with GIS projects, including developing and implementing GIS for local self-governments, territorial communities, business process reengineering;
* minimum 6 successfully implemented GIS projects in the field of GIS for local self-governments;
* minimum 3 years of experience from working with GIS/Spatial technologies and leading the development of GIS-based software projects; and
* minimum 2 years of experience with training for public officials in GIS/spatial technologies and providing consulting services to users on the use of GIS software;
* minimum 3 years of experience of cooperation with local self-governments on the development and implementation of software;
* the level of qualification of the specialists involved in the project (summary of the involved specialists) should be high (minimum master degree in computer science, GIS or relevant field);

The contractor's core team shall include the following profiles:

|  |  |
| --- | --- |
| **Position** | **Team lead, project manager** |
| 1-General Qualifications | * 4 years of experience as a team lead in GIS development projects or/and project management
* Proven experience with providing technical assistance, services to government agencies or local self-government
 |
| 2-Adequacy for the assignment | * Experience in leading teams of a similar nature in a relevant technical field
* Experience in implementation of GIS-based assets and database management systems and the application of geospatial technologies and public service provision
 |
| 3-Experience in the region and language | * Relevant working experience in the region.
* Basic English language communication skills (verbal and written, A2-level), fluency in Ukrainian
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|  |  |
| --- | --- |
| **Position** | **GIS specialist** |
| 1-General Qualifications | * Master degree in geoinformation systems and technologies or relevant
* 3 years of experience of GIS development and implementation
 |
| 2-Adequacy for the assignment | * Experience in handling an assignment of a similar nature in a relevant technical field
* Experience in implementation of GIS-based assets and database management systems and the application of geospatial technologies and public service provision.
 |
| 3-Experience in the region and language | * Relevant working experience in the region.
* Basic English language communication skills (verbal and written, A2-level), fluency in Ukrainian
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|  |  |
| --- | --- |
| **Position** |  **Geoinformatics expert** |
| 1-General Qualifications | * Master degree in geoinformation systems and technologies or relevant
* 4 years of experience of GIS development and implementation
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| 2-Adequacy for the assignment | * Experience in handling an assignment of a similar nature in a relevant technical field
* Experience in implementation of GIS-based assets and database management systems, and the application of geospatial technologies and public service provision.
 |
| 3-Experience in the region and language | * Relevant working experience in the region.
* Basic English language communication skills (verbal and written, A2-level), fluency in Ukrainian
 |

## . Estimated budget and level of effort

The maximum budget available for this assignment is **DKK 141,300 (equivalent to approx. EUR 19,000)**. This amount includes project-related costs such as, for example, audit, basic technical assessment and printing.

Companies submitting proposals will need to submit an offer broken down by fees and reimbursable costs. Proposals, where the offered Contract Price exceed the above maximum budget, will be rejected.

## Management

The contractor is responsible for the timely delivery of the outputs required in the required quality and quantity for the internal management of the contractor’s team.

The EUACI will appoint a contact person responsible for the management of this assignment from the side of the EUACI, including for any correspondence with regard to the implementation of the assignment and for issues related to the agreement between the contractor and the EUACI. The contractor will report to and ensure that the appointed contact person is copied in on all relevant communication related to the assignment, including correspondence with all the five partner cities and any other stakeholder.

## Background documents

The key background document is the Programme Document for EUACI, Phase II, and specifically the draft Development Engagement Documents (DEDs) for the five integrity cities.

In the preparation of documents, the contractor is obligated to take into account the related local regulations about the operation of GIS, national legislation in the field of geospatial data infrastructure, and standards of the national legislation in the field of open data.

Annex 1 Technical requirements for development GIS for Nikopol city council.

Annex 2 Technical requirements for development GIS for Mariupol city council.

**Annex 1**

**Technical requirement for GIS subsystem** **«****Objects of destruction and reconstruction projects» in Nikopol.**

Content:

* + - 1. Introduction
			2. Technical requirements for GIS subsystem “Objects of destruction and reconstruction projects”
			3. General description of the subsystem “Objects of destruction and reconstruction projects”
			4. Nonfunctional requirements for all GIS subsystem
			5. Technical requirement for data collection, processing, refining and uploading
			6. Technical requirements for training for internal GIS subsystem users
			7. Technical requirement for technical and consultation support of GIS subsystem in Nikopol City Council
			8. Stages of GIS subsystem implementation in Nikopol City Council

Introduction

These technical requirements for subsystem “Objects of destruction and reconstruction projects” is developed as a part of the cooperation between Nikopol City Council and the EU Anti-Corruption Initiative (hereinafter - EUACI). These subsystems will be developed within the functioning of the existing geographic information system, will be displayed on the existing official geoportal of the Nikopol City Council.

The introduction of new GIS subsystems requires standardization of the workflow in Nikopol City Council, communal enterprise, institutions, organizations, vectorization, and digitization of materials to create a cartographic basis for subsystem development. Training of responsible city council employees is also a part of the new GIS subsystem implementation.

The document consists of terms of reference (ToR) for subsystem development and ToR for collecting, processing, and uploading data to GIS subsystem, training public officials, and technical support.

The subsystem should be developed using the principles of the concept of Free and Open Source Software (FOSS), extended by the paradigm of humanitarian responsibility (Humanitarian-FOSS) and includes the following requirements:

1. Focus on solving critical tasks to increase the speed of service delivery. High focus on quality, reliability, and stability of the GIS, elimination of data loss and duplication.

2. High requirements for the organization of the user interface (usability), minimum requirements for the qualifications of users and the need for their training.

3. Ensuring the required level of personal data protection in accordance with the Data Protection Law.

4. Ensuring transparency of access to information.

5. Ensuring software components reservation.

All components that will be implemented and shipped under this procurement must be provided under the terms of the GPL (http://www.gnu.org/licenses/gpl.html) and ensure the openness, transparency, and availability of product codes based on the OpenSource ideology (free software license).

**1.2. Software requirements**

The software should consist of:

* system software, based on existing GIS software;
* application software.

The software should reflect the specifics of the functional tasks of users and provide:

* support for generally accepted international standards for open systems;
* compatibility and integration;
* support for operation in heterogeneous hardware and software environments;
* built-in error protection mechanism and integrity maintenance.

System software includes:

* operating systems;
* database management system;
* application servers.

The result of subsystem development should be installed on existing servers, and should not be accompanied by the installment of additional operating systems, databases, application servers.

The system software decisions must be technically and economically justified in terms of integrity and reasonable completeness of the software application and its components for the purpose and minimize the cost of further maintenance.

The application software should include software that is developed and configured during the subsystem's development. Based on the results of development and implementation, the software code of the application software in electronic form and non-property, property rights must be transferred by the Contractor to the Customer.

The application software development should be carried out with the help of modern software engineering tools to design and generate distributed databases (CASE-tools).

**1.3. Requirements for technical and information architecture**

**1.3.1. Basic requirements**

Three-tier architecture: Database Management System/Database (DMBS), Application server, Thin client. All components (including DBMS and Application Server) must be free of charge based on freely distributable software. Preference may be given to components with public (open) source code. The software assumes presence in delivery of a DBMS and adjustment of work with it. The terms of delivery of the database should be without any paid types of licensing.

A thin client is a web interface for users to work through a web browser (the solution must be compatible at the time of implementation with the late versions of the most popular browsers).

The interaction between the application servers of individual subsystem must be performed via the HTTPs protocol.

The interaction between the application server and the client must be performed via the https (tls) protocol.

Service-oriented technology should support geospatial data storage (topographic maps and plans, remote sensing data, profile geospatial data of application modules) and ensure the publication of this data in workplaces with limited hardware resources.

For e-maps and online applications software run an open-source library using JavaScript, HTML 5 as a semantic markup language, CSS3 as a stylization language, and Bootstrap 5 as an adaptive layout, or the equivalent distributed with a free license except for Adobe Flash or Microsoft Silverlight technologies should be used.

The application server must be developed on Node.js using the Express framework or a similar input/output non-blocking platform that executes asynchronous requests to build high-performance networking applications that are distributed under free software license.

Basic mapping, cartography, analysis and data management tools should be ready to use immediately after the launch and easy to set up. Interfaces, dialogues, messages, forms of issuing results, documentation of workstations and administrators should be formed in Ukrainian and Eanglish.

1.3.2. Requirements for the components

All components (subsystem) must have a unified web user interface of automated workstations. All web interfaces must be unified to work and perform on personal computers, tablets and mobile devices.

Each subsystem that is involved in the formation, filling, editing and maintenance of data must contain mandatory sections:

* register of objects;
* object card;
* editing forms;
* cartographic visualization on the map (for objects that have spatial localization).

The register of objects should provide:

* control the display of columns with information in the tabular register;
* page-by-page display of data in the tabular register (for registers where the number of objects exceeds 100 pieces) to minimize the hardware resources;
* control the display of the number of objects within one page (example: display on one page of 10, 20, 50, 100 objects)
* export of information about registry objects in xls, csv or other agreed with Customer format;
* search for objects by text query;
* search query should be stored and saved in the address bar of the web interface to allow sharing the selected information with other users of the system.
* selection of objects (filtering) with the following capabilities:
	+ date range filter (for data containing date format),
	+ drop-down list filter (for directory-generated data),
	+ checkbox filter for selecting several options (for data generated on the basis of the directory),
	+ numeric range filter,
	+ filter with the choice of spatial coverage (for registers that contain spatial localization),
	+ actions with the selected filters should be stored in the address bar of the web interface to provide the ability to share the selected information with other users of the system.
* editing the data of the table register when you click on a cell in the table,
* color gradation of registry objects according to status.

The object card must provide:

* display all the information stored on the object in the database;
* display the spatial position of the object on the map;
* display attached photos (photo galleries) and other attachments;
* the option to attach an unlimited number of documents;
* the option to comment on the object;
* display information on the change of the object (by whom and when the object was created, who and when last edited it), log change should be available;
* the option to generate a document about the card object with all available information;
* interface elements such as horizontal and vertical "tabs", "accordions", image gallery and others should be used to display a large amount of information on the object card.

The editing form should provide:

* entering the following category of information: text information, directory information, numerical information, object geometry, images, files;
* the information in the form should be divided into groups by the appropriate title;
* drop-down lists in the form should be formed on the basis of directories or other registers in the system;
* fields for entering numbers must be controlled for entering inappropriate characters;
* drop-down lists, which are formed on the basis of a significant amount of information, should be downloaded only at the request of the user with notification about the size of the file, and not in full (to reduce the hardware load on the system);
* the form element for entering the spatial position of the object must be able to load the geometry of the object from a third-party file, and it must be possible to export this information to a file.

Mapping of registry objects should provide:

* display objects on the map as point, linear, or polygonal objects;
* display point objects with icons defined by the Customer;
* display of registry colors in different colors according to the status;
* selection of objects on the map using a system of filters;
* building buffers around registry objects within the map;
* construction of heat maps of the density of objects on the map or other categories defined by the Customer;
* setting the transparency of the display of registry objects for use in visual comparative analysis with other registries;
* selection of an object on the map to obtain information about it (register objects on the map must be interactive);
* save information about the selected registry object layer and selected filters in the address bar of the web interface.

2. Technical requirements for GIS subsystem “Objects of destruction and reconstruction projects”

**2.1. Goals and purpose of the subsystem “Objects of destruction and reconstruction projects”**

The purpose of the subsystem is to increase the efficiency of accounting for destroyed objects and preparation of projects for their reconstruction by the Nikopol City Council, simplify access to information provided by structural units of the executive body of the city council, enterprises, institutions and organizations.

Implementation of the subsystem involves the formation and updating of registers for different categories of objects and the entry of primary data on projects.

The main task of registers, maps is to increase the efficiency of public utilities, avoid unnecessary costs, competent allocation of equipment and time in everyday work and unusual situations.

The implementation of the subsystem will provide reliable data on the quantitative and qualitative characteristics of оbjects in the city and the status of preparation, implementation, monitoring of reconstruction projects.

**2.2. The structure of the subsystem**

The structure should include a storage subsystem (file storage) and a database subsystem (dynamic content relational storage), as well as a topographic plan 1: 2000 (1: 500), external services OpenStreetMap, GoogleMaps, Bing Maps (or equivalent) for work with maps. The design of the subsystem should be in the style of the implemented geoportal <http://nk-geoportal.dp.gov.ua/>, in soft tones and using HTML and CSS languages.

The structure of the subsystem by their nature belongs to the category that must remain relevant for a long period of time. Static materials are technically implemented in the form of HTML-pages containing text, graphics and multimedia components. The contractor develops tools for working with the subsystem, data storage (file storage) and database subsystem, priority processing and loading of data necessary for the subsystem, while constant information content of layers (text, graphics and multimedia components) of the subsystems Nikopol City Council provides independently.

The subsystem consists of administrative and public parts. The administrative part is designed to maintain databases, enter information and current work, planning, control and monitoring the work of structural units of the executive bodies of the city council. On the public part of the subsystem it is displayed on the official geoportal of the Nikopol city council where, besides viewing of data in the form of registers, maps, access to data, the possibility of access to data through API, data loading is provided.

The administrative part envisages the functioning of modules for data entry and accounting of destruction objects and projects of restoration, control and monitoring, digitization and automation of management, planning and reporting processes.

**The subsystem consists of the following modules:**

**Register of destroyed/damaged objects.** This register contains detailed information about objects that have been destroyed or damaged by all available documents, schemes, passports for these objects, balance holders, etc.

**Register of reconstruction, recovery and development projects.** This register contains a detailed description of the reconstruction projects with the initial data about the object, a brief description, the status of its implementation, the budget and technical documents.

Implementation of subsystem modules should provide prompt and high-quality input of quantitative and qualitative characteristics of objects and projects, including using mobile devices, uploading photos and documents with the ability to attach them to the object, changing and assigning the status of objects in the relevant registers, automation of reports and inquiries and entry of data on the status of objects with photo-fixation / video-fixing and geo-localization using a device with GPS navigation.

**2.3. Tasks of the subsystem:**

* + formation of a register of destroyed or damaged objects
	+ automation of the processes of proper accounting of destroyed or damaged objects
	+ easy access to up-to-date, structured and high-quality geospatial data on destroyed or damaged objects
	+ automation of reporting processes, preparation of statistical data on destruction in the city
	+ formation of the register of city reconstruction projects
	+ monitoring the implementation of city reconstruction projects
	+ presentation of the state of destruction in the city and proposals for the restoration of facilities

**2.4. Basic business processes subsystem:**

**Entering data about objects in the subsystem**

This business process involves the work of persons responsible for accounting for the entry of data on destroyed objects in the subsystem in accordance with the forms approved by the Customer with geolocation, photographs and other supporting documents. Those responsible for accounting may make changes to the data based on the results of surveys and inspections. All changes are recorded in the log. The entered data and changes are verified by those responsible for the subsystem.

**Entering data about reconstruction projects in the subsystem**

This business process involves the work of those responsible for the preparation and submission of data on reconstruction projects in the subsystem in accordance with the forms approved by the Customer with geolocation, photographs, videos and other supporting documents. Those responsible for accounting may make changes to the data based on the results of surveys and inspections. All changes are recorded in the log. The entered data and changes are verified by those responsible for the subsystem.

**Maintaining a register and verifying entered data**

The staff member (s) responsible for the subsystem is responsible for the up-to-dateness, accuracy and completeness of the data in the subsystem. They verify and approve the information entered by those responsible for accounting. If the entered information does not meet the needs of the subsystem, those responsible for the subsystem have the opportunity to notify the person responsible for the assessment (notification in the administrative part of the relevant register) about the need to verify and correct the entered information. The person in charge of the assessment is notified and is obliged to respond and make appropriate changes within the set time limit. The data in the subsystem is also updated.

**Designation of areas of responsibility**

The subsystem provides automatic localization of areas of responsibility according to the parameters set by the Customer. For example, if it is a municipal educational institution, the subsystem calculates a certain distance around the perimeter around the institution and marks it on the map as the area of ​​responsibility of the educational institution.

**Reporting**

Internal users (responsible for the subsystem and for monitoring) have the opportunity to upload reporting documents in the form specified by the Customer.

**The principle of adding/editing data:**

* + Initially, the available data on objects will be downloaded from the Excel spreadsheet to the portal, and the information in the object cards will be supplemented by moderators during the work.
	+ The address is entered in the appropriate field (the street name is substituted as the name is entered, the building number from the keyboard).
	+ If the address is already entered, the user opens the desired address from the search results and adds the necessary information (several cards of different objects can be displayed at one address)
	+ If the object at the address is not in the results or if you need to add another, it is created with the "Add address" button, and then the form for data entry opens
	+ The admin panel should be able to select the required objects by setting filters (if the filter field is not filled, the search is for all values):
		- Type
		- Category
		- Subcategory
		- Balance holder
		- Settlement
		- Area
		- Street
		- building number
		- the nature of the damage
		- % of damage (from-to). Search for all values ​​in the range, inclusive
		- Availability of data on destruction ("yes" and / or "no"). For example, if "yes" is selected, all objects with information in the Damage section are displayed
		- Availability of photo/video evidence (Yes / No)
* The search results should also be uploaded to an Excel spreadsheet (all fields in the address cards. If there are several sources in the object card, photos, they are added to the columns on the right (ie first column 1, then source 2, etc. )
* It is possible to display the filtering results on the map. Addresses corresponding to filters are indicated by markers on the map (in the form of points):
* Red - (Destroyed)
* Orange - (Critical level)
* Yellow - (Intermediate)
* Light green - (Easy level)
* Dark green - (No damage)
* White - no information about the destruction (data not included in the Damage block)
* It is also possible to display information on certain categories and subcategories of the function of real estate (for example, educational institutions - preschool institutions)
* You must be able to choose which of the following markers to display on the map

**2.5. Interfaces of the public part of the subsystem**

Principles of displaying information on the front (front part is published for access in stage 2, initially all data is available only through the admin panel)

* Filters available to the user to display on the map:
* categories, subcategories
* critical destruction
* severe destruction
* average destruction
* light destruction
* It is possible to search for an object by address
* After selecting filters, addresses are marked with colored markers on the map (similarly as described above)
* When hovering over the marker, information appears in the pop-up window:
* address
* category
* sub category
* nature of the damage
* % destruction

The interface provides the display of objects on the map and information card, which contains all the information entered in the administrative part except the one to which access is restricted by law, as well as registers and access to data through API.

Objects of the public and administrative part should be displayed with different iconograms and colors, which are agreed with the Customer at the stage of detailing the terms of reference and implementation.

Additional components of the interface, graphic, color display, marks for display of objects are discussed and agreed with the Customer during the detail of the technical task and implementation of the subsystem.

Thus, the public part of the subsystem provides:

* access to register data,
* access to the card with display of register information (with information card),
* access to data through open API,
* the ability to put several marks on the map at the same time.

**2.6. Subsystem functionality**

The subsystem must provide:

* for the administrative part:
* the possibility of different types of access to the subsystem for entering and maintaining a database;
* the ability to enter and edit data responsible for monitoring from mobile devices, tablets, determining geocoordinates, landfills, to take pictures in the system, upload documents, diagrams, maps;
* the ability to use the base map to enter and maintain registers with maximum detail and accuracy of the location of objects;
* the ability to generate reports in the form specified by the Customer;
* the ability to download data from the subsystem, the generated filters;
* the ability to add categories to the registers as needed;
* the ability to overlay cartographic materials in the admin panel
* the ability to automatically indicate the relevance of the data of each of the objects.
* for the public part
* the ability to view the objects of the subsystem on the geoportal in the form of a map, objects must be visually marked and differ in key characteristics, as well as in the form of registers that can be downloaded in machine-readable formats;
* access to subsystem data through the application programming interface (API).

**2.7. Legal framework:**

* Law of Ukraine “On Information”
* Law of Ukraine “On Access to Public Information”
* Law of Ukraine “On Electronic Documents and Electronic Document Circulation”
* Law of Ukraine “On Personal Data Protection”
* Law of Ukraine “On Local Self-Government in Ukraine”
* Law of Ukraine “On Environmental Impact Assessment”
* Law of Ukraine “On self-organization of the population”
* Law of Ukraine “On the national infrastructure of geospatial data”
* Resolution of the Cabinet Of Ministers Of Ukraine "On approval of the Procedure for the functioning of the national geospatial data infrastructure"
* Resolution of the Cabinet Of Ministers Of Ukraine «About realization of the experimental project on monitoring of the caused damages and destructions on regions of Ukraine owing to armed aggression of the Russian Federation on the basis of the geoinformation system»
	+ 1. General description of the subsystem “Objects of destruction and reconstruction projects”

**3.1. Register of destroyed/damaged objects**

Infrastructure objects (there can be several different objects at the same address):

* Inventory number of the property. Not displayed on the front
* Code and name of property according to the Classifier of state property. Not displayed on the front
* Type (drop-down list: (residential, non-residential premises)
* Categories (drop-down list: Schools, Social security facilities, Higher education, Preschools, Sports and fitness facilities, Healthcare facilities, Culture and arts facilities, Vocational schools and lyceums, Housing and communal facilities, etc.)
* Sub category (drop-down list: rowing base, sports school, etc.)
* Name the property
* Balance holder / property owner (Directory, list). Not displayed on the front
* Area of ​​the object, sq.m.
* Address:
* Settlement
* Area (drop-down list)
* Street type from the directory (drop-down list)
* Street name from the directory (search by letters when entering names)
* House number (from the keyboard)
* Coordinates x
* Coordinates y
* Number of inhabitants
* Value indicators of property:
* Initial cost, thousand UAH
* Residual value, thousand UAH
* Date of inventory/calculation of initial (revalued) and a residual value of fixed assets
* Data on the state registration of ownership of real estate. Not displayed on the front:
* Document name
* Name of the issuing authority
* Date of state registration
* Ownership record number
* Registration number of the real estate object / cadastral number of the land plot
* Display on the map (yes / no).

Damage:

* The nature of the damage (multiple choice of values):
* no windows
* facade damage
* partial damage to the roof
* complete damage to the roof
* damage to the walls of the building
* burning out of individual apartments
* building burnout
* destruction of the building
* not detected
* % damage (keypad number)
* Additional damage description (text box)

Source of information (there may be several sources of information, by default one source, on the form you can add a block with fields describing the next source):

* Date of notification or recording.
* Date of publication of information on the resource.
* source (text field, in case of inserting a hyperlink, must be clickable on the form).
* Photo evidence materials (several photos can be uploaded)
* Video evidence (several links to video materials can be added), clickable on the viewing form, several videos can be uploaded)

Materials compiled by local governments to fix the damage:

* Date of drawing up the act.
* Officials who conducted the survey.
* Description of identified violations.
* Photo evidence materials (several photos can be uploaded)
* Video evidence (several links to video materials can be added), clickable on the viewing form, several videos can be uploaded)
* Possibility of forming an electronic document and signing the EDS act by the persons who made the valid act.
* Ability to download a paper copy of the act (if it is drafted).

**3.2. Register of reconstruction, recovery and development projects:**

Main elements:

* Category, subcategory
* Area
* Local community
* Full name of the object
* Object address
* Photo of the object (gallery with the ability to open in actual size)
* Budget for the reconstruction of the object
* Show all
* Show how much is collected and how much is left

Object characteristics:

* For cultural objects:
* Capacity of the institution
* Area of ​​the cultural institution, m2

For medical institutions:

* What is the population of the medical institution
* Number of people who will be provided with work
* Number of beds
* Area of ​​the medical institution, m2

For educational institutions

* Number of children / students who will attend the educational institution
* Number of teachers in the educational institution
* Area of ​​educational institution, m2

For sports buildings and structures

* Number of people who can play sports
* Number of seats in the stands
* Area of ​​the sports facility, m2

For all categories

* Estimated cost of project development, in case of absence, thousand UAH
* Estimated cost of construction works, thousand UAH
* Estimated cost of building equipment, thousand UAH

Description of the object of reconstruction (including the date of destruction, the reason for the destruction, the consequences of the destruction, the degree of destruction, the type of work to be performed, etc.)

Object reconstruction status code (from the status directory)

4. Non-functional requirements

**4.1. Requirements for internal and external integration**

The subsystem must meet the technical characteristics and requirements of the GIS implemented in Nikopol City Council. The interface, functionality and databases should be fully integrated into the existing GIS and displayed on the geoportal of Nikopol City Council. All components of the subsystem must be compatible with the basic software package GIS, namely:

Subsystem must be integrated with the Open Data Portal, data must be automatically uploaded in open data formats (CSV - for tabular data, GeoJSON - for data with spatial localization) in the data holder account on the Open Data Portal.

Integration with registers such as:

* Geoinformation system for monitoring the damage and destruction caused by the regions of Ukraine as a result of the armed aggression of the Russian Federation
* Unified Register of Legal Entities and Individual Entrepreneurs
* Prozorro
* Unified portal of public funds expenditure
* Unified state electronic system in the field of construction

**4.2. Requirements for mathematical and information support**

Mathematical software should include the necessary algorithms to perform data search operations, statistical information processing, data analysis. Information analysis tools should provide quick access to information and its presentation in an intuitive form.

Information support should provide:

* data storage in a form that allows organization of the system work for many users, as well as automatic system recovery in a case of emergency;
* allocation and granting of access rights on the basis of system roles;
* work of GIS users with information resources in real time;
* storage of the history of change data (maintaining a personalized protocol of changes - change log);
* integrity of geographically distributed data;
* use of state classifiers and directories, GIS directories;
* control of input and processing of input data on correctness, accuracy of writing according to classifiers, directories, file formats;
* option to work with different types of information.

**4.3. Requirements for linguistic and methodological support**

The user interface must be in Ukrainian. Instructions for users and other operating documentation for subsystem must be written in Ukrainian. GIS should provide input, storage and presentation of information in Ukrainian.

Other languages ​​can be used as an option. English can be used in regulatory procedures or in interaction (integration) with other resources.

The documentation for GIS subsystem should include:

* Detailed documentation for subsystem GIS (architecture, server and software components) in 1 (one) copy;
* Instructions for installation and configuration in 1 (one) copy;
* User's guide in 1 (one) copy;
* Administrator's guide in 1 (one) copy.

**4.4. Performance requirements**

The subsystem must work coherently with the already implemented GIS in Nikopol City Council, providing the possibility of uninterrupted operation and updating.

**4.5. Reliability requirements**

Reliability of work should be reached by complex application of hardware-software, technical and organizational measures. Reliability should be ensured by locating the hardware on which the main components of GIS operate, such as database servers, application servers and web servers at the data center, which provides the required level of fault tolerance.

List of emergencies that regulates reliability requirements should ensure the preservation of data in the following situations:

* emergency power outage;
* occurrence of physical defects on information carriers;
* failure of hardware components;
* incorrect user actions.

**4.6. Requirements for ergonomics and technical aesthetics**

The graphical user interface of GIS subsystem must be made in the style and colors in which the GIS implemented in Nikopol City Council is made. The interface of GIS subsystem should be easily understandable and convenient, should not be overloaded with graphic elements and should provide fast display of screen forms.

Navigation elements must be user-friendly. The user interface of GIS subsystem should provide the possibility of reversibility of user actions and the need to confirm potentially destructive user actions to modify and recover data. The user interface should provide the tools to obtain reference data on the capabilities of GIS, option of obtaining on-screen context-sensitive prompts to perform operations, functions and more. Data input-output, receiving commands and displaying the results of their execution should be performed in an interactive / dialog mode.

The interface of GIS subsystem should be designed for the predominant use of the manipulator type "mouse" so control of the subsystem should be carried out using a set of screen menus, buttons, icons and other visual elements.

All screen forms of the user interface must be made in a single graphic design, with the same location of the main controls and navigation. Similar graphic icons, buttons, and other elements should be used to indicate similar operations. The terms used to name typical operations, as well as the sequence of user actions when performing them must be unified. The external behavior of similar interface elements (reaction to moving the mouse pointer, switching the focus, pressing a button) must be implemented in the same way for the same type of elements.

The interface must meet modern ergonomic requirements and provide easy access to the basic functions and operations of GIS subsystem.

**4.7. Requirements for data protection from unauthorized access**

Data protection should be implemented with the use of hardware and software information security, as well as organizational measures aimed at managing security tools, regulating the actions of users and control over these actions.

Every fact of access to GIS subsystem must be noted in the access protocol. The fact of modification of data by the internal user should be noted in the protocol where the following information will be specified:

* the user who performed the operation;
* what operation was performed (entering new data, editing existing data, deleting data)
* date and time of the operation.

The access protocol and the user's action protocol must be available to the administrator, the unit responsible for information security.

The system must be ready for certification in the automated systems of the 3rd information protection class for systems that process information with limited access, which does not contain state secrets, with increased requirements for ensuring the confidentiality, integrity and availability of processed data.

Antivirus protection must be installed on all automated workstations from which the subsystem is accessed. Antivirus protection devices should be allowed for use in public institutions and provide remote monitoring to detect viral activity and attempts to penetrate the internal network of malicious software.

Users have the right to work with GIS subsystem within the limits of their rights granted by the administrator and in accordance with the approved regulatory documents and instructions.

**4.8. Intellectual rights requirements**

The software that will be used for GIS subsystem development must have the appropriate license certificates or other documents confirming the right to use this licensed software as part of the GIS.

The GIS software package must be provided under the terms of the GPL (http://www.gnu.org/licenses/gpl.html) and ensure the openness, transparency and accessibility of the product source code according to the ideology of OpenSource (free license) Software).

**4.9. Requirements for standardization and unification**

In order to ensure the logical integrity of the data at the stage of input of primary information, data classifiers should be used. The interaction of users and subsystem should be based on unified logical protocols of data exchange. Interaction with external subsystem must be carried out using the application programming interfaces (API) of the system.

The functioning of users' workstations should be ensured with the use of the same type of hardware (computers).

**4.10. Additional requirements**

The software of GIS subsystem should provide updating of information about classifiers and directories. The criterion for the quality of GIS subsystem software is the absence of critical and serious errors.

According to the degree of influence of the software defect of GIS subsystem, errors should be detected and classified as follows:

* Critical - the most serious consequences of the problem, up to complete system failure and data loss, complete or partial;
* Serious (Major) - serious consequences, possible inoperability of certain components of the system, unstable operation or "freezing" of automated workstations of the system;
* Normal - a normal error, such as a calculation error or a broken single object;
* Minor - a minor error, such as a name error, an error in formatting system controls.

The Contractor under warranty must correct all errors.

The GIS subsystem must support the mechanisms for setting up and generating notification messages on the status of documents and on other events occurring in GIS subsystem. The subsystem software must include a set of tools to create functionality and its development without the involvement of the developer. The Customer personnel using software tools (route designer, designer of functional modules and forms) can perform the development, modernization and enhancement of functionality of GIS subsystem, which are part of the GIS subsystem and do not require the involvement of developer and do not require programming skills.

**4.11. Compatibility requirements**

Client software requirements: access to system functionality (client interface) is provided by the web-browser tools allowing to organize work of users from any devices connected to a network (remote/mobile users without additional investments and with use of Internet options). For external users, the client part of the system is guaranteed to work with all modern browsers.

The public part of the GIS subsystem must be displayed correctly under all popular browsers (Internet Explorer 10, Mozilla Firefox (4.5+), Opera (9+), Chrome, Safari, Edge), and be adapted for viewing and working with the software package, administrative and public parts, on mobile devices.

**4.12. Localization requirements**

Alphanumeric information of the GIS subsystem is displayed according to the code table UTF-8. User and administrator interfaces are localized in Ukrainian. User and administrator interfaces have configuration mechanisms for changing information display parameters according to access rights, workflow stages and functional roles of system users.

**4.13. Reliability requirements**

The software is hosted on a virtual or physical server. If necessary, the software of the web server and the database server can be hosted on different servers. The system must be adapted for multi-server deployment to provide redundancy and have load balancing functionality when deployed on multiple servers.

The transfer of information between components should be performed by standard protocols at the software level or at the platform level (database management systems, web servers, etc.).

The system must operate 24 hours a day, 7 days a week. It is allowed to temporarily suspend access to the published data sets for preventive work with a notification about it beforehand.

**4.14. Backup requirements**

The GIS software provides the backup option and restore information through the web interface of the administrator. The backup is performed automatically or by the administrator's command. The administrator has the opportunity to return to one of the last 7 states of the software (backup), which is made automatically every 24 hours and contains copies of the database and files uploaded to the server along with the content referenced from the database. When creating new backups, the old ones can be automatically deleted if their number exceeds the default. The Customer defines the default number of backups.

**4.15. GIS software security**

4.15.1. The following requirements must be met during the operation of the GIS software:

* ensure the protection of information at all stages of work;
* use of HTTPS protocol;
* identification of users with limited access to data must be provided;
* user identification is performed on the basis of login / password pair, NTLM protocol and OAuth2;
* the mechanism of profiles and roles must be implemented in the access rights management system;
* the system must have the tools to record all security-critical events, including the facts of authorization of system users, as well as the main operations performed by users, including CRUD-operations;
* for all records the user and time of the last adjustment should be fixed;
* program mechanisms of the GIS software should provide functioning in a round-the-clock mode;
* software must be protected from SQL injections, as well as other means of interfering with the continuous operation of its software platform, attacks.

4.15.2. In order to ensure information security protocols, for GIS (public and administrative part) the Contractor establishes an SSL security certificate for 5 years.

4.15.3. The GIS should be able to save data in the following situations:

* power failure or emergency shutdown;
* failure of technical tools on which the GIS software is operated;
* failure due to erroneous actions of personnel, including intentional destruction or distortion of application, special and general software.

4.15.4. The storage of information in the database should be ensured by standard tools of backup and recovery after failures. To ensure the reliability and safety of operation, the software should provide tools for monitoring and diagnosing the main processes of the GIS software. List of emergency situations:

* power supply system failure;
* failure of technical means of the power subsystem;
* complete power outage;
* failure of the complex of technical means (hardware);
* server equipment failure;
* failure of network, telecommunication equipment and communication channels;
* failure of information backup equipment;
* software failure;
* failure based on the results of work of users or service personnel.

In the case of an emergency or software error, diagnostic tools should be able to store a set of information needed to identify and resolve the problem. Log files must be kept; abnormal situations and errors must be recorded automatically. In the case of an emergency, these logs should allow the administrator to store the full set of information needed to identify the problem.

A complex data protection system should be built on the information and telecommunication system, which includes subsystem and GIS, in the future, as a separate work, in accordance with regulations in the field of technical protection of information with enhanced requirements for integrity, accessibility and monitoring of information processed by the GIS software.

**4.16. Software installation and setup**

The Contractor provides installation, testing, update and configuration of relevant software at the server objects of the Nikopol City Council.

**4.17. Legal requirements and documentation**

When transferring the GIS software, the following must be transferred:

* Property and non-property rights to the developed software;
* Open license or other licenses for software used to implement the project;
* Software installation package in digital form and product code;
* Data processed in the form of a database within the framework of implementation;
* Training materials, video instructions for external and internal users;
* Accompanying documentation specified in item 4.3;
* Warranty obligations for the software product

5. Technical requirements for data collection, processing, refining, uploading to GIS subsystem

5.1. Procedures for providing services

|  |  |
| --- | --- |
| № | Stage name |
| 1 | Receiving and processing of materials from structural subdivisions of executive bodies of city councils, other information managers, responsible person |
| 2 | Formation of e-registers of data sets, databases for loading into subsystem |
| 3 | Download processed datasets to the spatial database of subsystem |

5.2. List of services

|  |  |  |
| --- | --- | --- |
| Data and service name | Data holder | Format |
| Process and load into the GIS module the database on damaged buildings  | Department of Architecture and Urban Planning of the Nikopol City Council | .xls |

Geocoding for all datasets is conducted on the base of open services; geocoding completeness depends on completeness of address registers in registers, services. The Nikopol City Council defines and provides a list of registers and services.

6. Technical requirements for training for internal GIS subsystem users

The contractor devdevelopse detailed program of each training with the executive bodies of Nikopol City Council. The contractor independently provides travel, accommodation and meals for coaches.

7. Technical requirements of technical and consultation support of GIS subsystem in Nikopol City Council

1. The Contractor provides consulting services to structural units of executive bodies, utilities, institutions and organizations of Nikopol City Council (hereinafter - the Customer) to work with the software subsystem of the geographic information system (hereinafter - GIS) in accordance with technical requirements, as well as on the assessment of data and technical infrastructure, namely:

* Objects of destruction and reconstruction projects
* Geoportal

**2. Consulting services of geosystem support include:**

2.1. Consulting of the Customer's personnel on work with the software complex, consulting on optimization and reconfiguration of processes, consulting on organizational support by Internet means. The list and duration of consulting services are recorded in the Journal of Provided Services.

2.2. Each month, the Contractor provides a detailed report on the results of the technical, consulting services for approval by the Customer. A log of changes in subsystem supplements the report. If the Customer is not satisfied with the work of technical support, performance of tasks and troubleshooting, this is stated in the report. The Contractor is obliged to carry out at his own expense all the work that was not performed, but was indicated as completed in the report.

2.3. To communicate with the Customer's staff, the Contractor shall appoint a responsible person assigned for such communication with the Customer (technical support city manager). Technical support city manager of the Contractor provides monthly reports to the Customer, communicates about the work of the support service, and clarifies problem situations.

2.4. Consultations are carried out by phone or online, including with the use of Skype or Zoom technologies on weekdays from 9-00 to 18-00. All these consultations are recorded in the Journal of Provided Services.

2.5. Consultations in the support service are performed via the official link to the support office, the Customer is provided with a user account to log in to the account. The time of diagnostics of the Customer's requests, preparation of the notice in terms of the answer and performance of works is specified in item 3. "Terms and list of technical support services". The Contractor's time for diagnostics of the Customer's requests, preparation of messages and answers by email is taken into account as a part of services and is fixed in the Journal of Provided Services.

2.6. The Contractor must ensure the implementation of actions, tasks to ensure the functioning of the system and its components, recovery in case of failure, as well as server administration, configuration of system components to the extent necessary to ensure the smooth operation of the system.

2.7. The Contractor eliminates the identified errors in the operation of the system and subsystem, regularly monitors the operation of servers, system software and infrastructure optimization for the operation of the Software Complex.

2.8. The Contractor provides consultations at the request of the Customer on the results of the audit of the Customer's database located on the territory of the Customer. To provide services under this item, the Customer provides the Contractor with access to the functioning Software Complex online.

2.9. The Contractor guarantees the confidentiality of the Customer's database and the impossibility of unauthorized access to it by persons not directly related to the provision of services to the Customer. All actions of the Contractor regarding the Software Complex are recorded in the diary, which is provided monthly to the Customer together with the report on the provided technical support.

2.10. The Contractor provides consulting services on the initial introduction of the Customer's database; work in system modules, as well as on the selection of the necessary server, system software and hardware.

2.11. The Contractor must inform the Customer in advance about the release of new modules and versions of the software, as well as install updates of the software after the approval of the Customer. The Contractor must send the Customer a notice and a description of the planned updates within the time agreed with the Customer and obtain written approval for the updates of the software.

2.12. The Contractor provides consulting services on the configuration of the software and services on completion (adaptation) of the software to the specific requirements of the Customer as part of the modules transferred to the Customer at the suggestion of the Customer:

2.12.1. Proposals of the Customer for configuration and completion (adaptation) in writing with the signature of the responsible person of the Customer are sent to the Contractor for approval by email.

2.12.2. The Customer's proposals for configuration, completion (adaptation) or development of reporting forms must contain forms with a description of the rules for calculating the output information. Proposals for refining the calculation algorithms should contain a systematic step-by-step description of the algorithms and formulas for calculating indicators.

2.12.3. The composition and complexity of services for configuration and completion (adaptation) are recorded in the Journal of Provided Services. The cost of additional functions to the specific requirements of the Customer of individual functions with fixed deadlines is calculated based on the complexity of services and recorded in the Journal of Provided Services, according to the monthly report.

2.12.4. If the need to complete the system arose during the performance of the task of technical support, then before performing the completion, the Contractor must inform the Customer about it, provide comments.

2.12.5. The Contractor shall perform the completion of the system only after the approval by the Customer.

**3. Terms and list of technical support services**

|  |
| --- |
| 1. **Name and description of services**
 |
| Time of service provision (Kyiv time) | Mon-Fri from 9:00 to 18:00 |
| Consultations and technical support in the support center | Yes |
| Consultations and technical support by phone | Yes |
| Remote administration of a web resource on the Customer's server | Yes |
| Modification / adaptation of the web resource (at the request of the Customer) |  Yes |
| 1. Terms of response to requests
 |
| Accident | 1 working hour |
| Serious malfunction | 1 working hour |
| Minor malfunction | 8 working hours |
| Consultation | 12 working hours |
| 1. **Troubleshooting deadlines**
 |
|  Accident | 8 hours |
| Serious malfunction | 12 hours |
| Minor malfunction |  48 hours |

8. Stages of software implementation of GIS subsystems in Nikopol City Council

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Stage | Name | 1 | 2 | 3 | 4 |
| 1 | Detailization of the terms of references and on its basis development of the first version of new GIS subsystems |   |   |   |   |
| 2 | Testing of subsystems and updating them according to test results |   |   |   |   |
| 3 | Collection, processing and loading of data into GIS subsystem |   |   |   |   |
| 4 | Training for internal users |   |   |   |   |
| 5 | Software installation, data transfer and system configuration on server capacities, correction  |   |   |   |   |

**Annex 2**

**Technical requirement for GIS subsystem «Objects of destruction and reconstruction projects» in Mariupol City Councils**

Content:

* + - 1. Introduction
			2. Technical requirements for GIS subsystem “Objects of destruction and reconstruction projects”
			3. Terms of reference for consulting and technical support of the GIS subsystem "Objects of destruction and reconstruction projects"
			4. Stages of software implementation of GIS subsystems in Mariupol City Council

Introduction

These technical requirements for subsystem “Objects of destruction and reconstruction projects” is developed as a part of the cooperation between Mariupol City Council and the EU Anti-Corruption Initiative (hereinafter - EUACI). The project is aimed at recording the level of damage to the objects of Mariupol that suffered from the Russian aggression, their further analysis and use in restoration of the city. These subsystems were developed within the functioning of the existing geographic information system, the data will be displayed on the existing official geoportal of the Mariupol City Council. Currently, the work on creating the functionality and filling in the directories has been completed. Residential and non-residential objects of the city have been created. The database already contains more than 40,000 objects of residential and non-residential stock linked to certain categories and subcategories. The level of destruction is determined for all objects. Key requirements for determining the level of destruction based on photographs are established. Various sources are used for verification (photo-video recording, satellite images). The project is in an active stage and needs additional development.

The document consists of technical terms of reference (TOR) for the development of the subsystem and TOR for consulting and technical support.

Technical requirements for GIS subsystem “Objects of destruction and reconstruction projects”

**2.1. Goals and purpose of the subsystem “Objects of destruction and reconstruction projects”**

2.1. Development of the module "Accounting and maintenance of the register of subordinate objects"

To solve the problem of accounting for non-residential premises, including commercial premises, as part of facilities (pharmacies, libraries, etc.), it is necessary to develop a separate module "Accounting and maintaining a register of subordinate objects". In this case, "Subordinate" objects will be premises that are part of the same facility.

Required:

2.1.1. Add the "Base object" attribute to all existing objects in the database.

2.1.2. Add the "Subordinate objects" tab to the card of the object marked "Base object".

2.1.3. In the tab, it should be possible to add a list of subordinate objects with the following information about them:

* Name of the object,
* Address (full name as in the register),
* District,
* Type of street,
* Street name,
* Building number,
* Category (directory of the register of damaged objects),
* Subcategory (reference from the registry of damaged objects),
* Area,
* Level of damage (classifier as in the register of damaged objects),
* Comment,
* Preview (possibility to upload a photo),
* Geometry (the geometry of the Basic object should be set automatically).

2.1.4. Information about the address, district, street type, street name, building number, geometry - is automatically pulled to the subordinate object after its selection from the drop-down list.

2.1.5. In the tab, it should be possible to edit information about subordinate objects, as well as to delete subordinate objects.

2.1.6. Add a separate register "Subordinate objects" with the following fields:

* Base object,
* Name of the object,
* Address (full name as in the register),
* District,
* Type of street,
* Street name,
* Building number,
* Category (directory of the register of damaged objects),
* Subcategory (reference from the registry of damaged objects),
* Area,
* Level of damage (classifier as in the register of damaged objects),
* Comment,
* Preview (possibility to upload a photo),
* Geometry.

2.1.7. Make a card of the subordinate object, which will display the name of the base object (with the possibility of switching to its card), basic information about the subordinate object, as well as additional tabs: map, comment, history.

2.1.8. Filters on the main fields of the subordinate object must be implemented in the register

* Address (full name, as in the register of objects),
* District,
* Type of street,
* Street name,
* Building number
* Name of the building,
* Category,
* Subcategory,
* Area,
* Level of damage.

2.1.9. On the public part, add the filter "Availability of subordinate objects": yes/no.

2.1.10. If there is a subordinate object, display the "Subordinate objects" slider in the card of the base object on the map. By default, the slider should be closed. In case of deletion of subordinate objects, the slider should disappear from the object card.

2.1.11. If there are subordinate objects, the following fields should be displayed in the base object card: Object name, Category (reference from the register of damaged objects), Subcategory (reference from the register of damaged objects), Area, Level of damage (classifier as in the registry of damaged objects), Comment, Preview (possibility to upload a photo), geometry, Comment, Preview.

2.1.12. Add the filter "Availability of subordinate objects" to the register of damaged objects: yes/no.

2.1.13. Update information in the current database. Assign the value "Base object" to all existing objects in the registry.

2.2. Develop an additional module "Actions of the occupier regarding the object"

In order to analyze and understand the current situation in the city, it is necessary to develop and add a separate tab "Actions of the occupiers regarding the object" to the object card

2.2.1. In the tab, add the following blocks and fields:

**Building**

Availability of action: Yes/No

Action. Meaning guide: Dismantling, Restoration, Construction

Scheduled date (month, year) - calendar

Actual date (month, year) – calendar

**Restoration of engineering communications**

Light: Yes/No

Water: Yes/No

Gas: Yes/No

Warmth: Yes/No

2.2.2. Provide the ability to filter results by the list of attributes of this block (action, date, light, water, gas, heat, etc.)

2.3. For visual display according to all criteria available in the object, it is necessary to expand the list of register filters and maps of the "Damage and Destruction Monitoring" system.

2.4. Develop a heat map to analyze the foci of the spread of destruction and understand the damage radius.

2.5. In order to bring the fields and directories of the " Country Recovery" portal, developed with the assistance and support of the President's office, into line with the current GIS system, it is necessary to process the data in the systems. Based on the results of processing, make changes to the current GIS system.

2.6. To automatically download data for the "Country Recovery" portal, develop a report. The item must be implemented after the implementation of clause 2.5. of this ToR.

2.7. To interact with national GIS portals, it is necessary to develop the functionality of data download using API or download to Excel

2.8. For analysis, it is necessary to develop the "Logging of user actions" module

2.9. For monitoring and reporting, it is necessary to develop the "User Statistics" module

The technical task is preformed and requires detailing at the development stage.

Terms of reference for consulting and technical support of the GIS subsystem "Objects of destruction and reconstruction projects"

3.1. The Contractor provides 300 hours of consulting services to structural units of executive bodies, utilities, institutions and organizations of Mariupol City Council (hereinafter - the Customer) to work with the software subsystem of the geographic information system (hereinafter - GIS) in accordance with technical requirements, as well as on the assessment of data and technical infrastructure, namely:

* Objects of destruction and reconstruction projects
* Geoportal

**3.2. Consulting services of geosystem support include:**

3.2.1. Consulting of the Customer's personnel on work with the software complex, consulting on optimization and reconfiguration of processes, consulting on organizational support by Internet means. The list and duration of consulting services are recorded in the Journal of Provided Services.

3.2.2. Each month, the Contractor provides a detailed report on the results of the technical, consulting services for approval by the Customer. A log of changes in subsystem supplements the report. If the Customer is not satisfied with the work of technical support, performance of tasks and troubleshooting, this is stated in the report. The Contractor is obliged to carry out at his own expense all the work that was not performed, but was indicated as completed in the report.

3.2.3. To communicate with the Customer's staff, the Contractor shall appoint a responsible person assigned for such communication with the Customer (technical support city manager). Technical support city manager of the Contractor provides monthly reports to the Customer, communicates about the work of the support service, and clarifies problem situations.

3.2.4. Consultations are carried out by phone or online, including with the use of Skype or Zoom technologies on weekdays from 9-00 to 18-00. All these consultations are recorded in the Journal of Provided Services.

3.2.5. Consultations in the support service are performed via the official link to the support office, the Customer is provided with a user account to log in to the account. The time of diagnostics of the Customer's requests, preparation of the notice in terms of the answer and performance of works is specified in item 3. "Terms and list of technical support services". The Contractor's time for diagnostics of the Customer's requests, preparation of messages and answers by email is taken into account as a part of services and is fixed in the Journal of Provided Services.

3.2.6. The Contractor must ensure the implementation of actions, tasks to ensure the functioning of the system and its components, recovery in case of failure, as well as server administration, configuration of system components to the extent necessary to ensure the smooth operation of the system.

3.2.7. The Contractor eliminates the identified errors in the operation of the system and subsystem, regularly monitors the operation of servers, system software and infrastructure optimization for the operation of the Software Complex.

3.2.8. The Contractor provides consultations at the request of the Customer on the results of the audit of the Customer's database located on the territory of the Customer. To provide services under this item, the Customer provides the Contractor with access to the functioning Software Complex online.

3.2.9. The Contractor guarantees the confidentiality of the Customer's database and the impossibility of unauthorized access to it by persons not directly related to the provision of services to the Customer. All actions of the Contractor regarding the Software Complex are recorded in the diary, which is provided monthly to the Customer together with the report on the provided technical support.

3.2.10. The Contractor provides consulting services on the initial introduction of the Customer's database; work in system modules, as well as on the selection of the necessary server, system software and hardware.

3.2.11. The Contractor must inform the Customer in advance about the release of new modules and versions of the software, as well as install updates of the software after the approval of the Customer. The Contractor must send the Customer a notice and a description of the planned updates within the time agreed with the Customer and obtain written approval for the updates of the software.

3.2.12. The Contractor provides consulting services on the configuration of the software and services on completion (adaptation) of the software to the specific requirements of the Customer as part of the modules transferred to the Customer at the suggestion of the Customer:

3.2.12.1. Proposals of the Customer for configuration and completion (adaptation) in writing with the signature of the responsible person of the Customer are sent to the Contractor for approval by email.

3.2.12.2. The Customer's proposals for configuration, completion (adaptation) or development of reporting forms must contain forms with a description of the rules for calculating the output information. Proposals for refining the calculation algorithms should contain a systematic step-by-step description of the algorithms and formulas for calculating indicators.

3.2.12.3. The composition and complexity of services for configuration and completion (adaptation) are recorded in the Journal of Provided Services. The cost of additional functions to the specific requirements of the Customer of individual functions with fixed deadlines is calculated based on the complexity of services and recorded in the Journal of Provided Services, according to the monthly report.

3.2.12.4. If the need to complete the system arose during the performance of the task of technical support, then before performing the completion, the Contractor must inform the Customer about it, provide comments.

3.2.12.5. The Contractor shall perform the completion of the system only after the approval by the Customer.

**3.3 Terms and list of technical support services**

|  |
| --- |
| **Name and description of services** |
| Time of service provision (Kyiv time) | Mon-Fri from 9:00 to 18:00 |
| Consultations and technical support in the support center | Yes |
| Consultations and technical support by phone | Yes |
| Remote administration of a web resource on the Customer's server | Yes |
| Modification / adaptation of the web resource (at the request of the Customer) |  Yes |
| **Terms of response to requests** |
| Accident | 1 working hour |
| Serious malfunction | 1 working hour |
| Minor malfunction | 8 working hours |
| Consultation | 12 working hours |
| **Troubleshooting deadlines** |
|  Accident | 8 hours |
| Serious malfunction | 12 hours |
| Minor malfunction |  48 hours |
| **Service volume** |
| Number of hours per month | 5 hours |

Stages of software implementation of GIS subsystems in Mariupol City Council

|  |  |  |  |
| --- | --- | --- | --- |
| Stage | Name | 1 | 2 |
| 1 | Detailization of the terms of references and on its basis development of the first version of new GIS subsystems |   |   |
| 2 | Testing of subsystems and updating them according to test results |   |   |
| 3 | Collection, processing and loading of data into GIS subsystem |   |   |
| 5 | Software installation, data transfer and system configuration on server capacities, correction  |   |   |