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**DIGITIZATION
OF DESTROYED
INFRASTRUCTURE**

Kyiv
region



REBUILD **UA**

ABOUT THE PROJECT

Background

The military actions of Russia and Belarus cause numerous damages and destruction in almost all regions of Ukraine — housing and infrastructure are being destroyed, industrial facilities and local businesses shut down.

The speed and efficiency of the country's recovery processes directly depend on a competent assessment of the damage, correct budgeting and a step-by-step plan for reconstruction. A transparent assessment of losses will justify the need for funding as well as simplify the process of raising funds for recovery.

About the project

The RebuildUA project aims to digitize, analyze and demonstrate to the world the destruction of Ukraine's infrastructure. The geography of the project covers all regions of the country affected by military aggression.

The results will be made public, communicated to communities, public authorities and specialized recovery funds.

Project founders:

Drone survey and digitization of geospatial information:



Land analysis and interaction with communities:



Methodology

1. Drone photography and orthophoto creation

The use of drones allows the project team to collect detailed data on the destruction: to fly at low altitudes, and shoot buildings at different angles and from all sides. For localities where drone shooting is not possible, we use high-resolution satellite images.

2. Collection of photos and videos

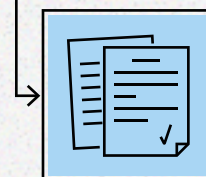
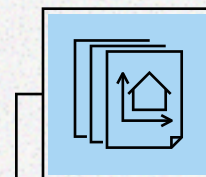
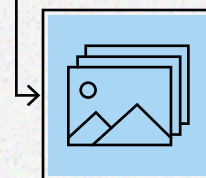
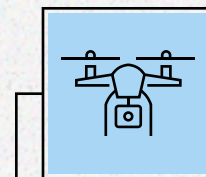
To ensure completeness of the input data, the project team captures photos and videos, as well as collects additional information from verified sources.

3. Destruction detection and data processing


Based on orthophotos, GIS specialists digitize all buildings, identify destroyed objects, classify building types, and determine levels of destruction.

4. Publication of analytical reports

Designers and content managers present the complete information in public infographic reports.



Find out more at the project website:

 rebuildua.net

ABOUT THE LOCALITY


Horenka is the only village near Kyiv that could be reached by tram until recently. Since the beginning of the war, the village was in the kilometer zone of the front. In March, there was not a single quiet day there — all this time Horenka was shelled by Russian troops.

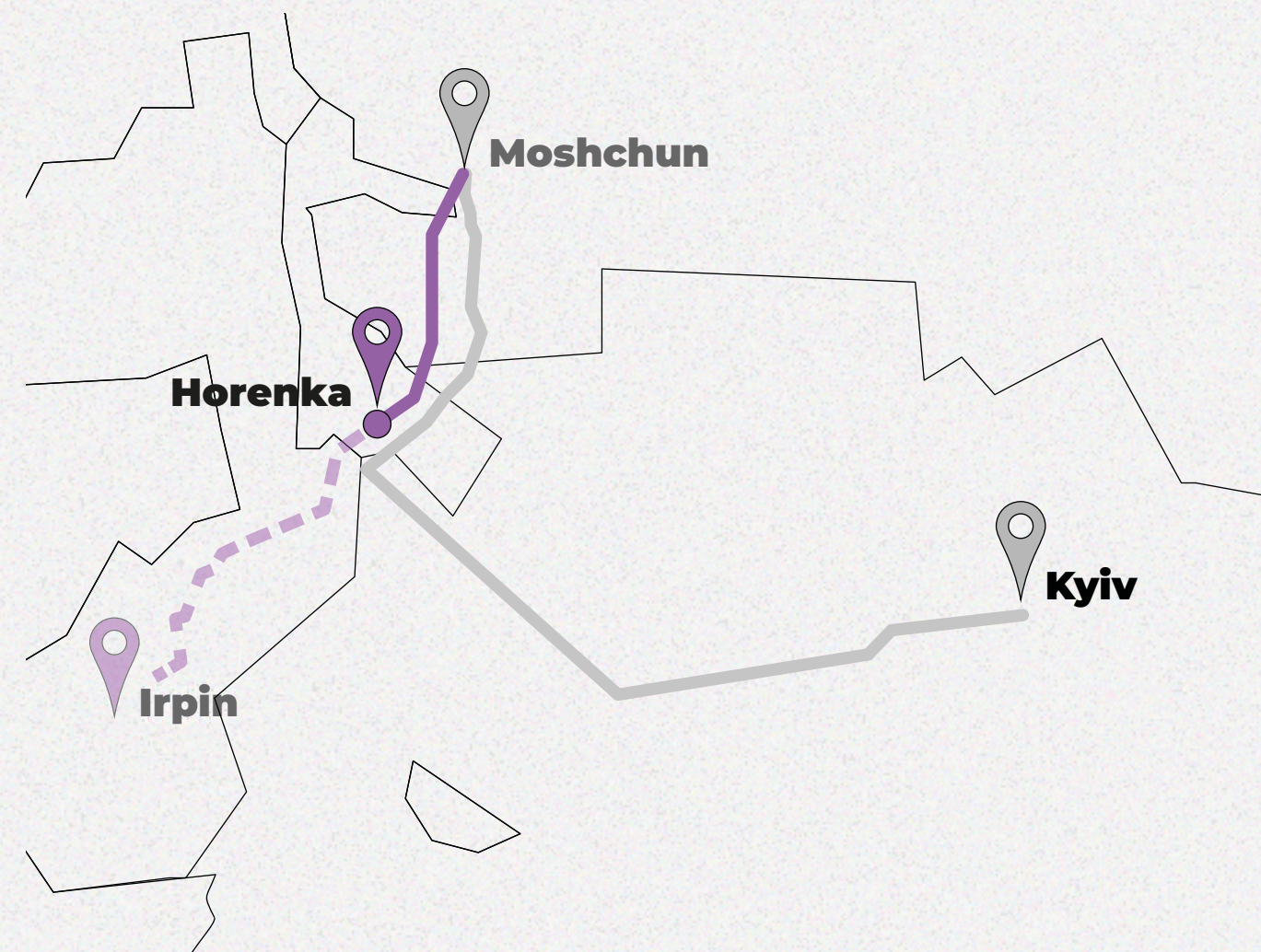
The village was recognized as the most destroyed settlement of Kyiv region. Our team analyzed its destruction in detail.

Keep track of our next destinations on the map and in the project news.



 rebuildua.net

 [/rebuildua.net](https://www.facebook.com/rebuildua.net)



Region **Kyiv**
District **Buchanskyi**
Community **Hostomelska**


 Survey area
447 hectares

 Population
5 358 people

DIGITIZATION PROCESS



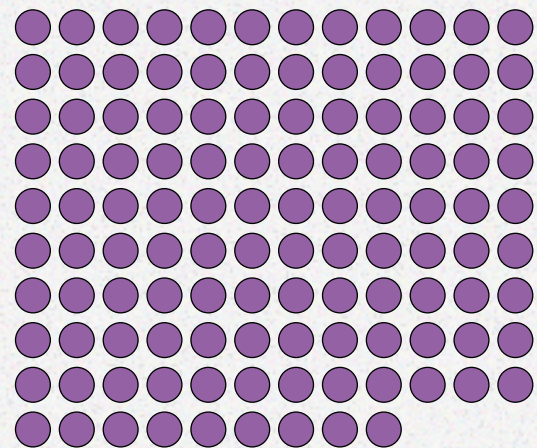
7 flight missions
1 813 pictures for orthophoto
150 hours of data processing
11,2 Gigabyte of data

Video from a drone  play

LEVEL OF BOMBING

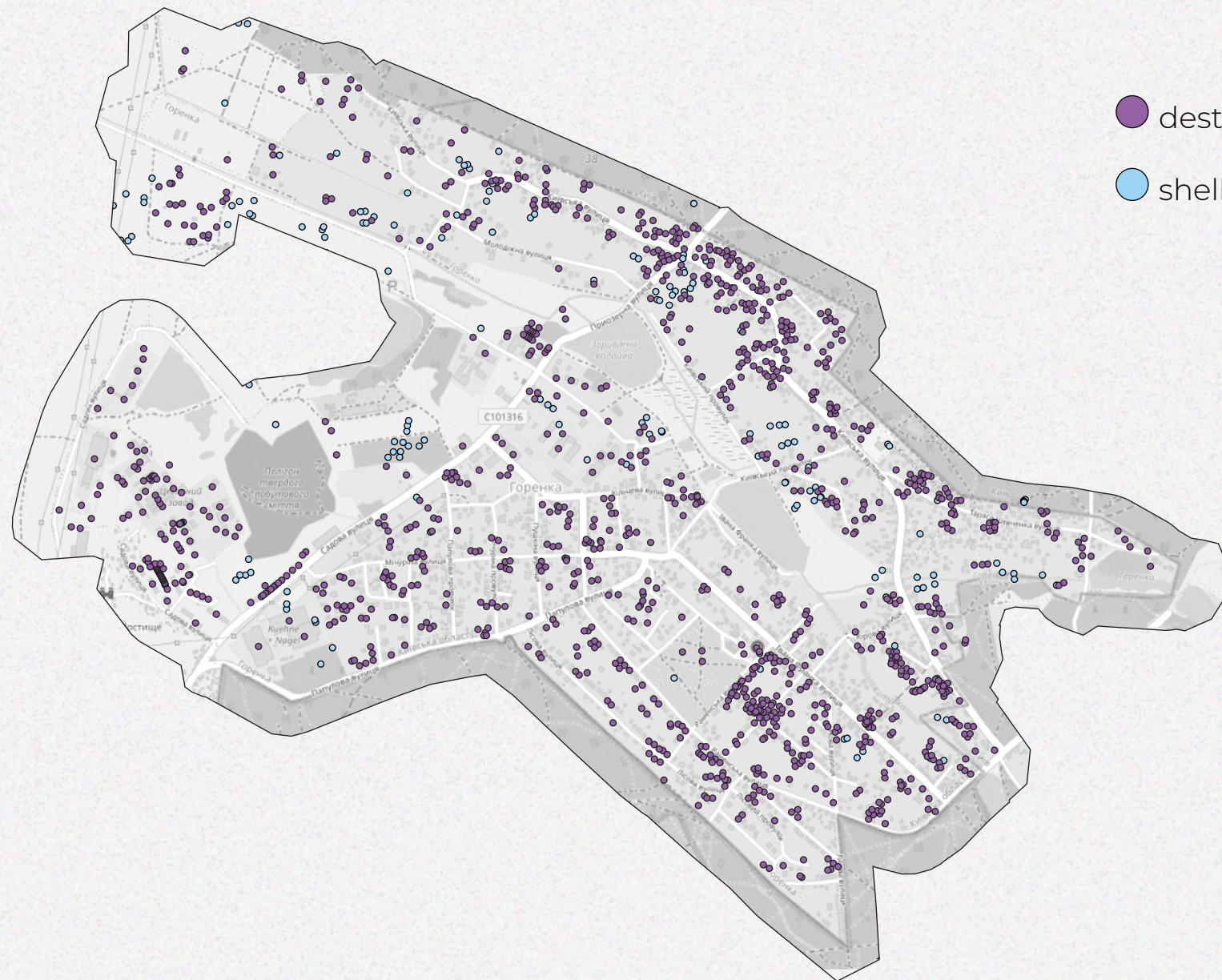
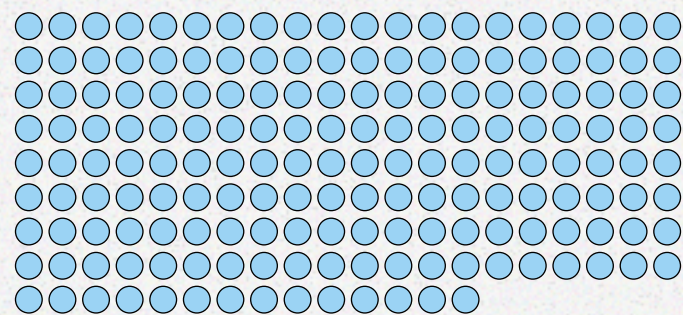
1 163

destroyed buildings



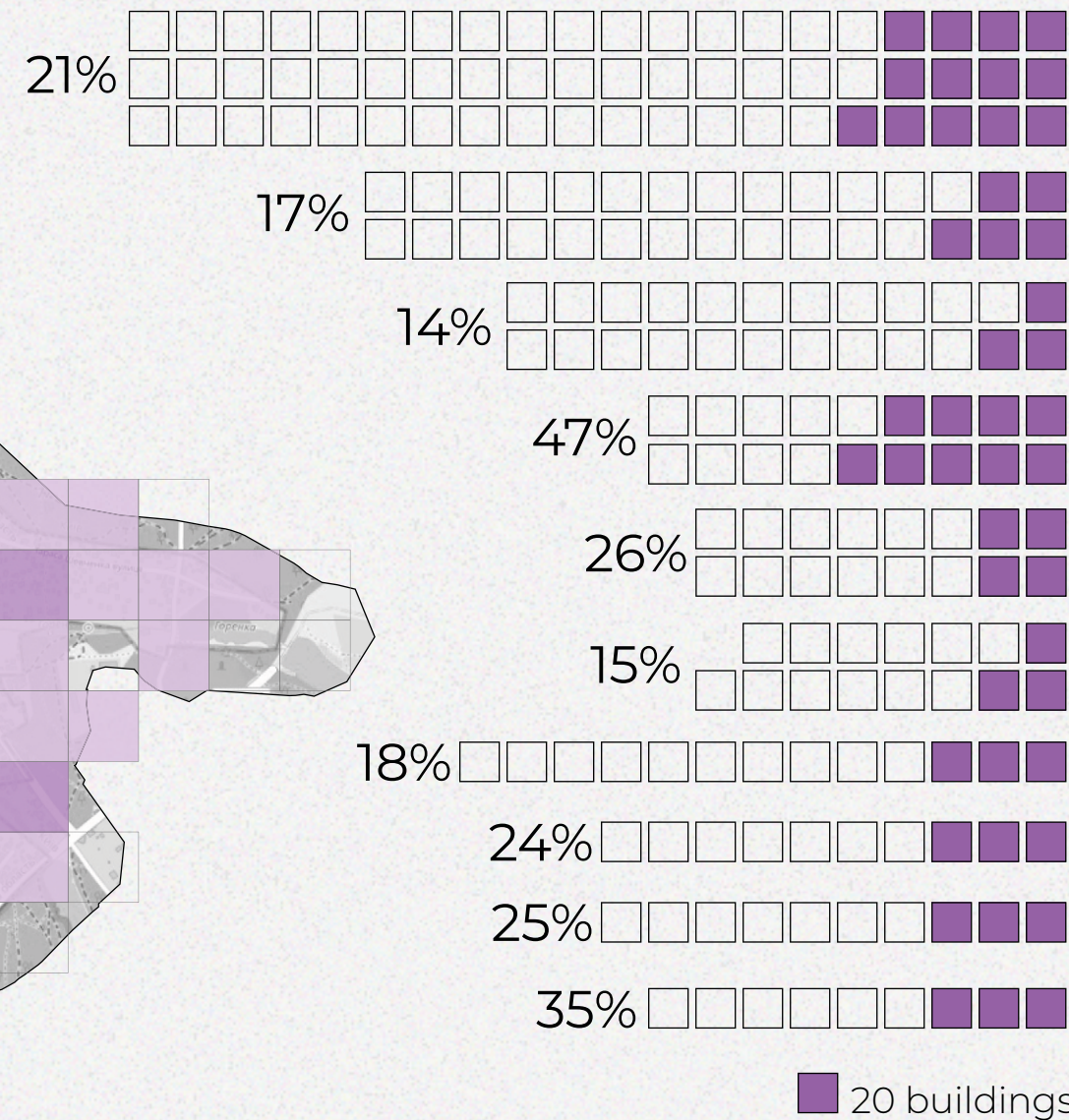
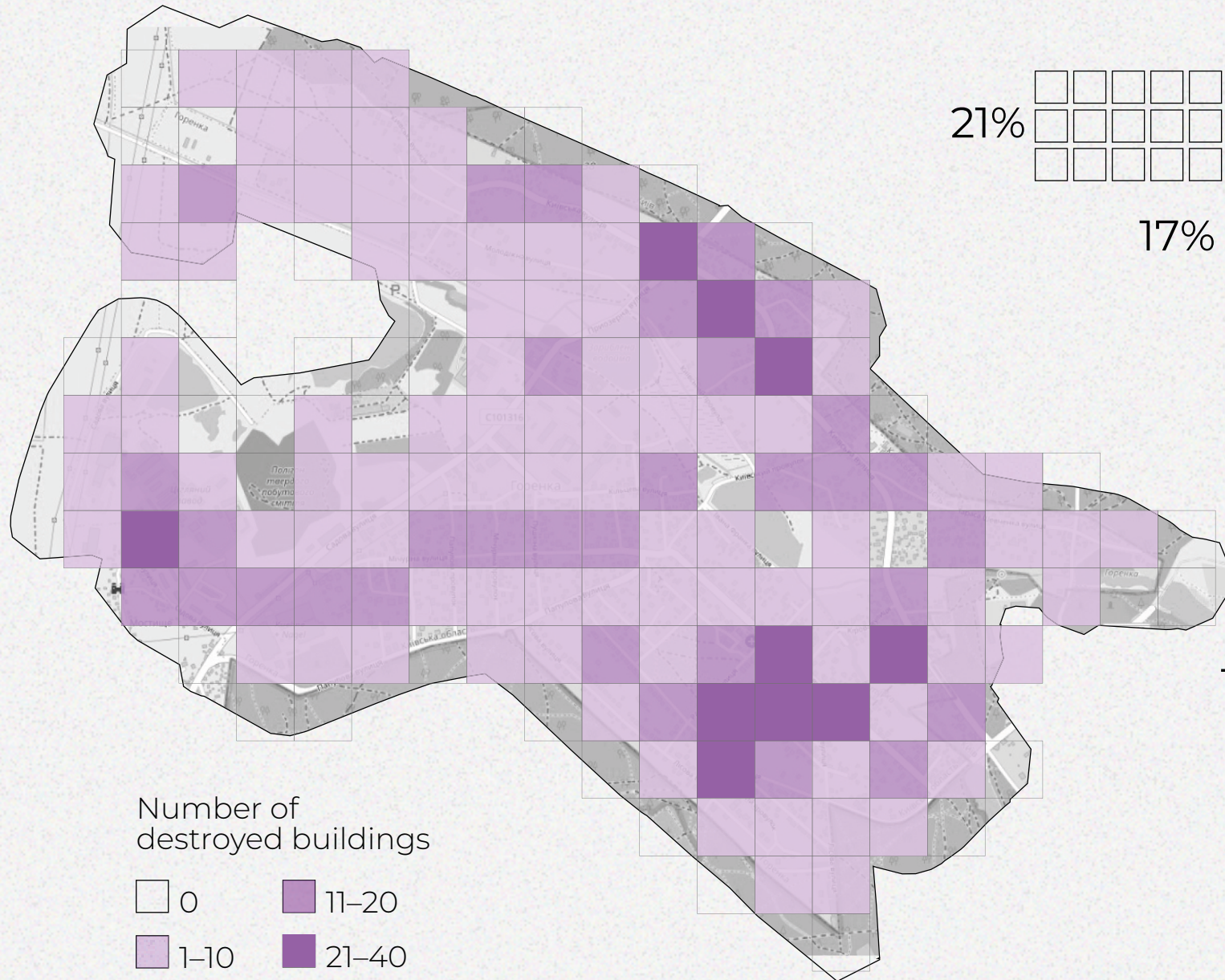
174

shell craters



THERMAL MAP OF DESTRUCTION

Destruction of the largest streets



251 / 1 206	Kyivska
96 / 567	Ivana Franka
65 / 453	Tarasa Shevchenka
166 / 356	Sadova
82 / 320	Ramenska
47 / 304	Lisova
46 / 262	Molodizhna
48 / 203	Kyivskiy lane
47 / 189	Michurina
61 / 172	Nova

HOW WE DETERMINE LEVELS OF DESTRUCTION

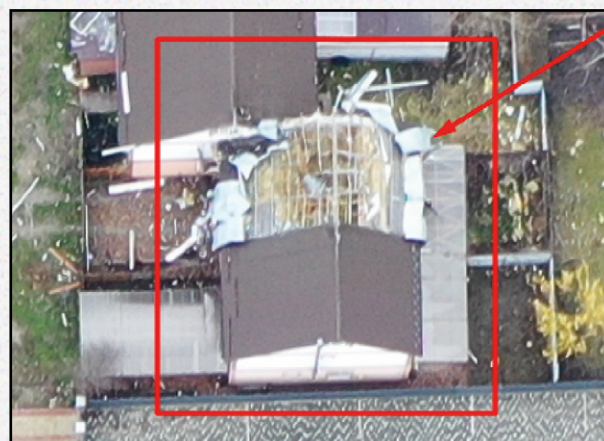
Total destruction



Appointed when the original structure of the building is no longer detectable restoration is impossible, namely:

- the building is completely or significantly destroyed (> 50%);
- only part of the building collapsed to the foundation.

Severe destruction



Implies significant visible damage to the building and its structure, which includes:

- collapse of part of the roof;
- serious destruction and damage to the walls.

Light destruction



Implies minor partial damage to the building and its structure:

- minor damage to the roof,
- collapse of chimneys,
- damage to facade, decorative and removable elements,
- a large amount of debris.

Possible destruction



Intended for buildings that are difficult to interpret due to lower image quality (for example, shadow or poor resolution due to high angle of shooting).

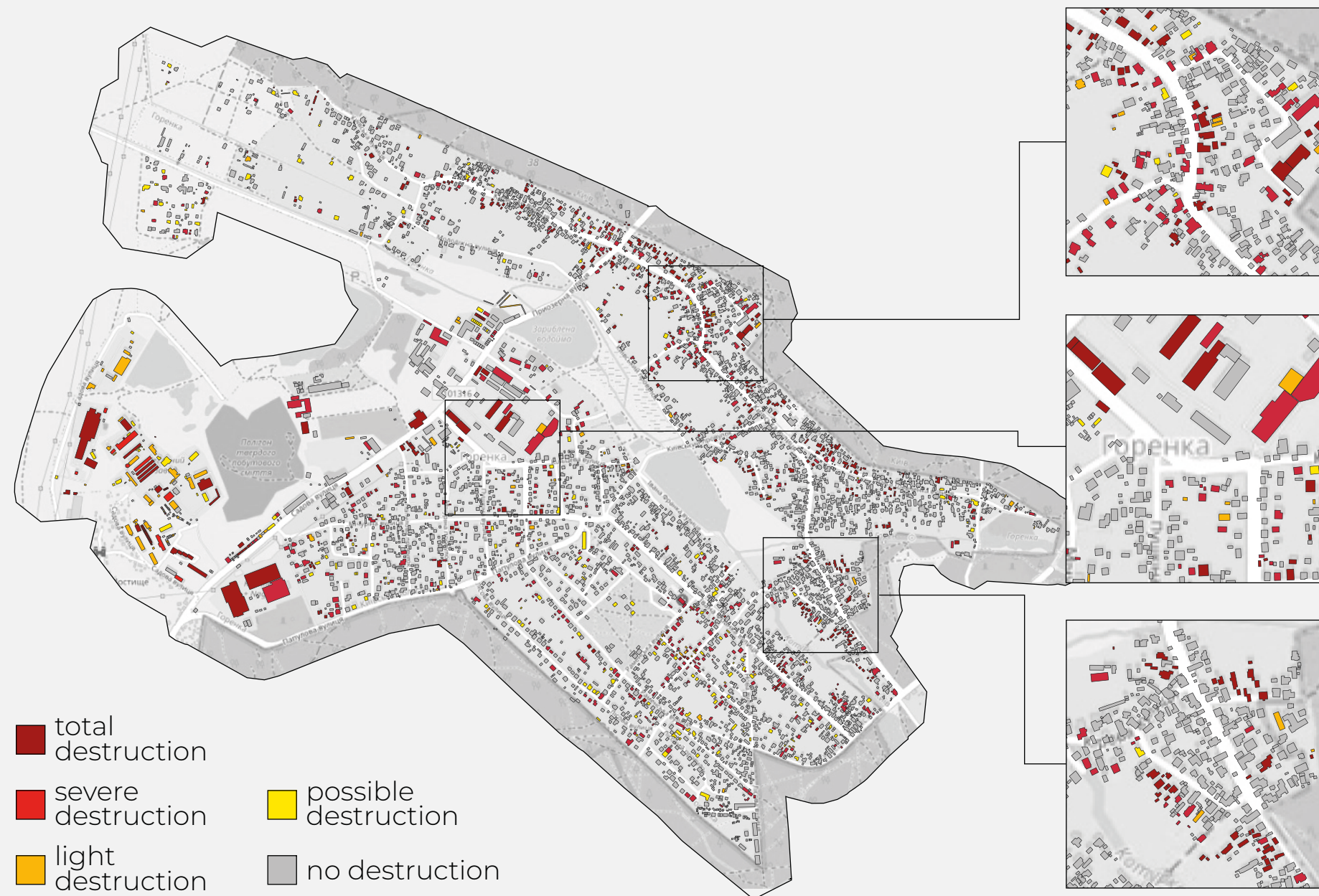
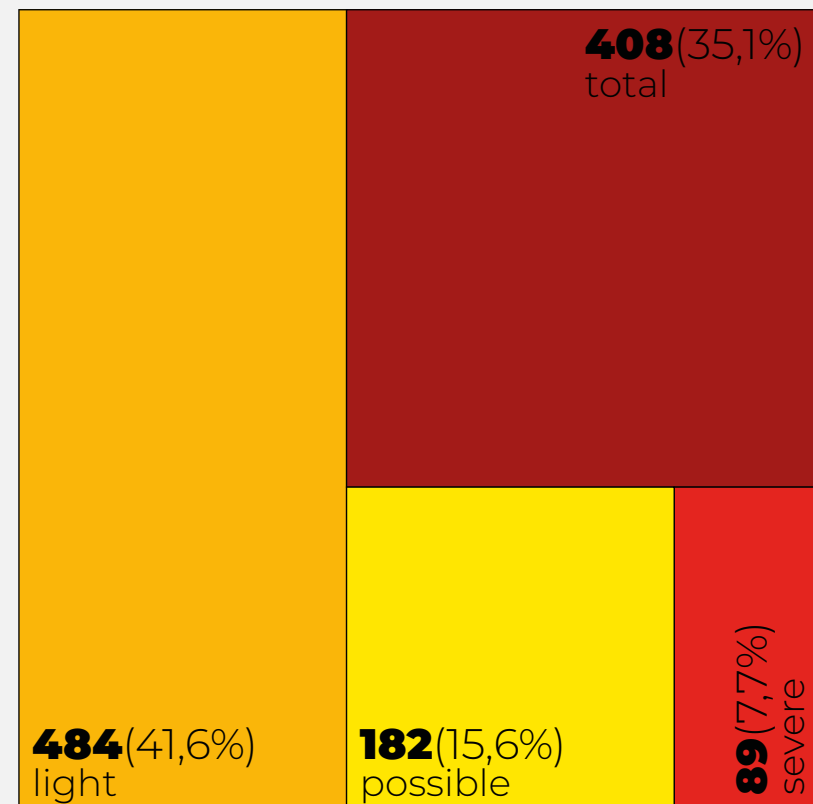
Visual signs may include be small amounts of debris, gravel or sand around the building.

LEVELS OF DESTRUCTION

Buildings destroyed:

1 163 out of 5 301

Level of destruction, number of buildings



TYPES OF DESTROYED OBJECTS

Administrative infrastructure

3 / 3

Social infrastructure

27 / 86

Industrial buildings

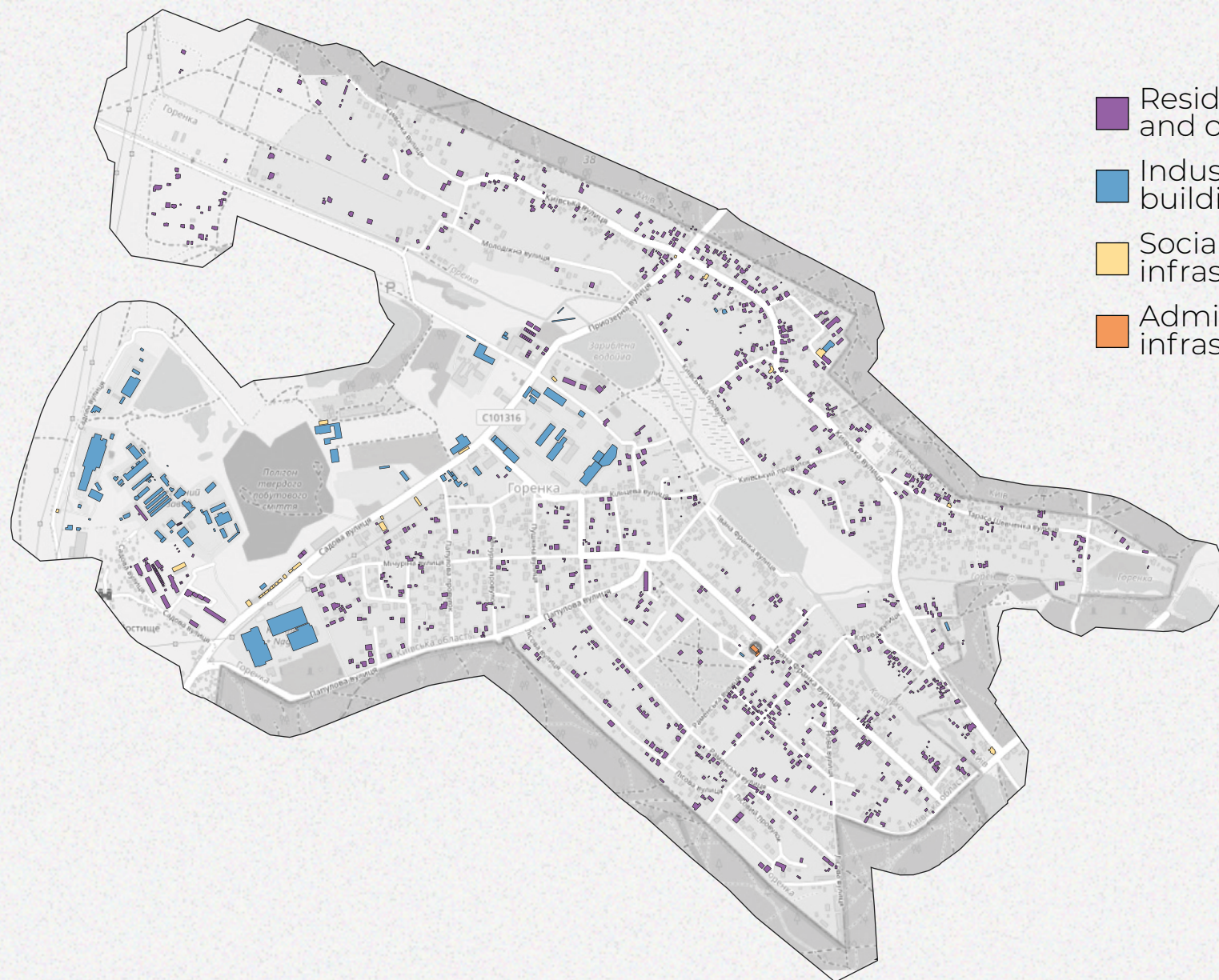
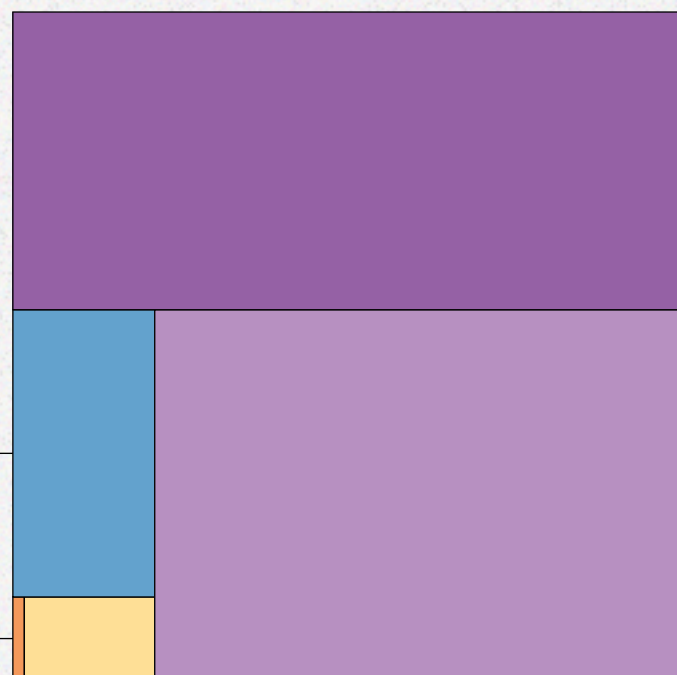
105 / 239

Outbuildings

509 / 3 079

Residential buildings

519 / 1 894

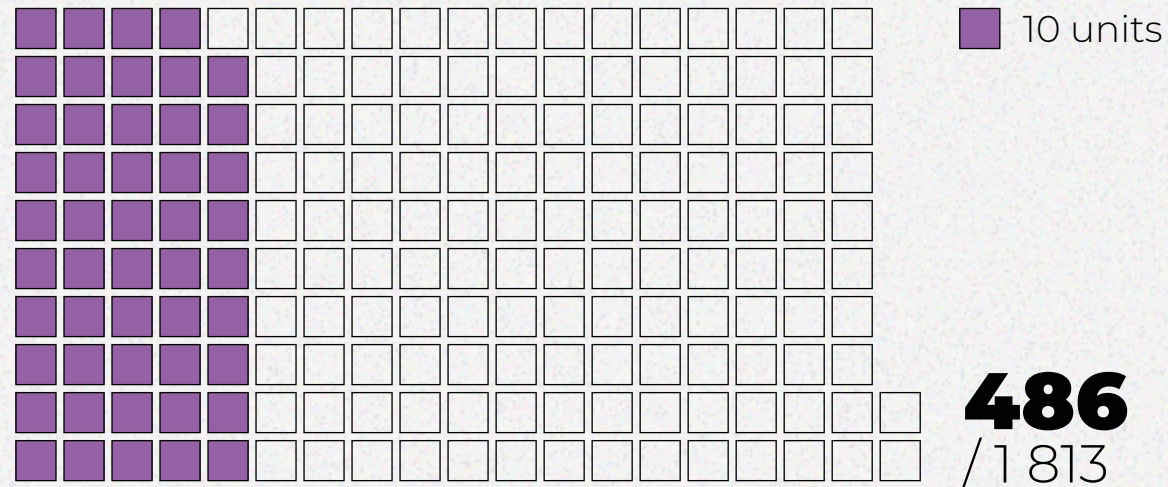


- Residential buildings and outbuildings
- Industrial buildings
- Social infrastructure
- Administrative infrastructure

SCALE OF DESTRUCTION

RESIDENTIAL BUILDINGS & OUTBUILDINGS

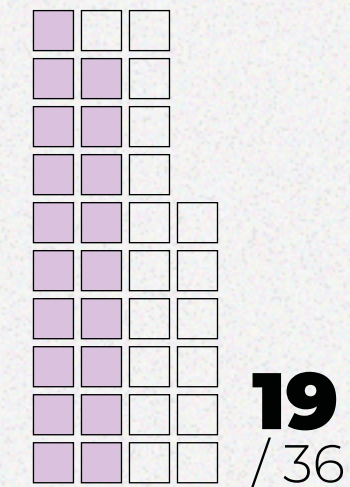
Private houses



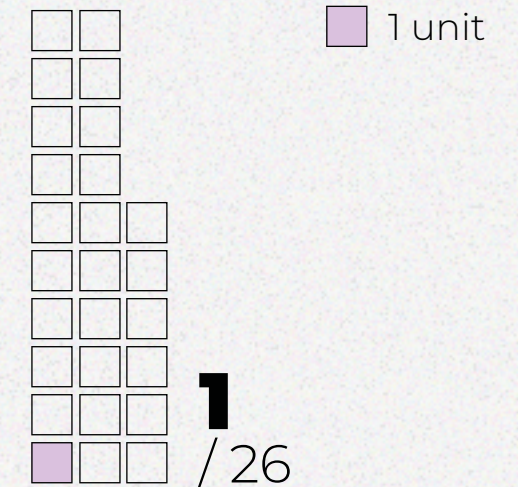
Apartment buildings



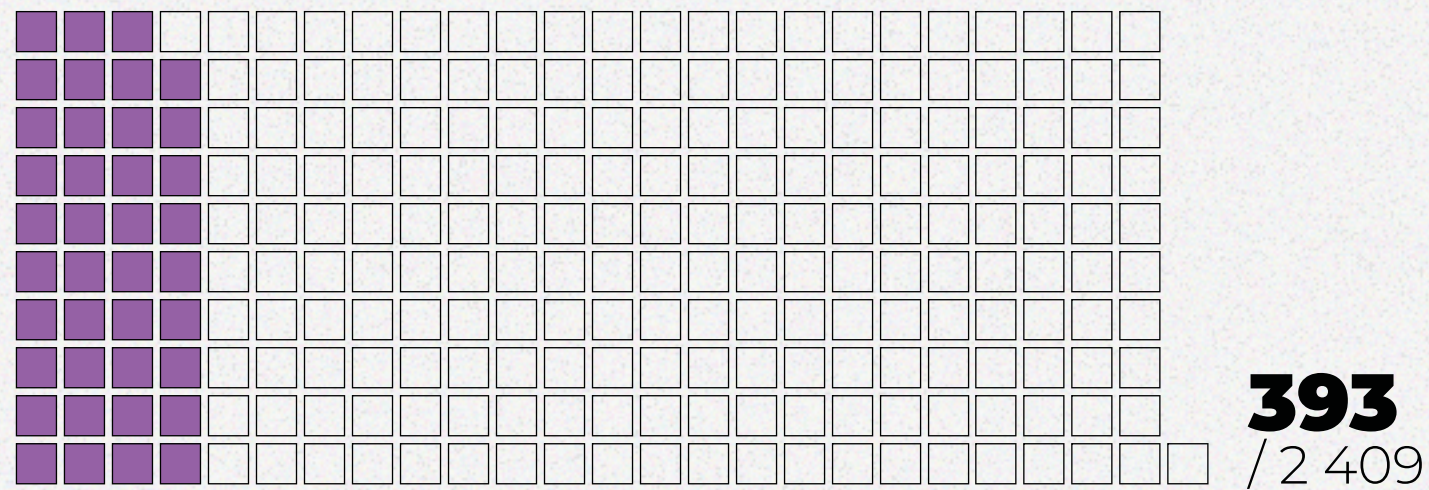
Townhouses



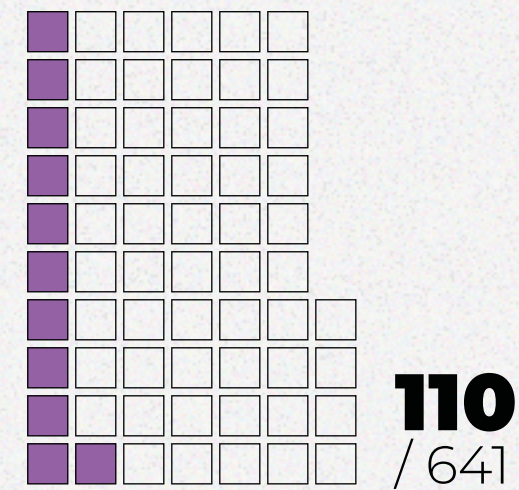
Unfinished buildings



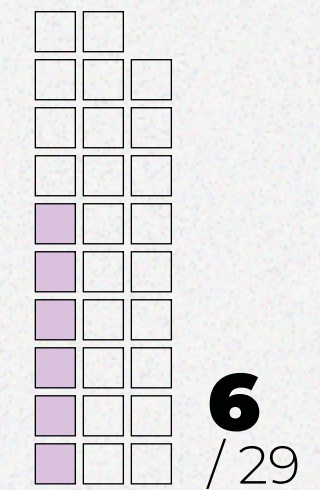
Outbuildings



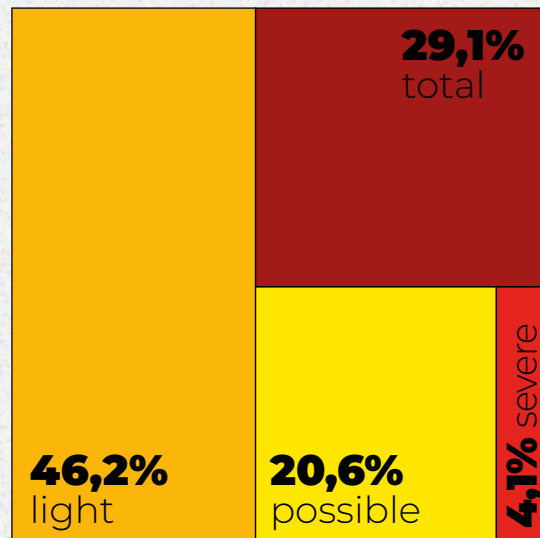
Garages



Greenhouses



SCALE OF DESTRUCTION



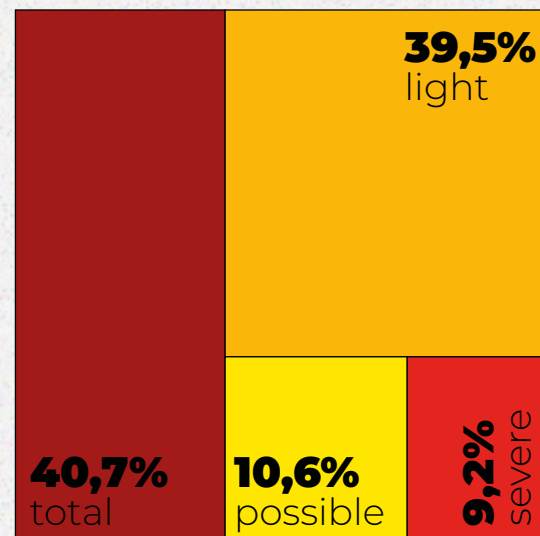
Level of destruction of residential buildings (private houses, apartment buildings, townhouses)



Private house



Private house



Level of destruction of outbuildings (outbuildings, garages, greenhouses)

SCALE OF DESTRUCTION

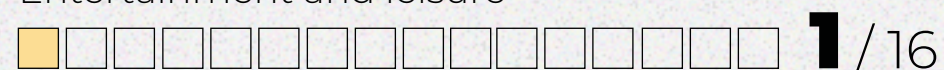
SOCIAL INFRASTRUCTURE

Social infrastructure

Trade and services



Entertainment and leisure



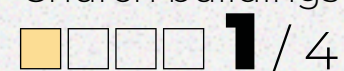
Grocery stores



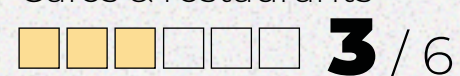
Educational facilities



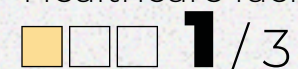
Church buildings



Cafes & restaurants



Healthcare facilities



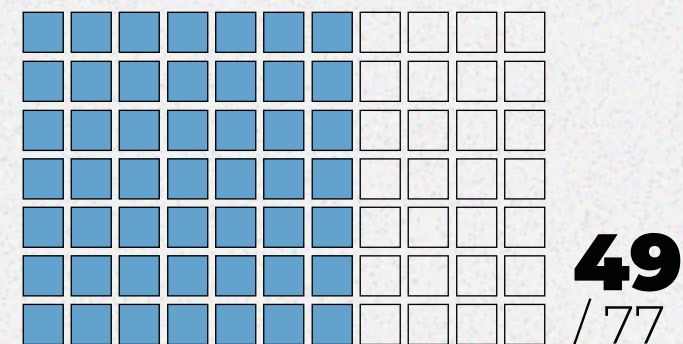
Administrative infrastructure

Administrative buildings

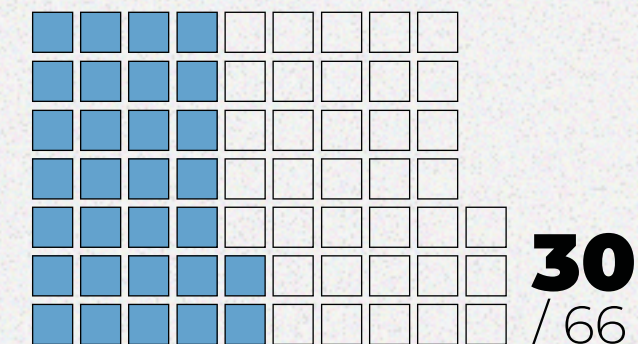


Industrial infrastructure

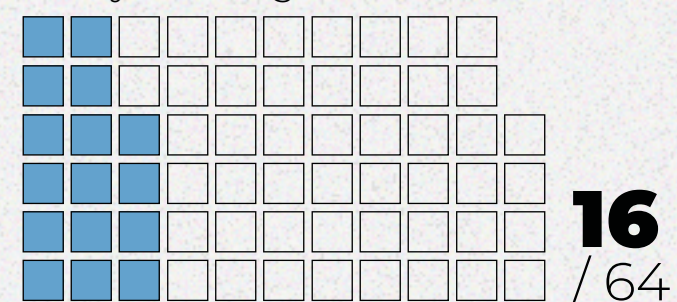
Warehouses



Industrial buildings



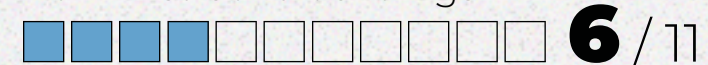
Utility buildings



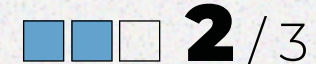
Solar panels



Administrative buildings



Boilers and generators

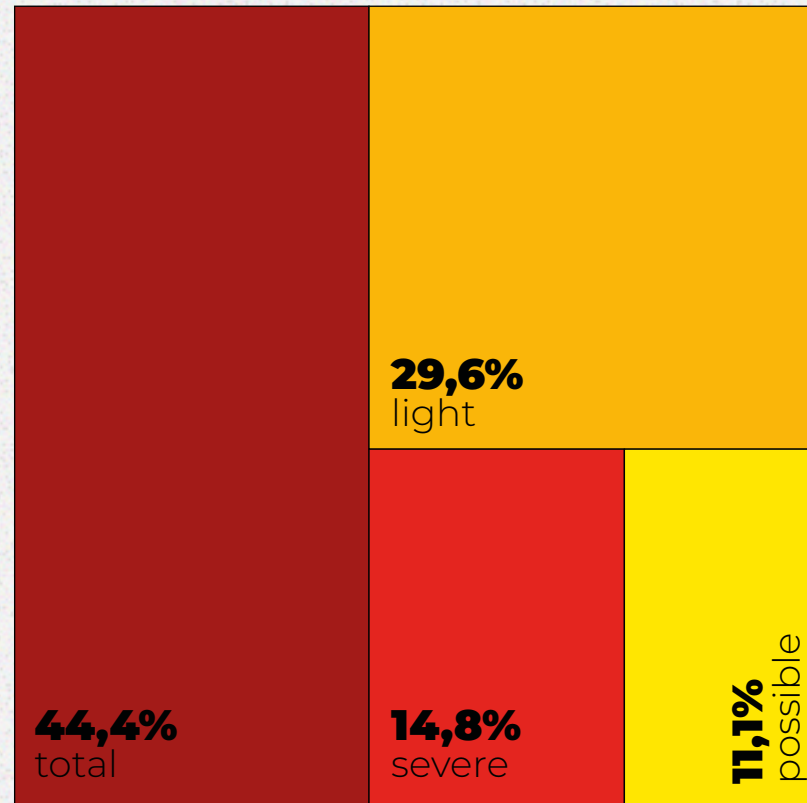


Destroyed enterprises and warehouses

-  Logistics complex KUEHNE+NAGEL
-  Gerd Billerbeck GmbH
-  LLC ClimTek
-  LLC Inter Cars Ukraine
-  TRANS LOK SPE LLC
-  LLC PromZIZ

SCALE OF DESTRUCTION

Level of destruction



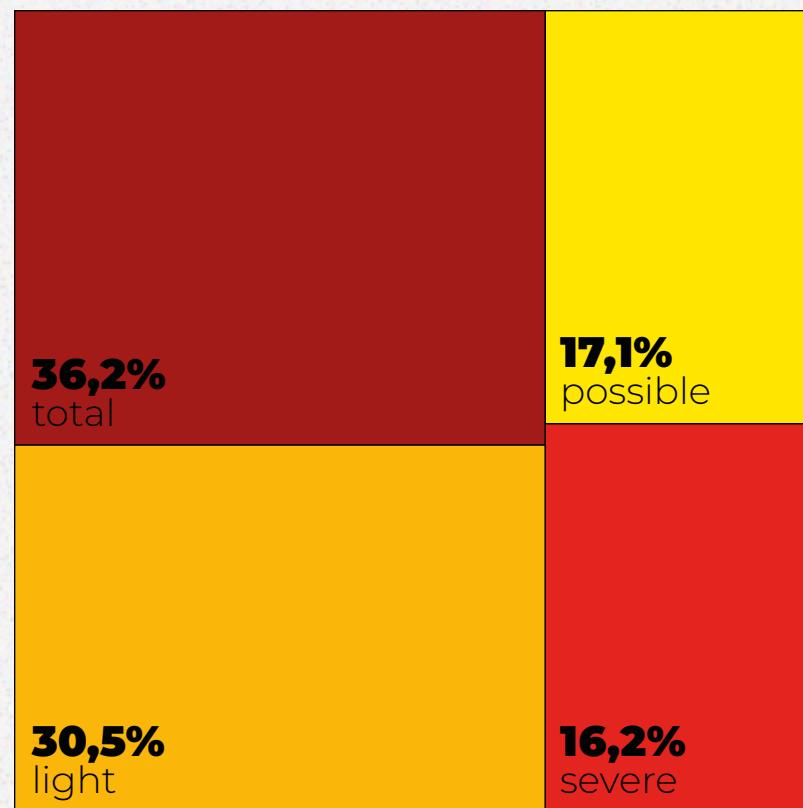
Cafe



Car wash

SCALE OF DESTRUCTION

Level of destruction



Logistics complex KUEHNE+NAGEL



PromZIZ LTD office

Losses by types of buildings



Total losses

\$85.12 mln

(2.49 bln UAH)

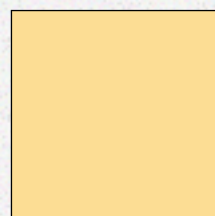
ASSESSMENT OF LOSSES

Residential buildings and outbuildings



ASSESSMENT OF LOSSES

Social infrastructure



\$1.46 mln

Trade



\$0.11 mln

Cafes & restaurants



\$86.93 ths

Churches

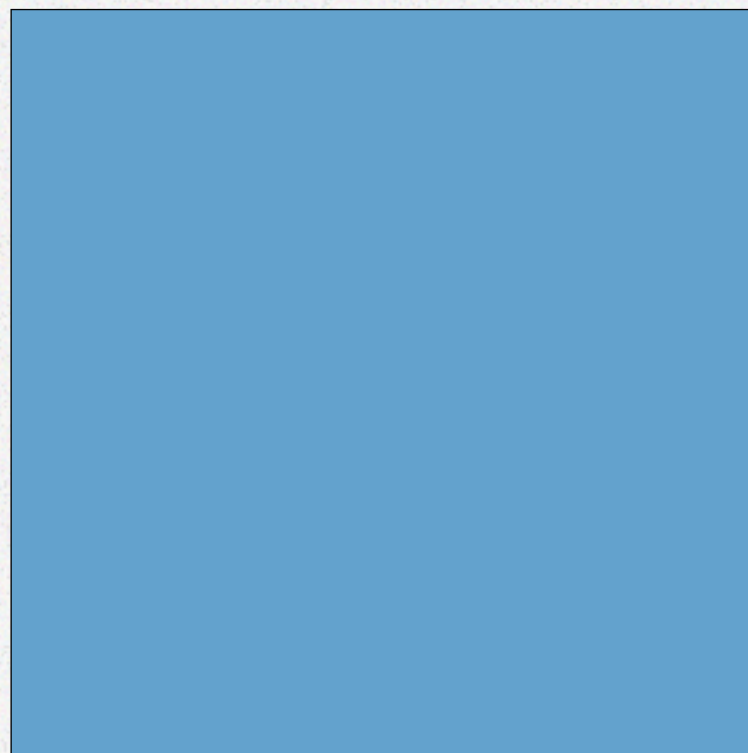
Administrative infrastructure



\$67.38 ths

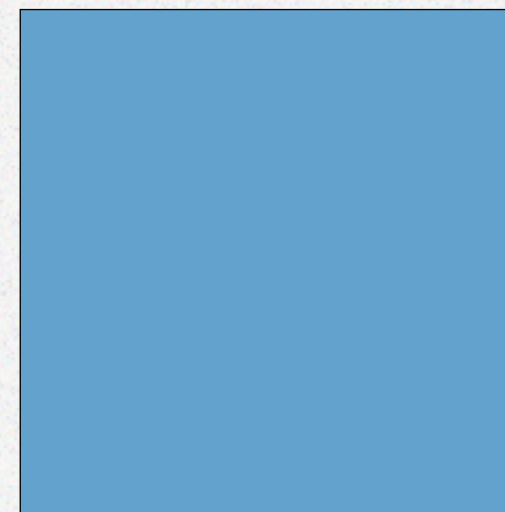
Administrative buildings

Industrial infrastructure



\$20.88 mln

Industrial buildings



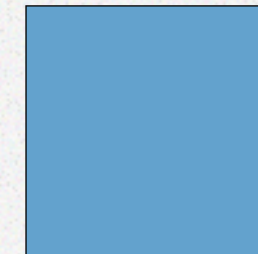
\$12.16 mln

Warehouses



\$0.60 mln

Boilers



\$2.79 mln

Administrative buildings



\$60.26 ths

Utility buildings



\$15.76 ths

Solar panels

1. Assumptions

The following fractions were used for calculations:

100%

of the replacement cost of total destruction

50%

of the replacement cost of severe destruction

10%

of the replacement cost of light destruction

0%

of the replacement cost of possible destruction

2. Value determination



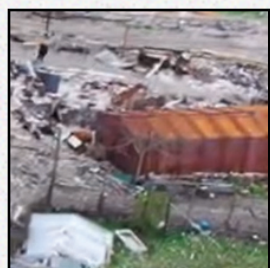
Large objects

The assessment of large objects, in particular enterprises, is calculated individually on the basis of financial statements and other public sources regarding value information.



Medium objects

Medium facilities, in particular, social infrastructure, trade objects, and services (health, education and culture, shops, hotels, restaurants, etc.) are calculated on the basis of average cost data, taking into account the type of area (urban/rural).



Small objects

Small objects, which include residential buildings, outbuildings and garages, are calculated based on the average footage (taking into account the area and type of area) and the cost per square meter (nominal cost + cost of redecoration repairs + cost of dismantling).

HORENKA THROUGH THE EYES OF BEHOLDERS

Gorenka village near Kiev destroyed by 77%



Situation in Horenka near Kyiv after the Russian army withdrawal



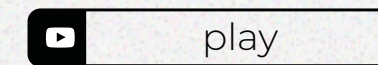
Gorenka village destroyed by occupants in suburbs of Kyiv. Video&photos



Houses in Gorenka damaged in Russia attack



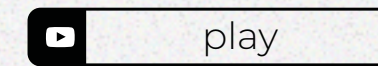
Russian destruction of Gorenka



Houses burn after Russian bombing outside of Kyiv



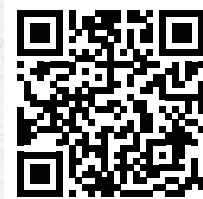
Gorenka, the most ruined village Kyiv region, comes back to life



REBUILD



The RebuildUA project aims to analyze and visualize the destroyed infrastructure of Ukraine, make this information public and share the results with communities, public authorities and specialized foundations



rebuildua.net

Partners:

Visual style and content:



Assessment of losses and damage, budgeting:



Digitization of geospatial information:



Support in cooperation with public authorities:



Cooperation & analysis of community economy, Vkursi Hromada:



Supported by:

