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**DIGITIZATION
OF DESTROYED
INFRASTRUCTURE**

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 damages 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

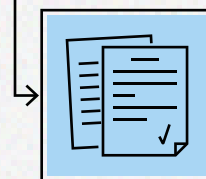
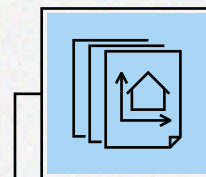
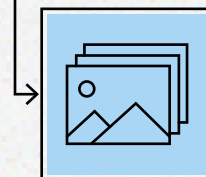
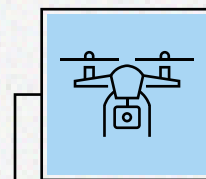
To ensure completeness of the input data, the project team captures photos and videos, as well as collects additional information from verified sources.

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

Hostomel became one of the key targets of Russian occupiers on their way to Kyiv: it was shelled and bombed from the air, and landing forces tried to occupy the local Antonov airport. Heavy battles were fought for the airport and Hostomel itself, as the town was liberated only on April 2.

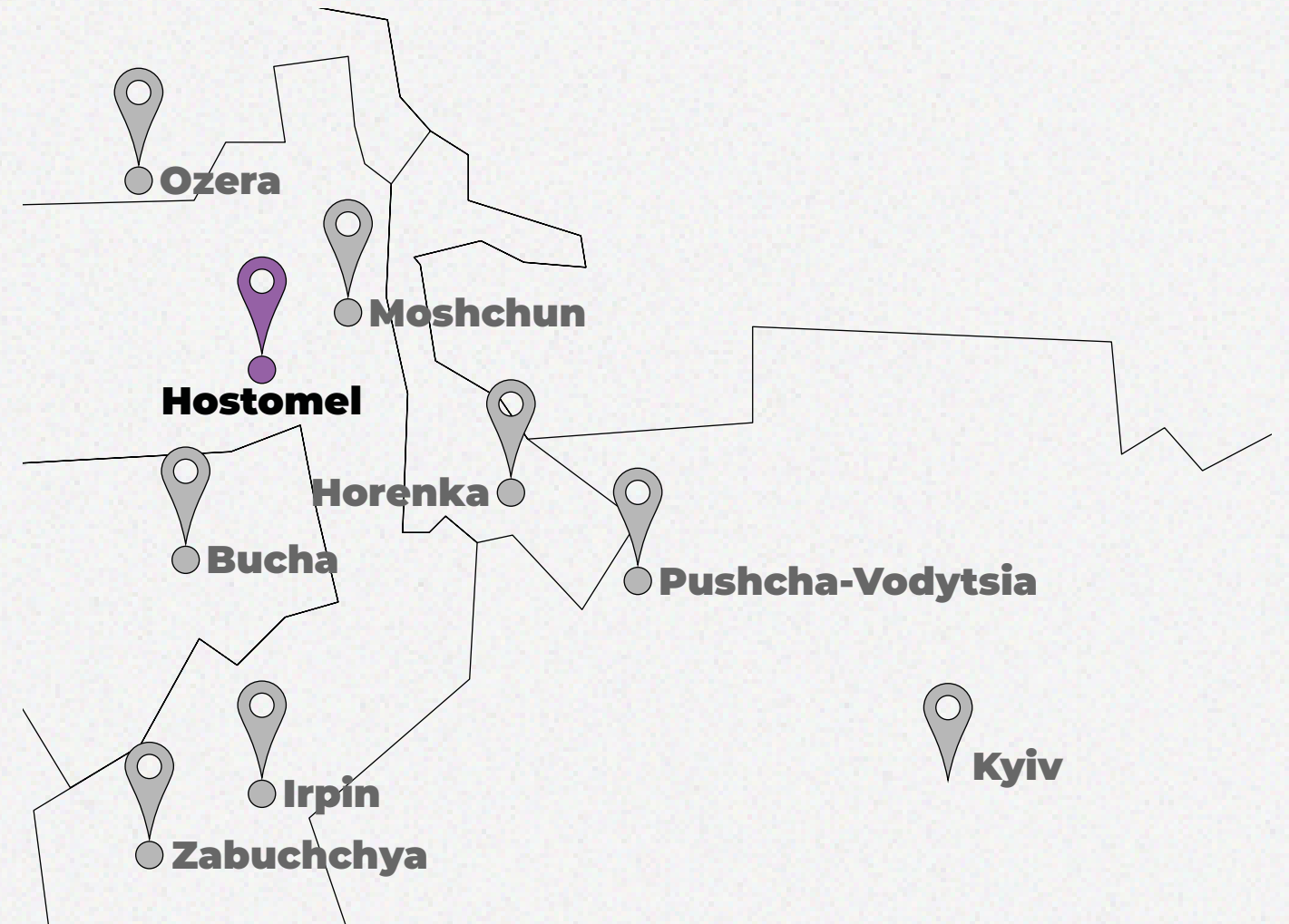
Thousands of damaged buildings, 400 missing people, even more killed local residents, the destroyed Ukrainian plane «Mriya» — this is what the «liberators» left behind in the town.

The RebuildUA the consequences of the occupation for Hostomel. Keep track of our destinations on the map and in the project news..



 rebuildua.net

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

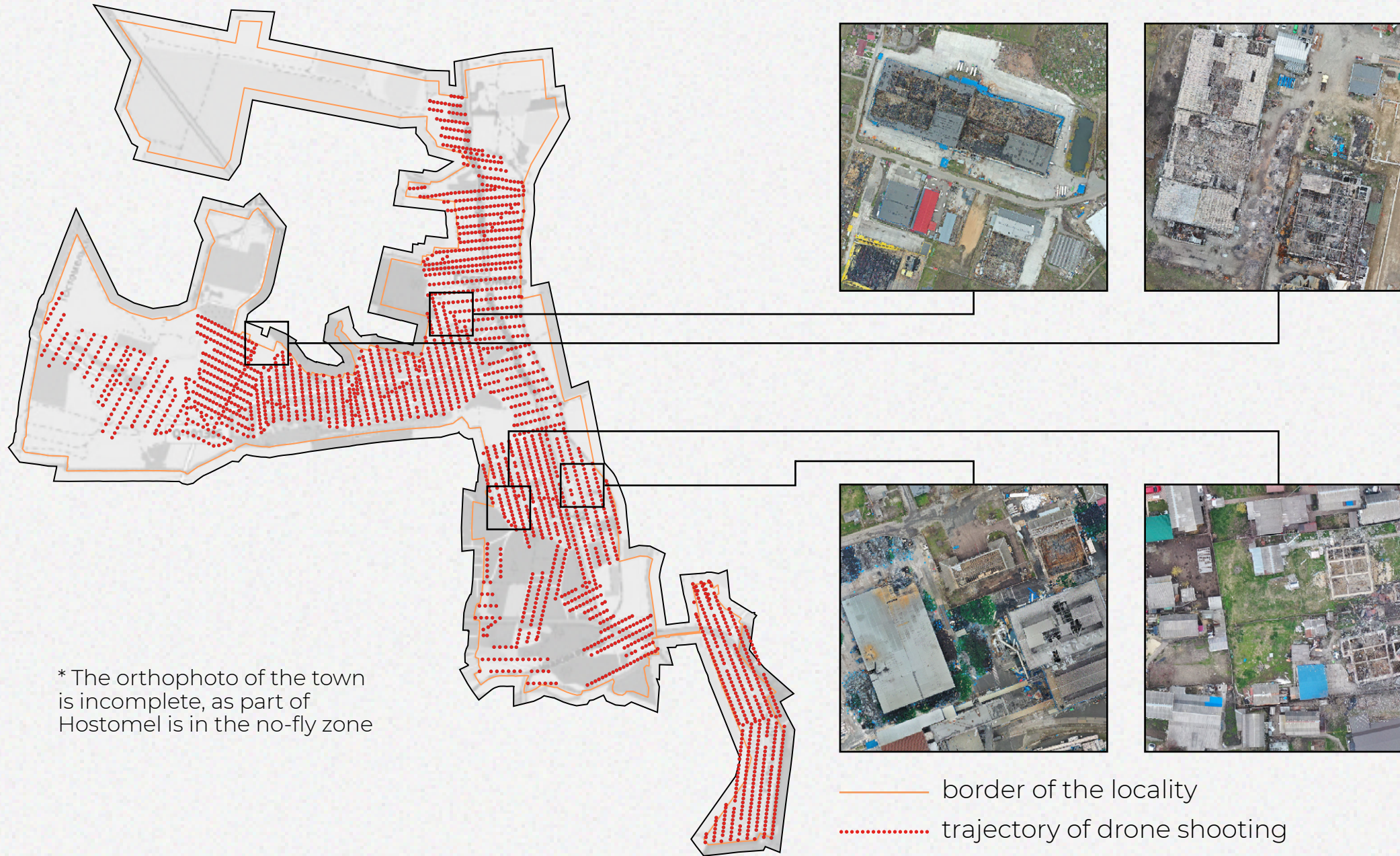


Region **Kyiv**
 District **Buchanskyi**
 Community **Hostomelska**

 Survey area
1 955 ha

 Population
16 945 people

DIGITIZATION PROCESS



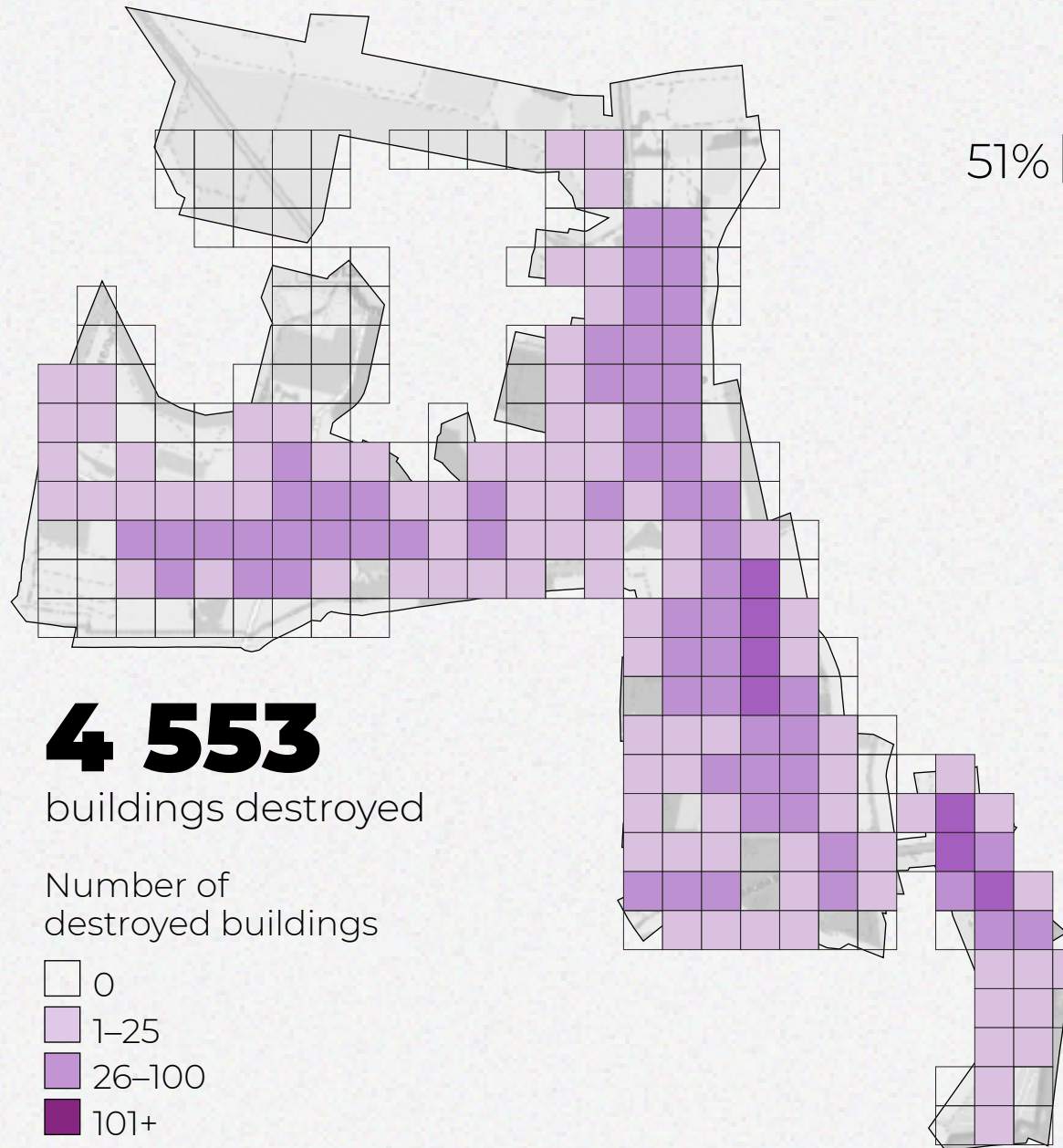
* The orthophoto of the town is incomplete, as part of Hostomel is in the no-fly zone

14 flight missions
3 265 pictures for orthophoto
500 hours of data processing
30 Gigabytes of data

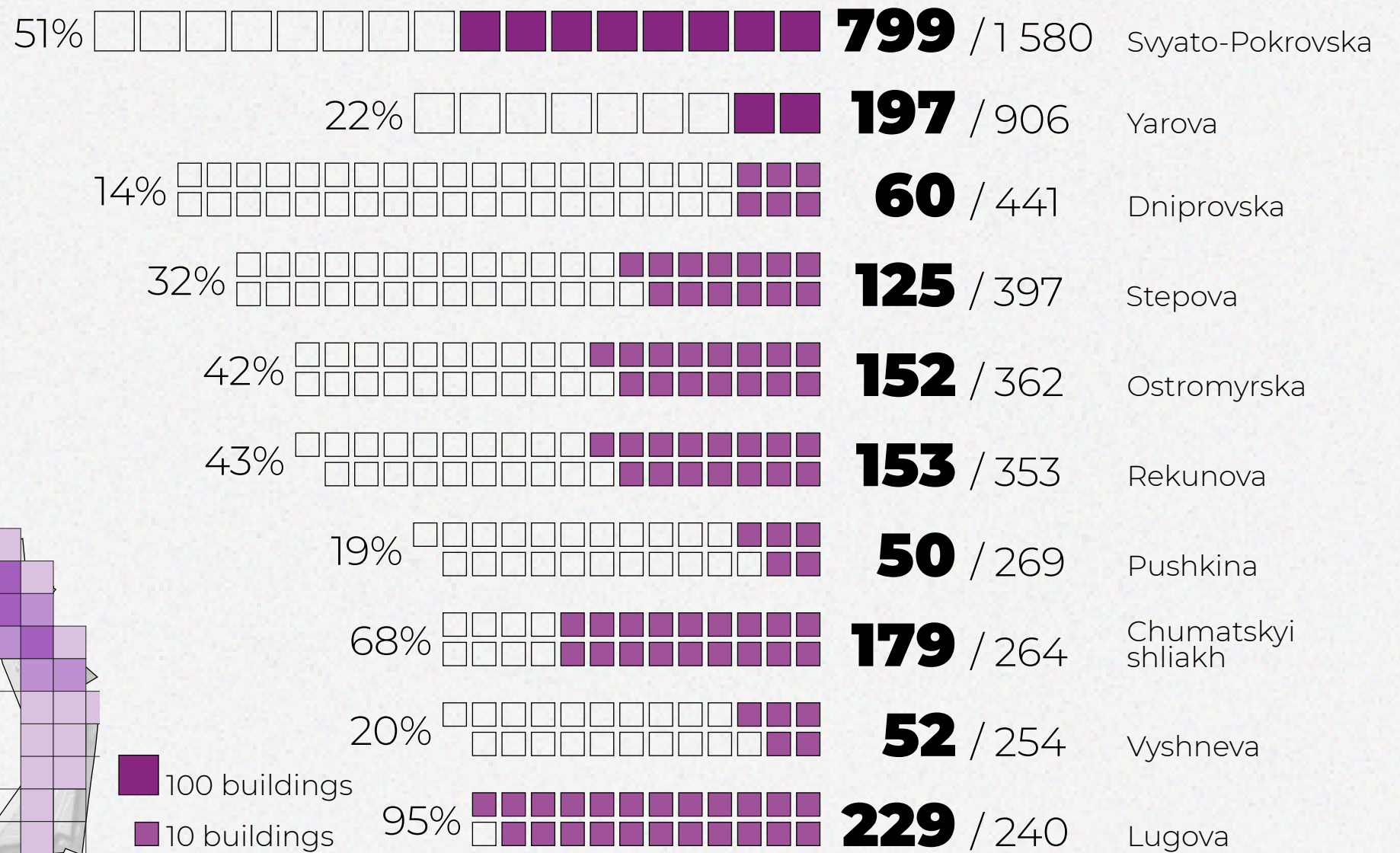
Video from a drone



THERMAL MAP OF DESTRUCTION



Destruction of the largest streets

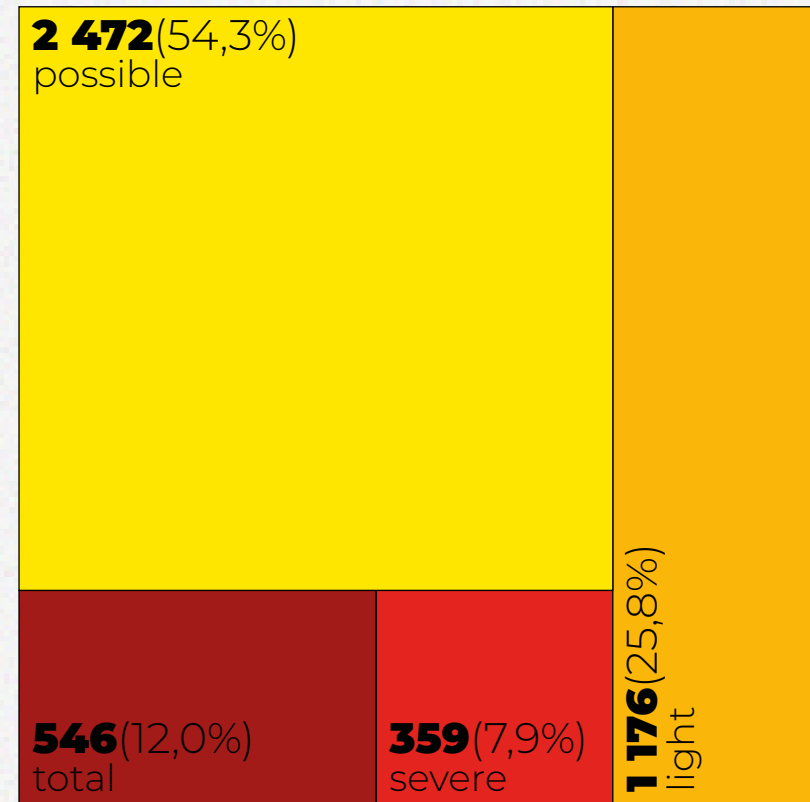


LEVELS OF DESTRUCTION

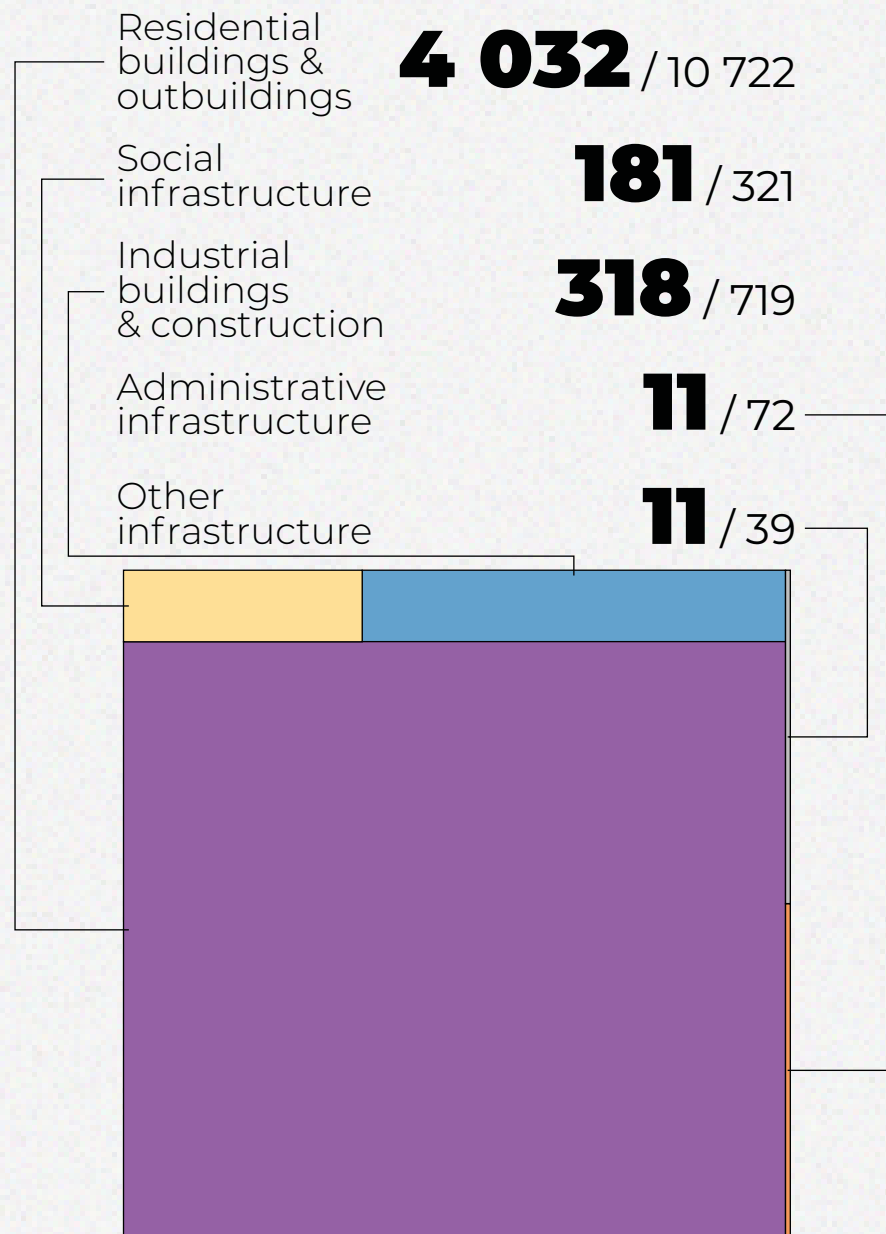
Buildings destroyed:

4 553 / 11 874

Level of destruction, number of buildings

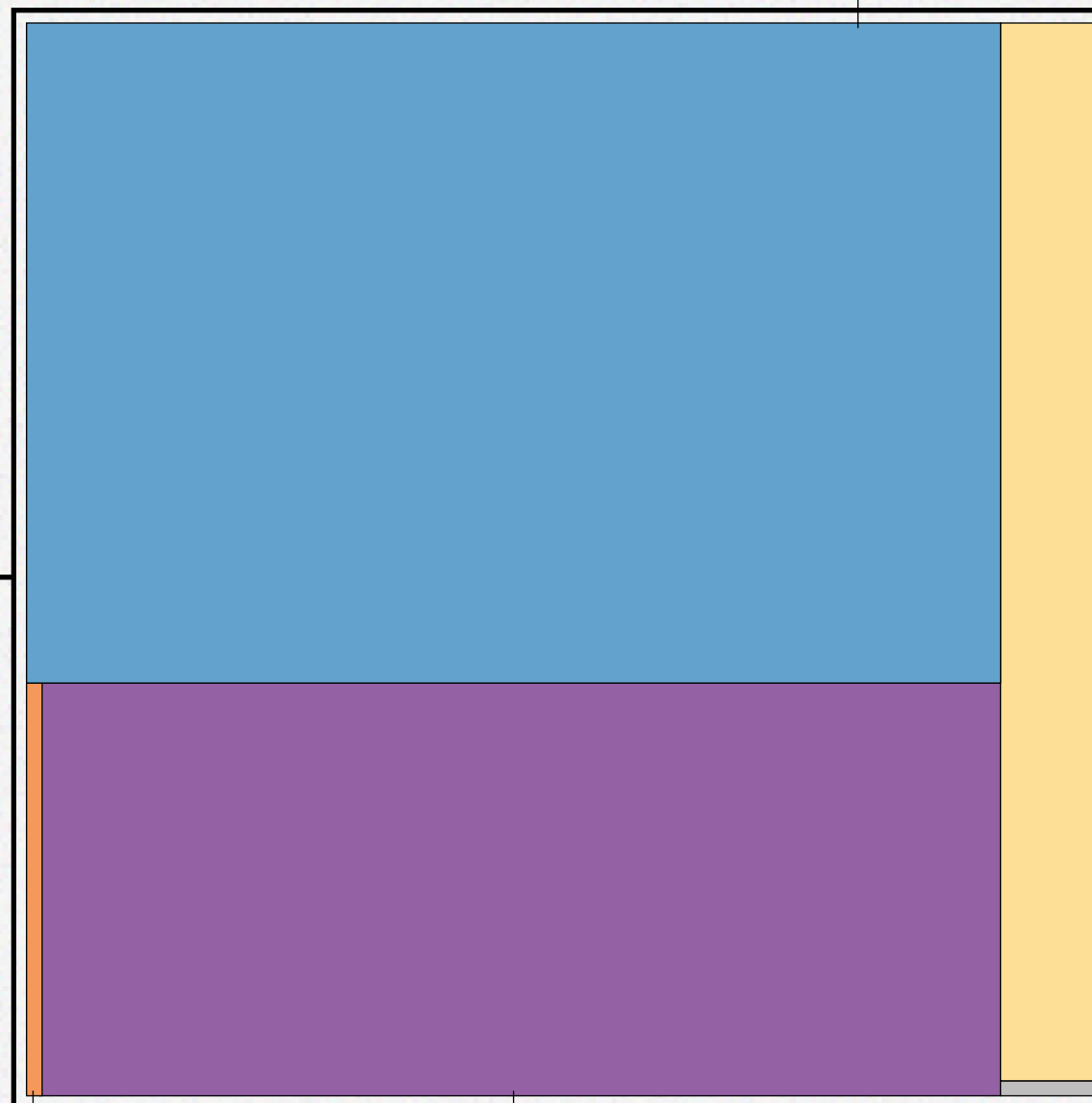


TYPES OF DESTROYED OBJECTS



ASSESSMENT OF DAMAGES

Damages by types of buildings



Total damages
\$342,9 mln
(9,5 bln UAH)

\$189,66 mln
Industrial buildings
& construction

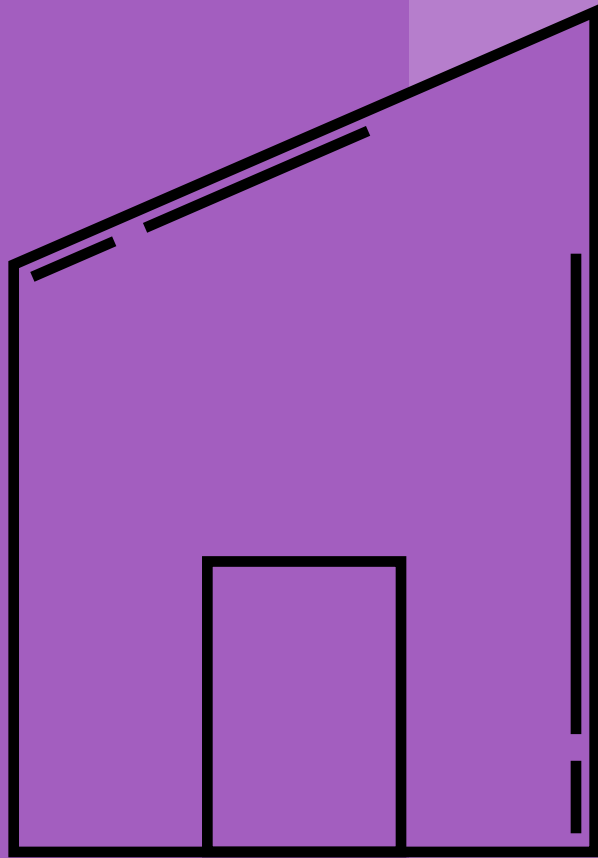
\$30,89 mln
Social infrastructure

\$0,05 mln
Other infrastructure

\$119,83 mln
Residential buildings
& outbuildings

\$2,49 mln
Administrative infrastructure

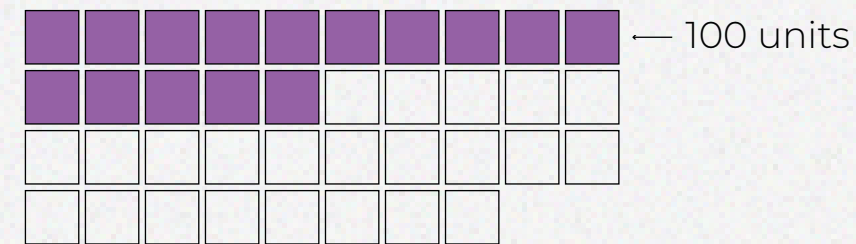
RESIDENTIAL BUILDINGS & OUTBUILDINGS



SCALE OF DESTRUCTION

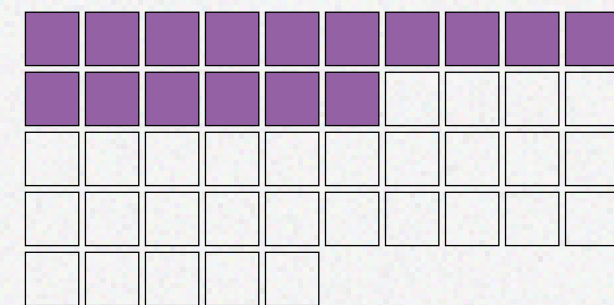
Residential buildings & outbuildings

Private houses

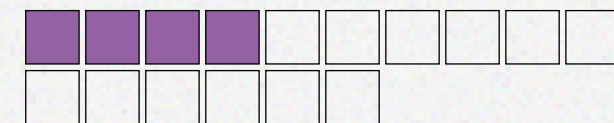


1 524 / 3 796

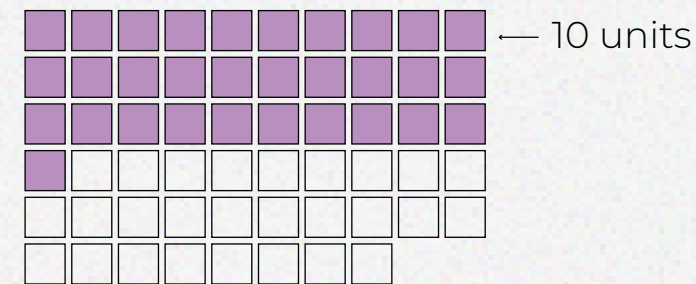
Outbuildings



Garages & parking spaces

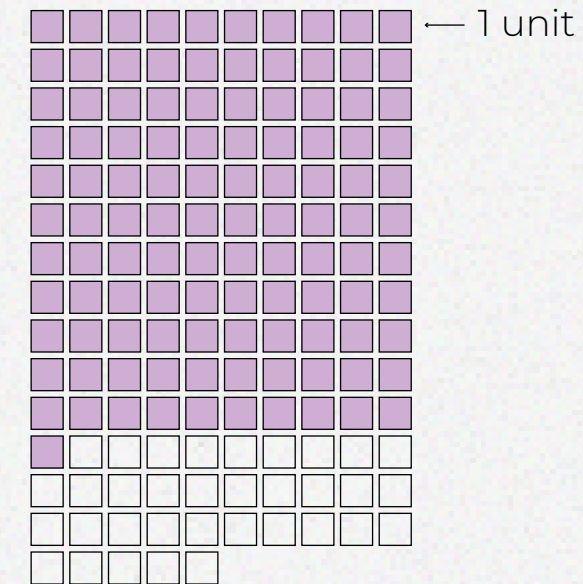


Townhouses & duplexes



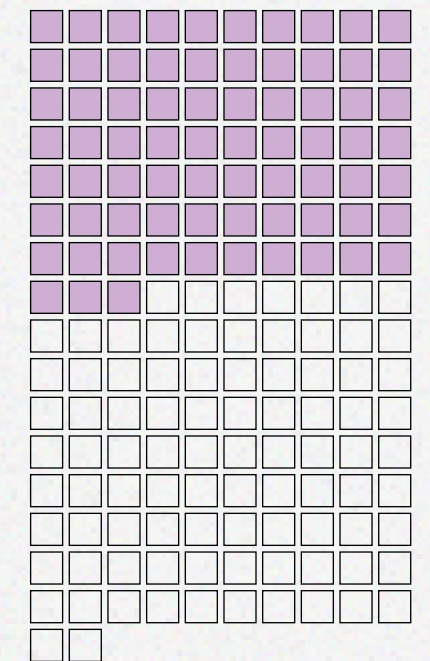
310
/ 583

Apartment buildings



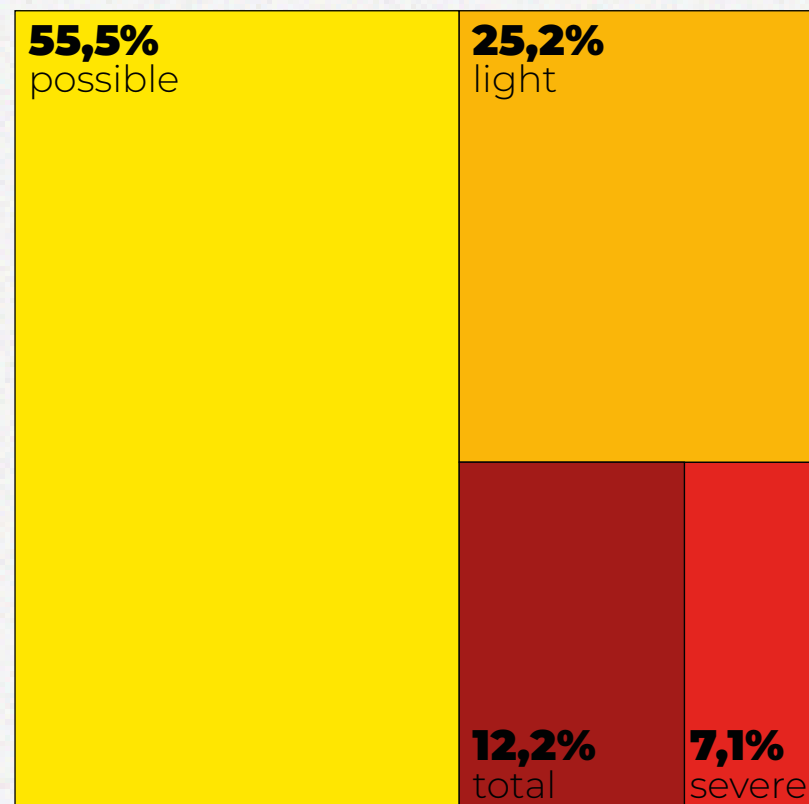
111
/ 145

Greenhouses



SCALE OF DESTRUCTION

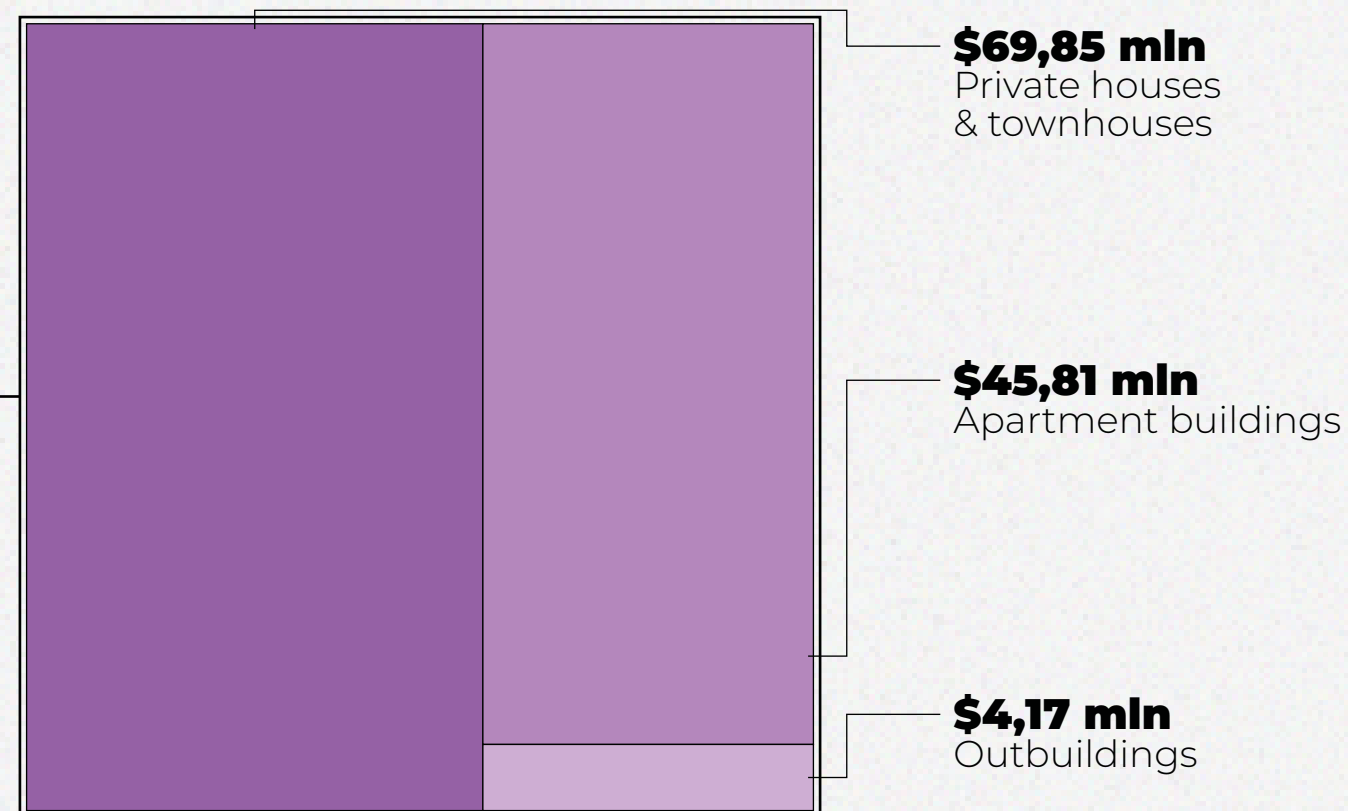
Level of destruction



Assessment of damages

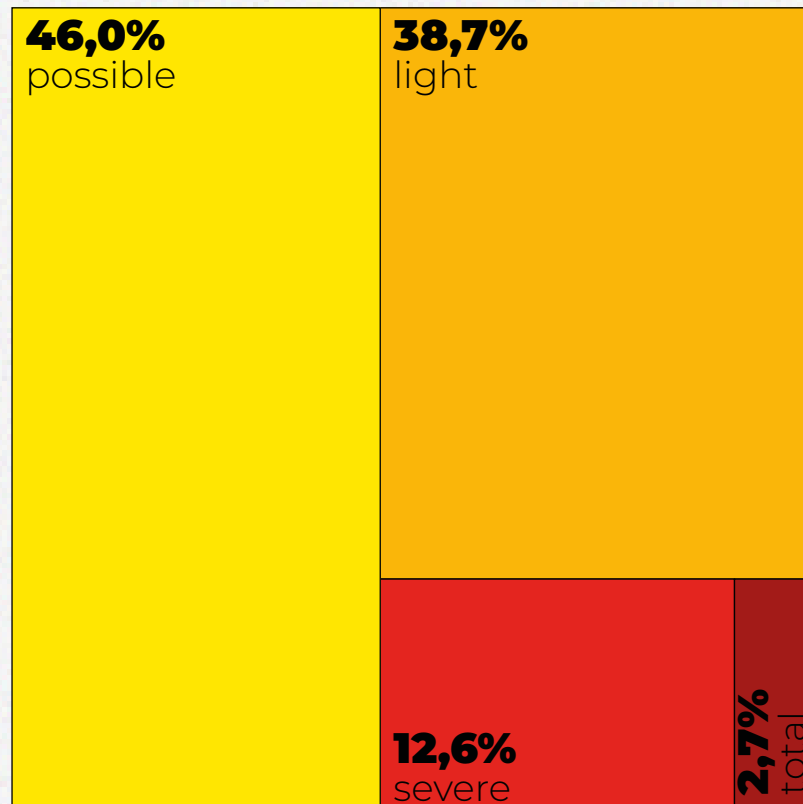
Total damages

\$119,8 mln



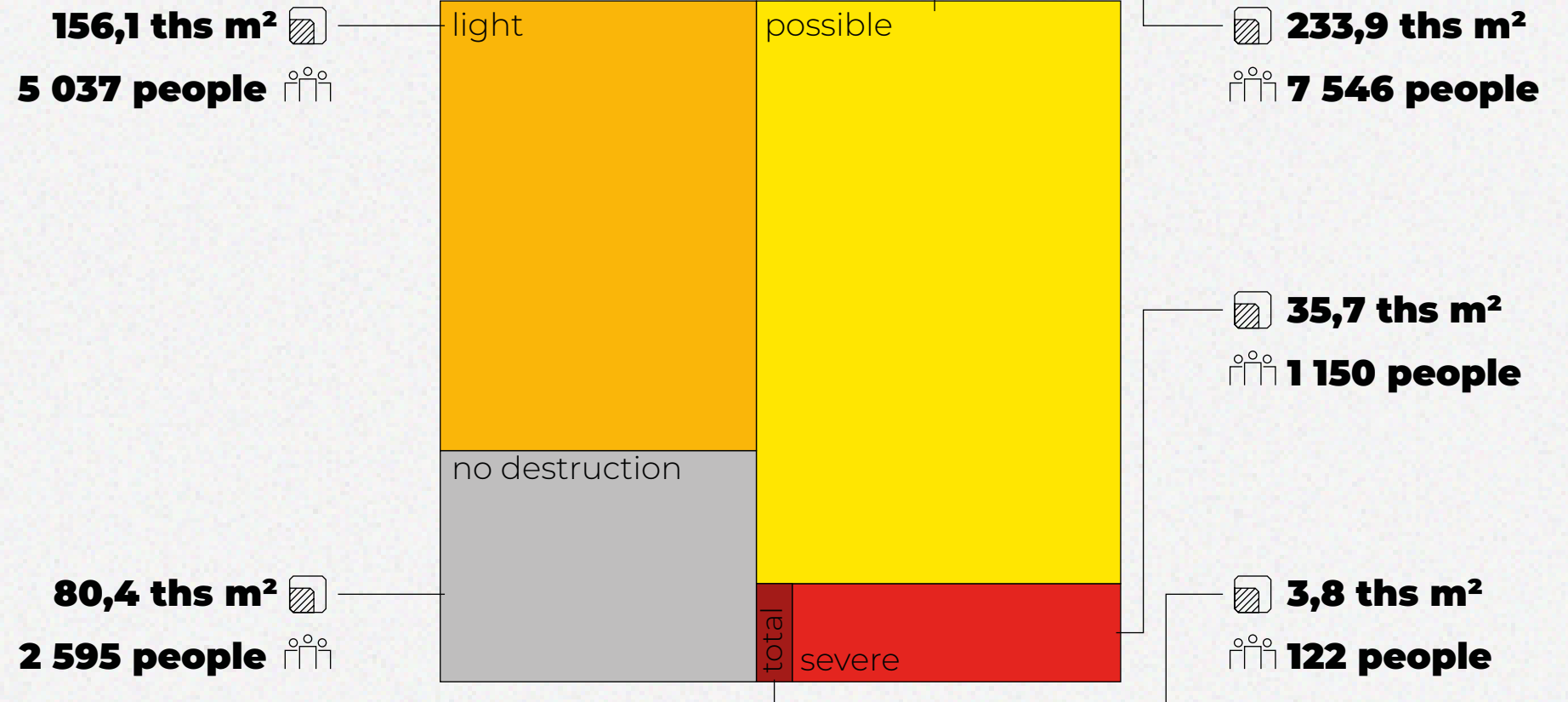
APARTMENT BUILDINGS

Level of destruction



Total damages
\$45,8 mln

The area of destruction and the number of residents who suffered damage



Total area of damage
429,5 ths m²

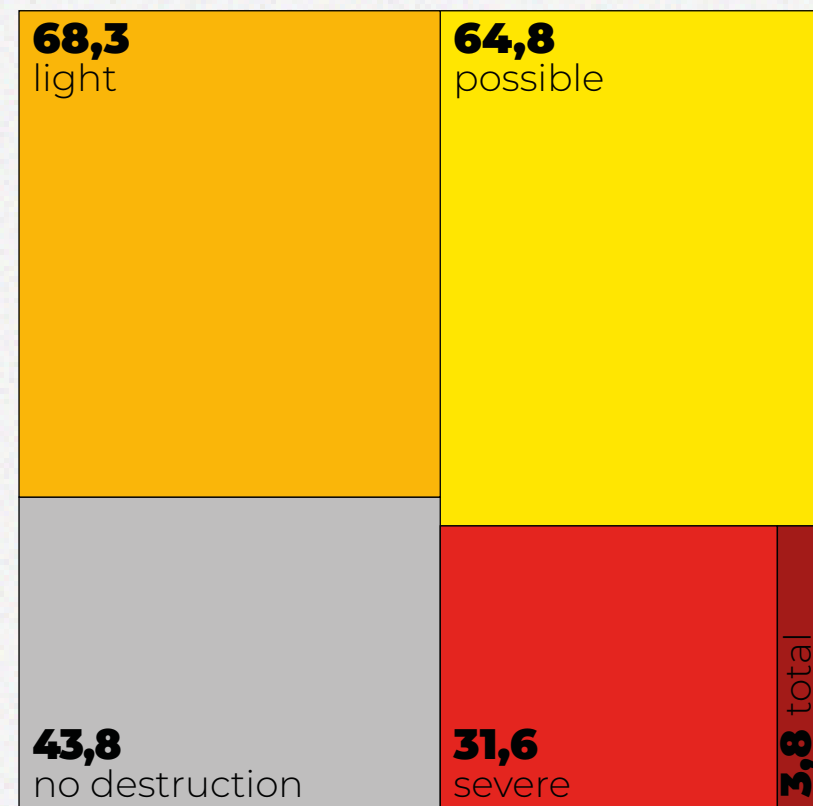
Number of residents affected
13 855

APARTMENT BUILDINGS

Area of destruction by number of floors

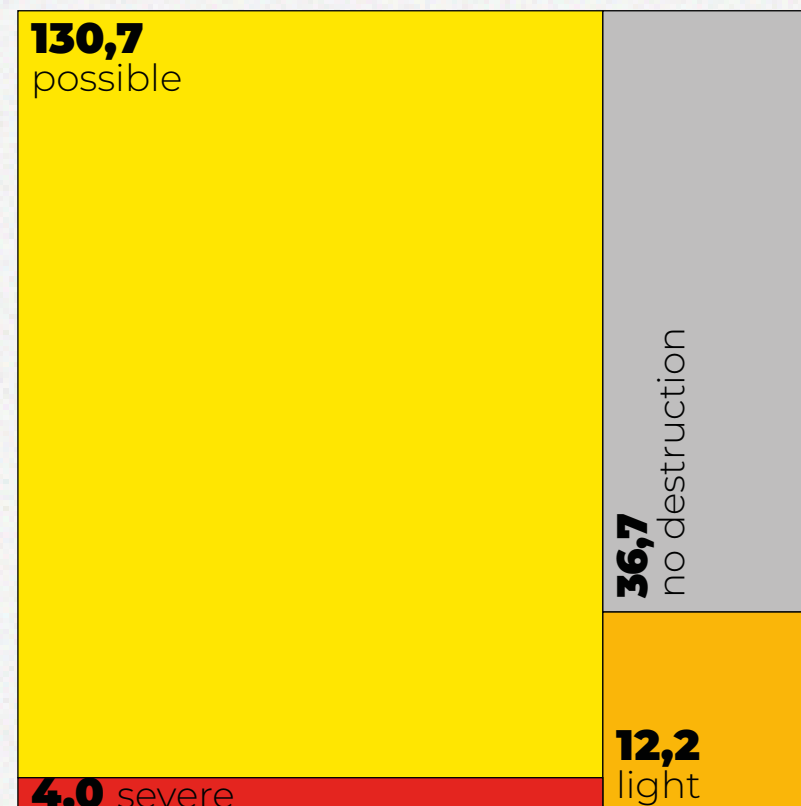
 **5 floors**

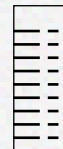
(ths m²)



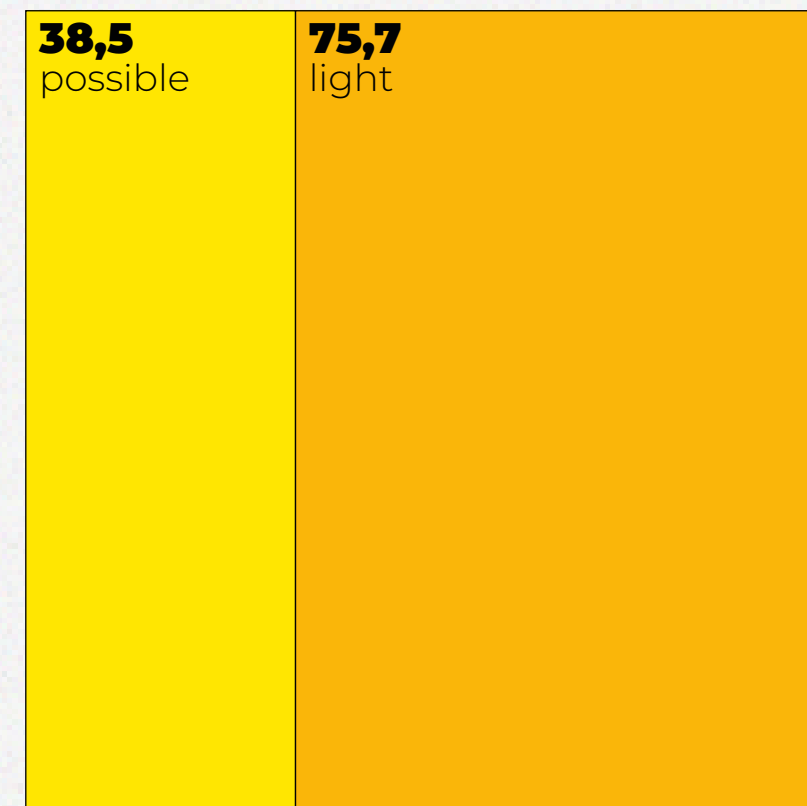
 **6-9 floors**

(ths m²)



 **10+ floors**

(ths m²)



Total area of damage

168,5 ths m²

Total area of damage

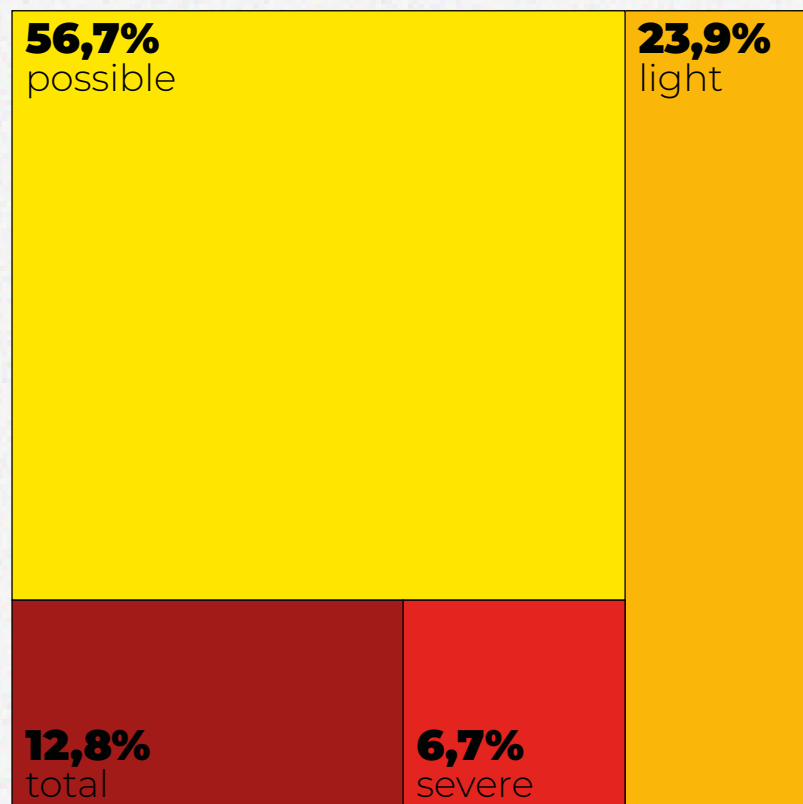
146,9 ths m²

Total area of damage

114,1 ths m²

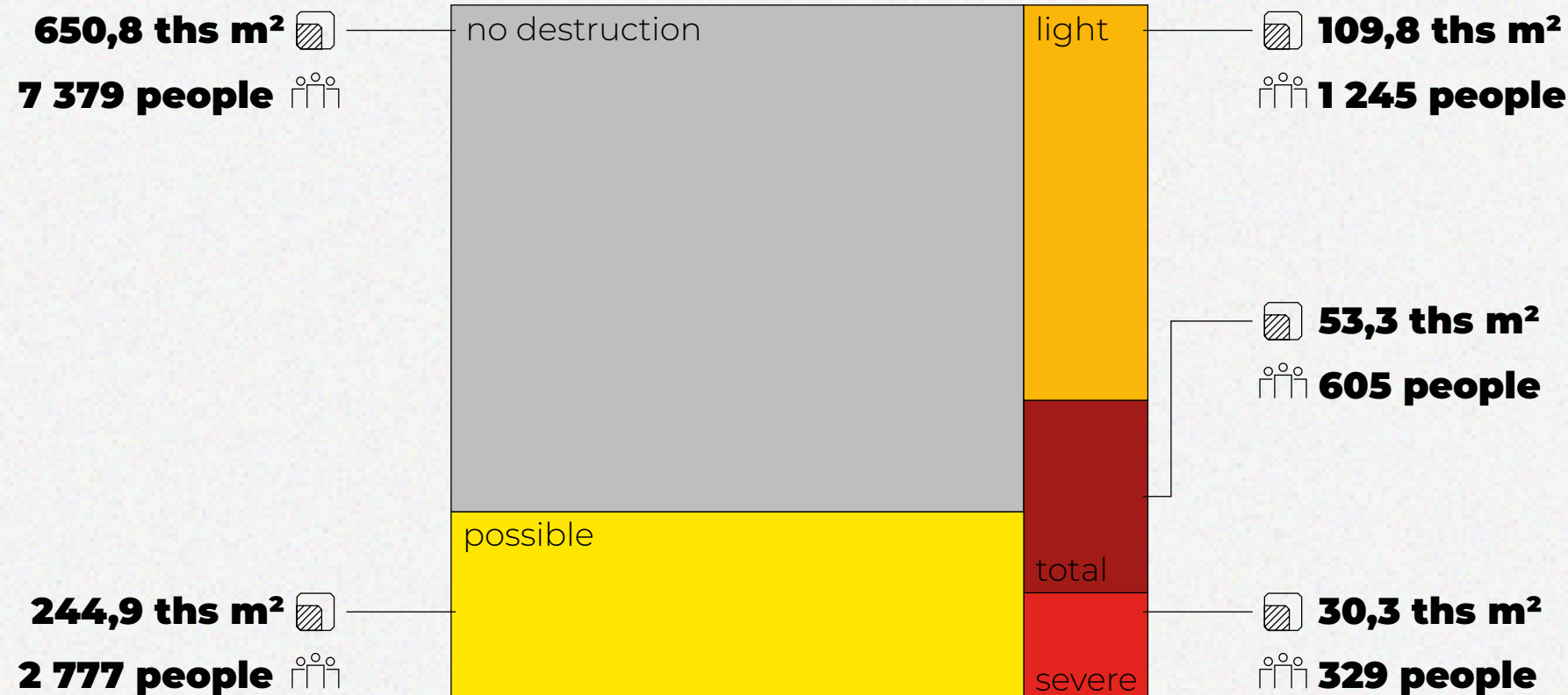
PRIVATE HOUSES & TOWNHOUSES

Level of destruction



Total damages
\$69,9 mln

The area of destruction and the number of residents who suffered damage

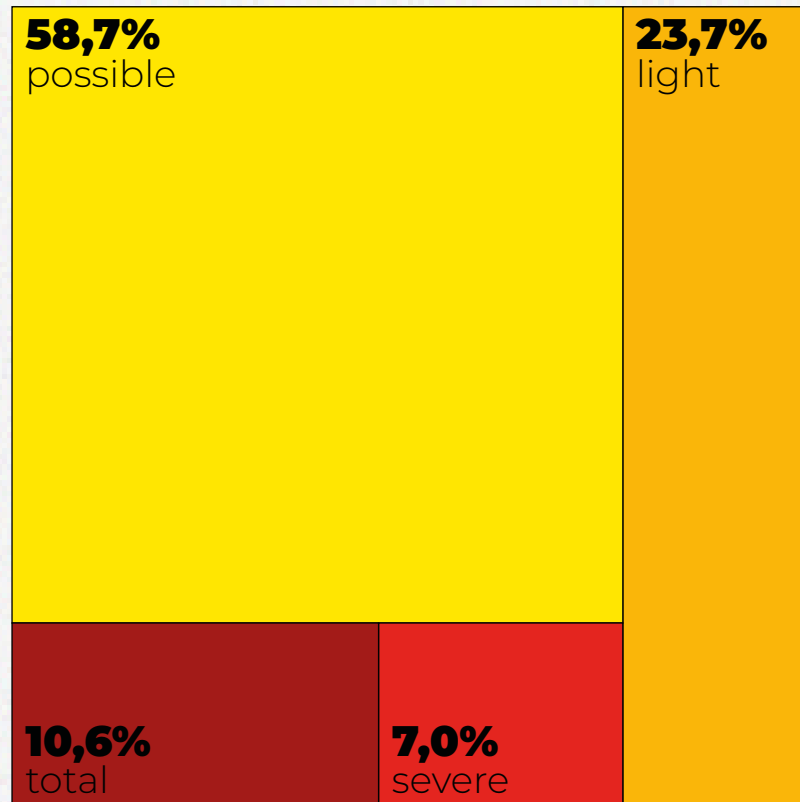


Total area of damage
437,2 ths m²

Number of residents affected
4 957

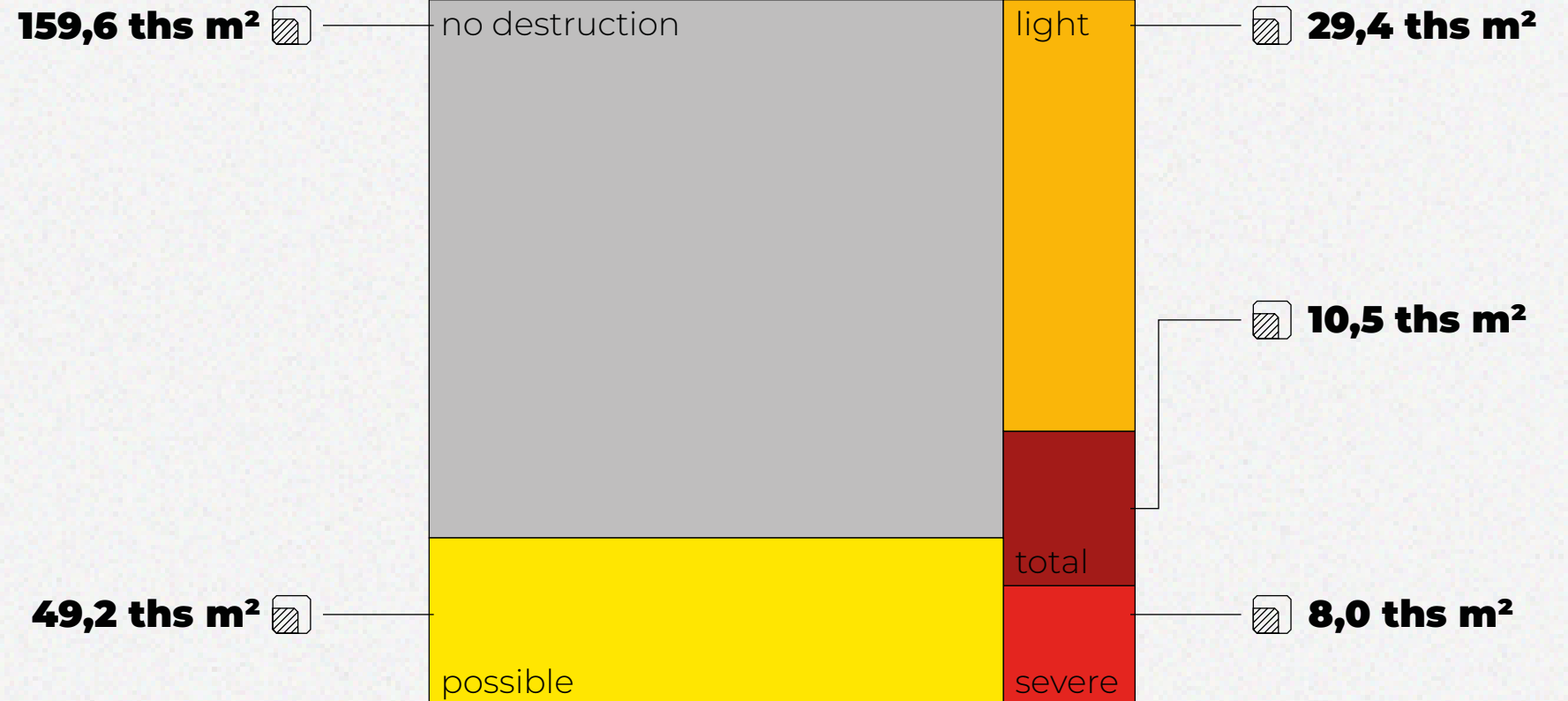
OUTBUILDINGS

Level of destruction



Total damages
\$4,2 mln

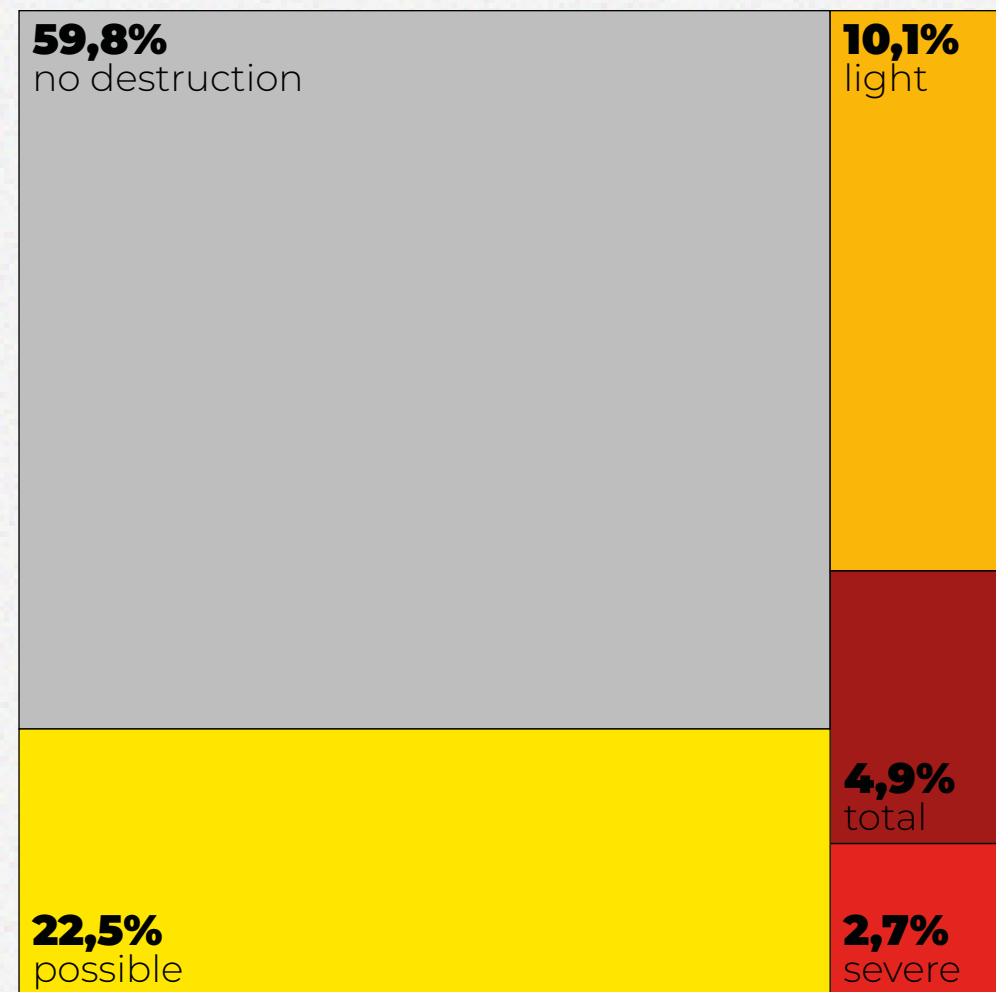
Area of destruction



Total area of damage
97,1 ths m²

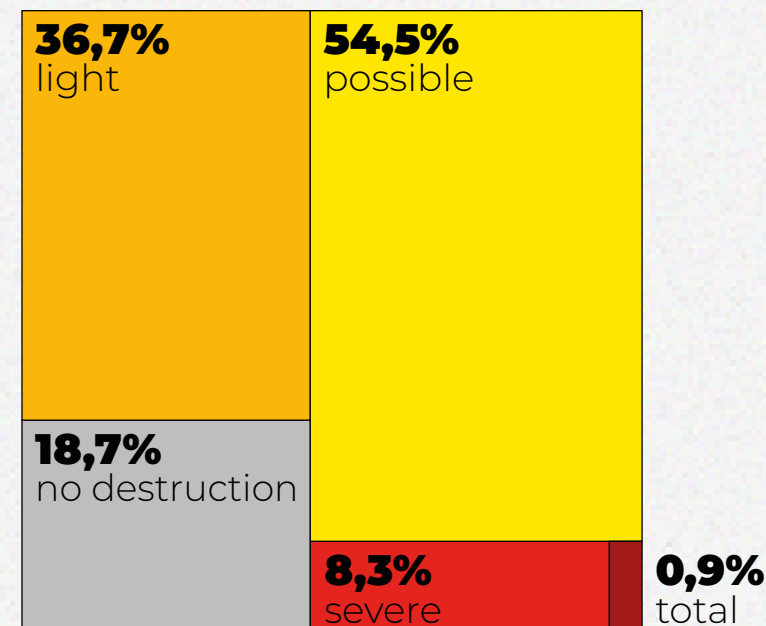
TOTAL AREA OF DESTRUCTION

Private houses & townhouses



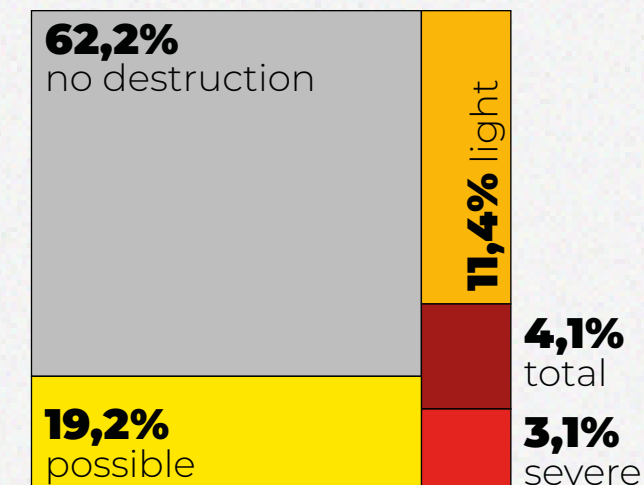
Total area of damage
437,2 ths m² / 1 088,0 ths m²

Apartment buildings



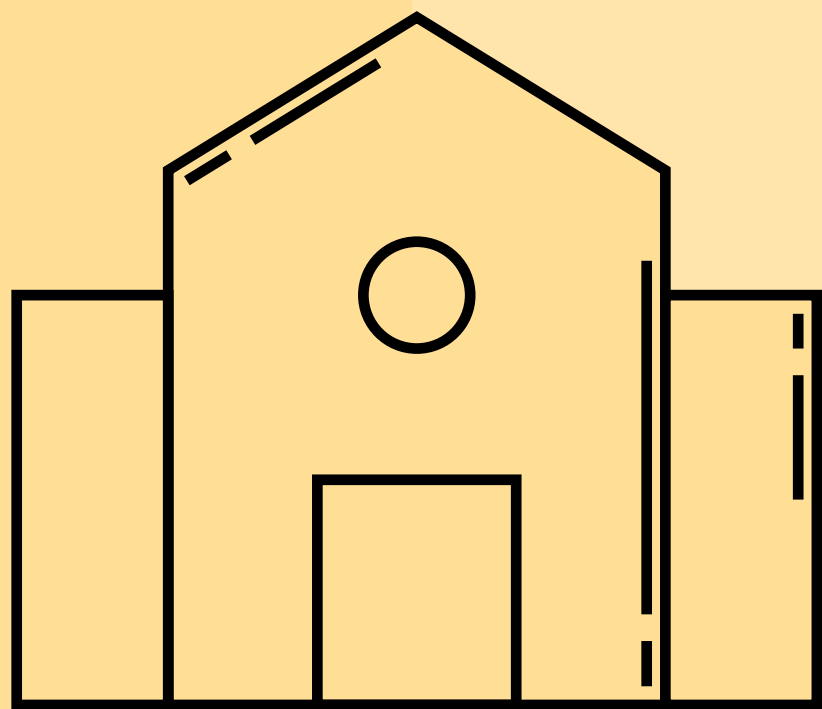
Total area of damage
429,5 ths m² / 509,9 ths m²

Outbuildings



Total area of damage
97,1 ths m² / 256,7 ths m²

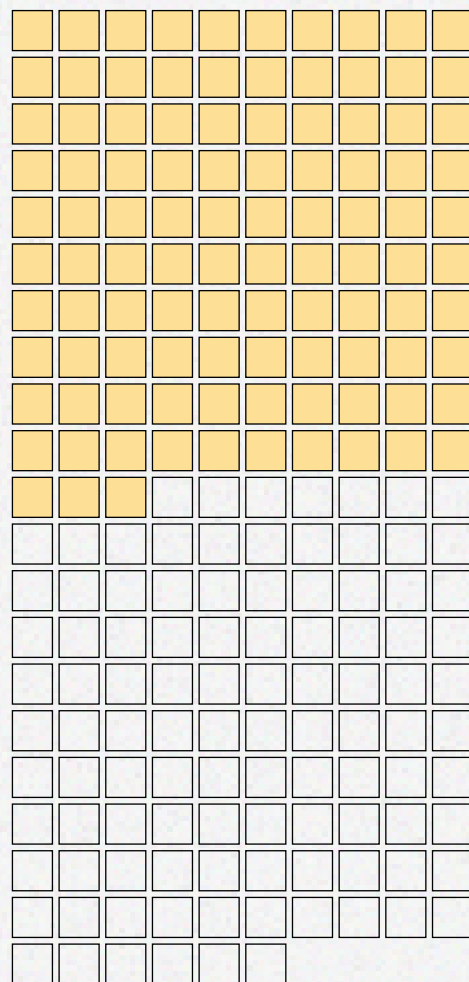
SOCIAL INFRASTRUCTURE



SCALE OF DESTRUCTION

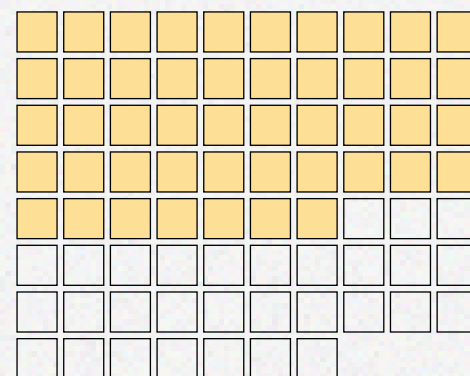
Social infrastructure

Trade and commerce



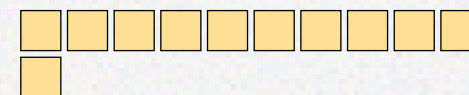
103 / 206

Buildings of general purpose



47 / 77

Offices and conference centers



11 / 11

Hotels and recreation facilities



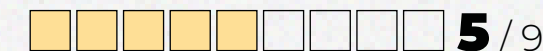
7 / 10

Sports facilities



1 / 1

Culture and religion institutions



5 / 9

Healthcare institutions



2 / 2

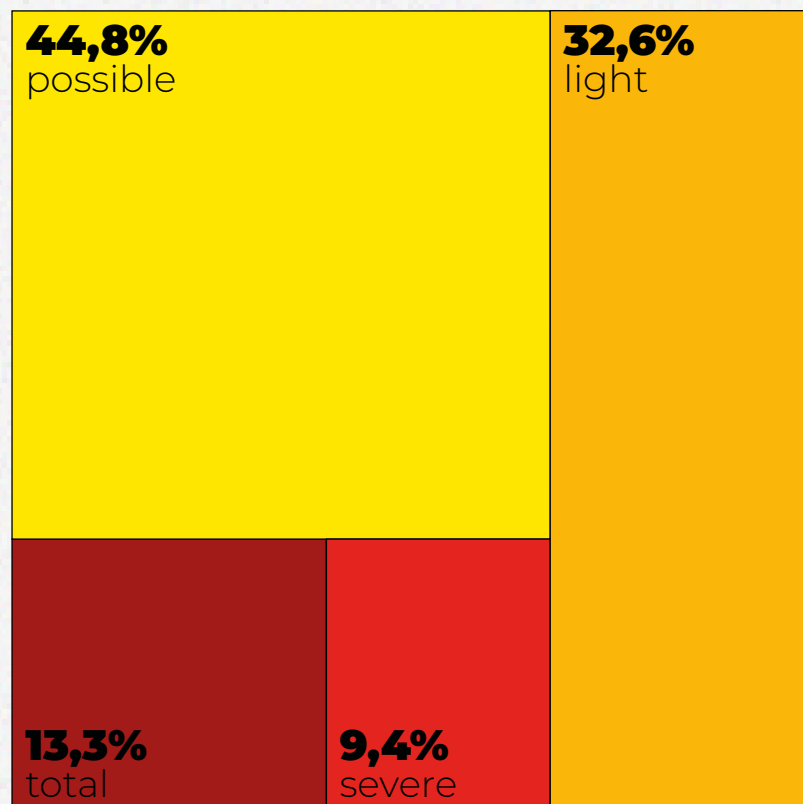
Educational institutions



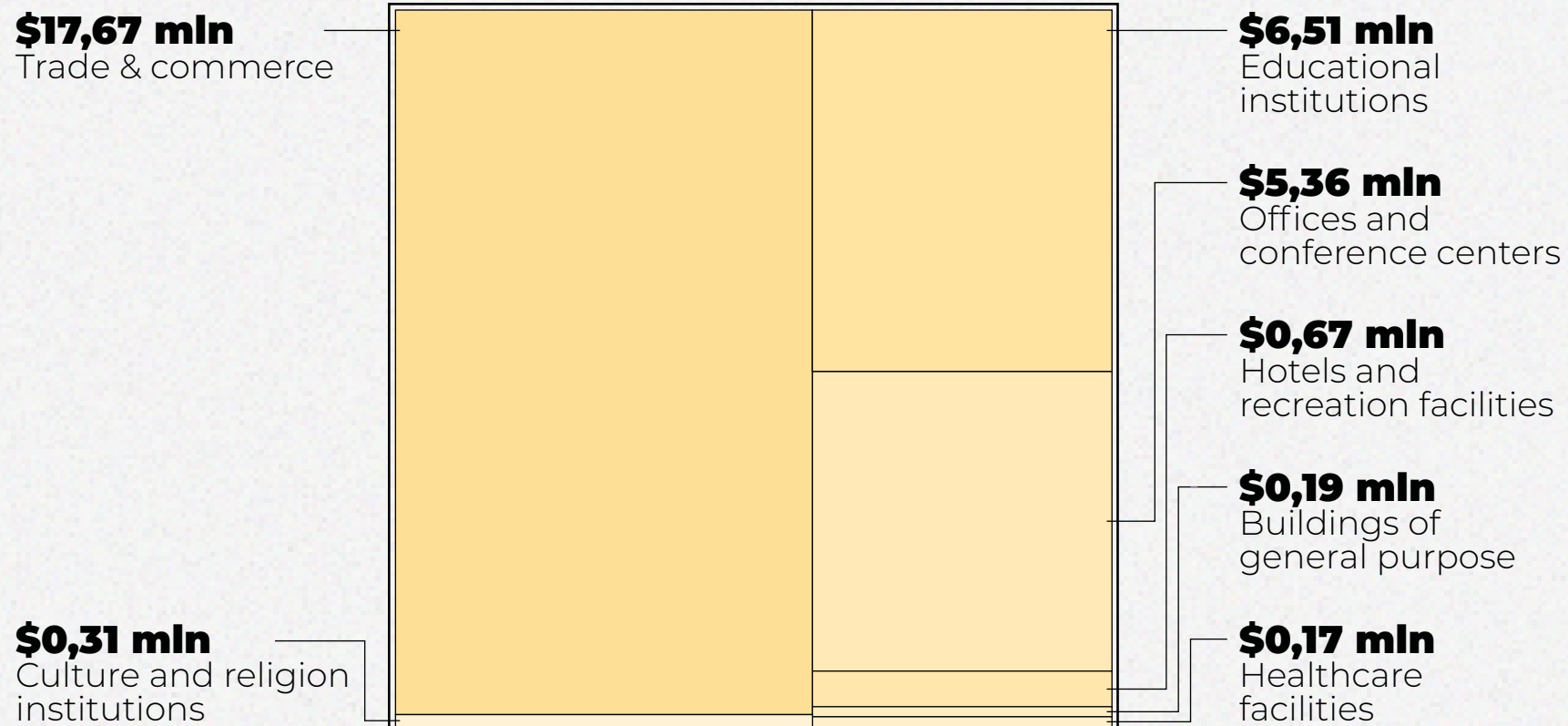
6 / 7

SCALE OF DESTRUCTION

Level of destruction



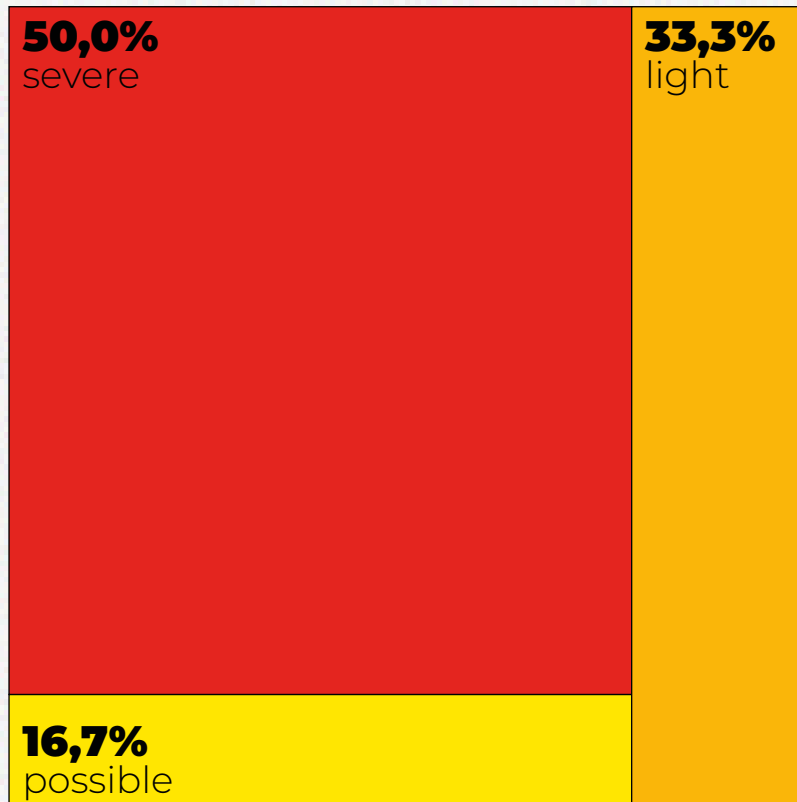
Assessment of damages



Total damages
\$30,9 mln

HEALTHCARE & EDUCATION

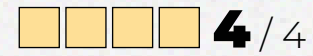
Level of destruction



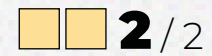
Total damages
\$6,7 mln

Scale of destruction

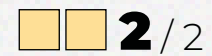
School



Kindergarten



Ambulatories and private clinics

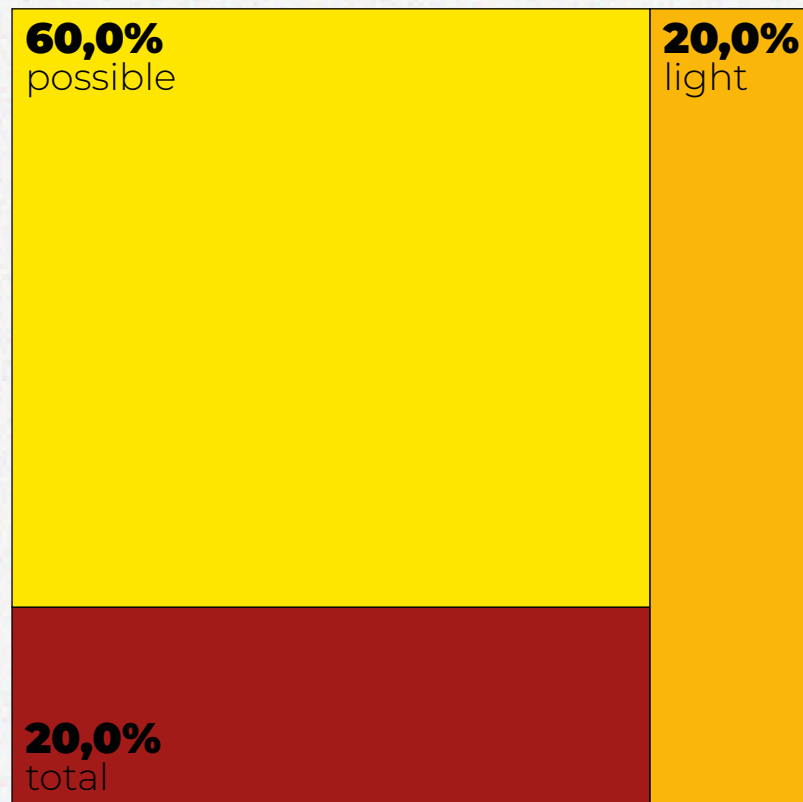


Kindergarten



SPORT, CULTURE & RELIGION

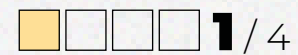
Level of destruction



Total damages
\$0,31 mln

Scale of destruction

Cultural institutions and historical monuments



Churches



Sports facilities and buildings

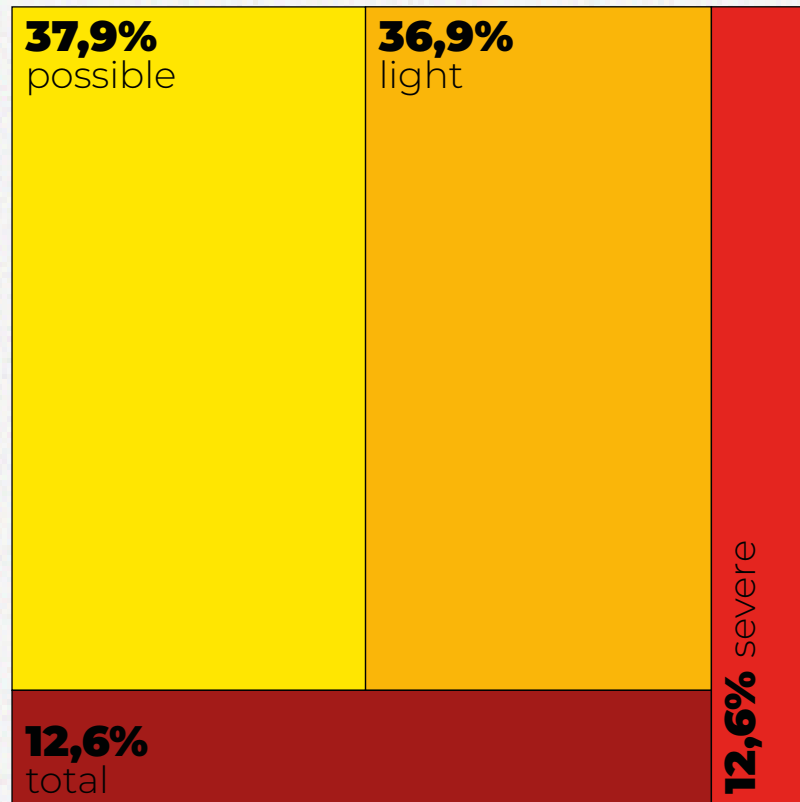


Church of Sviata Pokrova



COMMERCIAL BUILDINGS

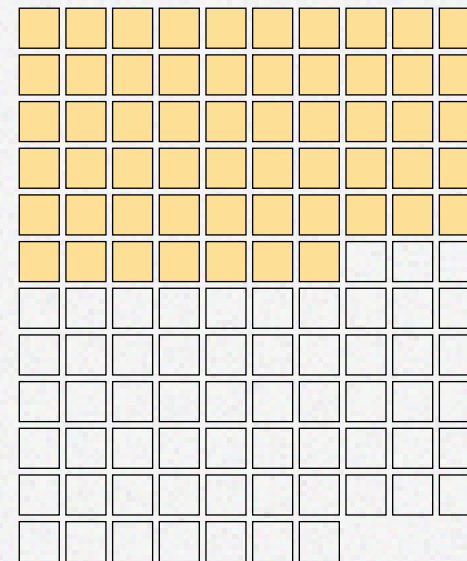
Level of destruction



Total damages
\$17,7 mln

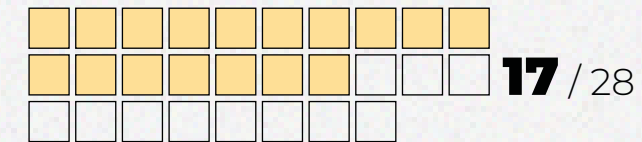
Scale of destruction

Commercial services and institutions



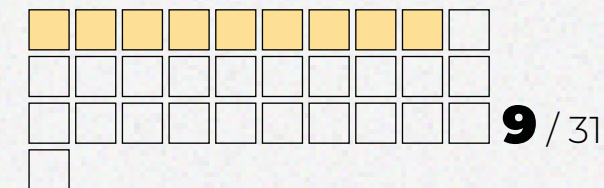
57 / 117

Grocery stores



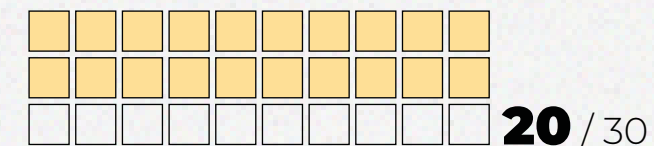
17 / 28

Cafes & restaurants



9 / 31

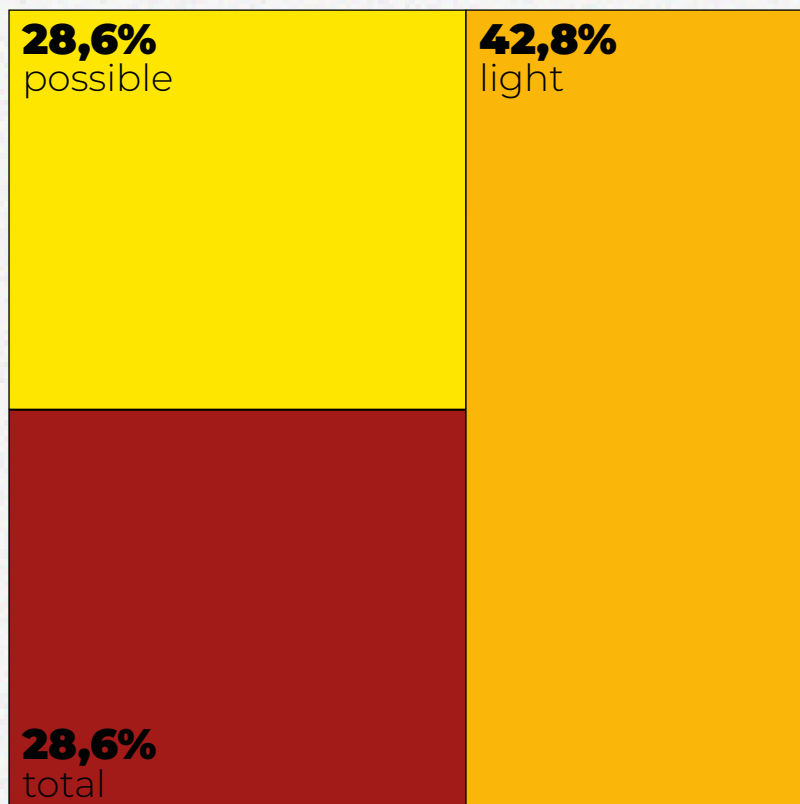
Trade



20 / 30

HOTELS & RECREATION FACILITIES

Level of destruction



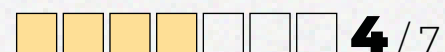
Total damages
\$0,67 mln

Scale of destruction

Hotels



Recreation facilities

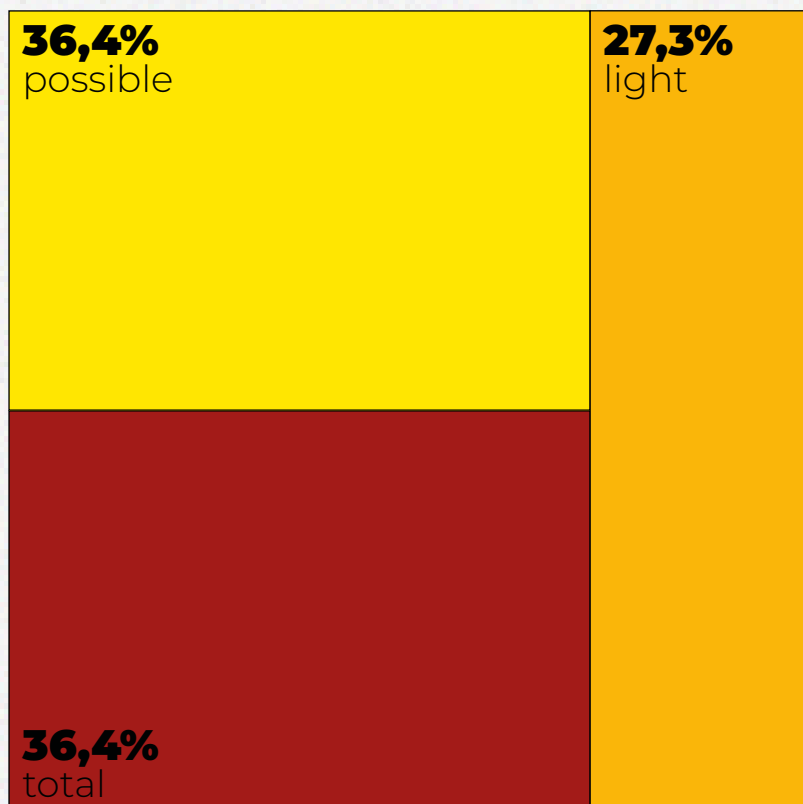


Mini hotel



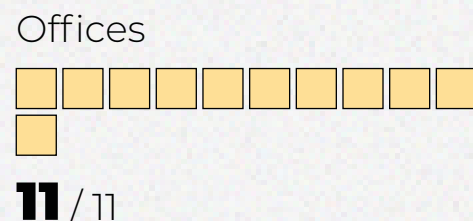
OFFICES & CONFERENCE CENTERS

Level of destruction



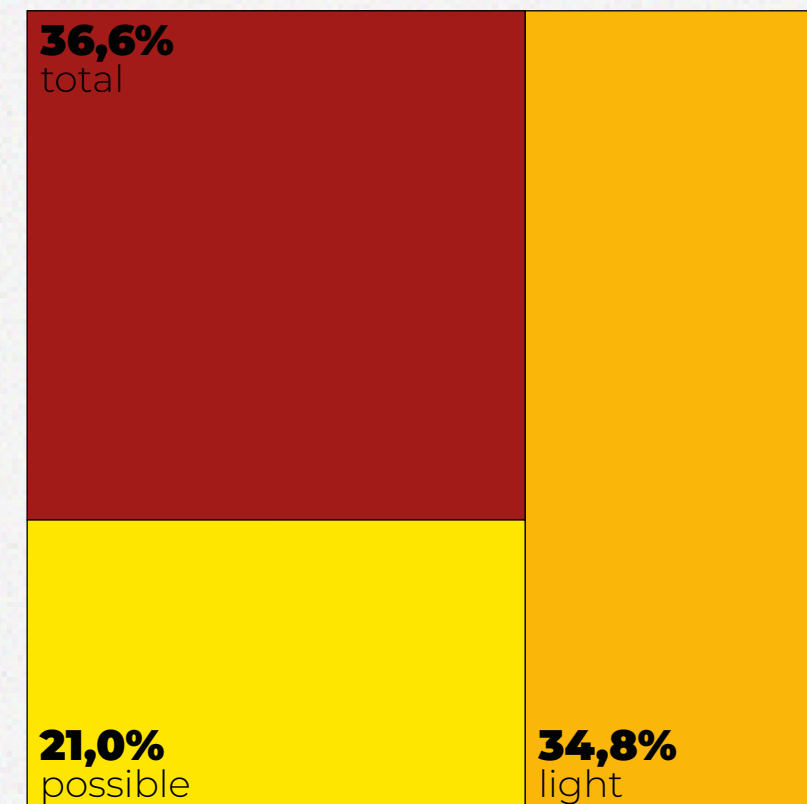
Total damages
\$5,4 mln

Scale of destruction



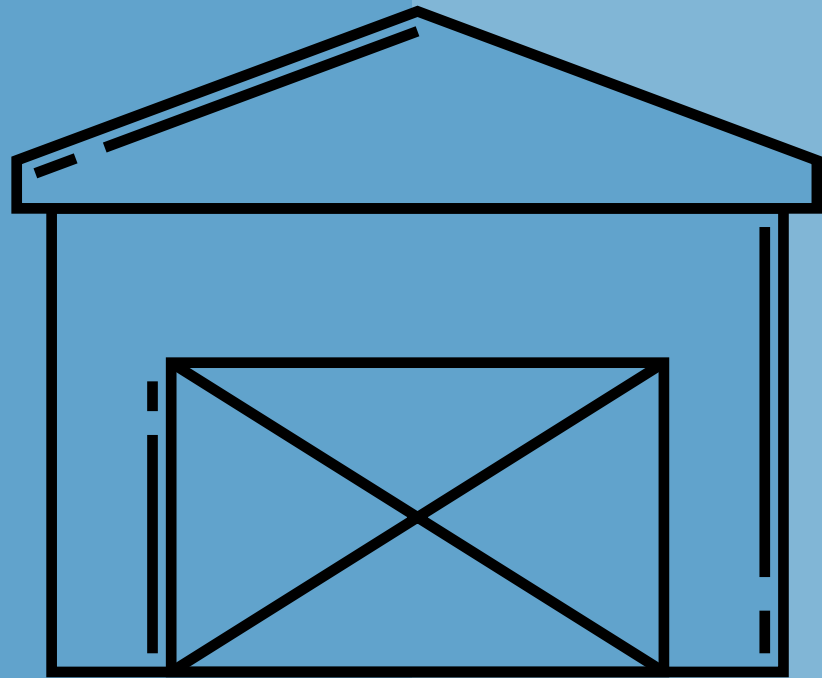
Lost working places
909 / 909

Area of destruction



Total area of damage
9,1 ths m²

INDUSTRIAL BUILDINGS & CONSTRUCTION

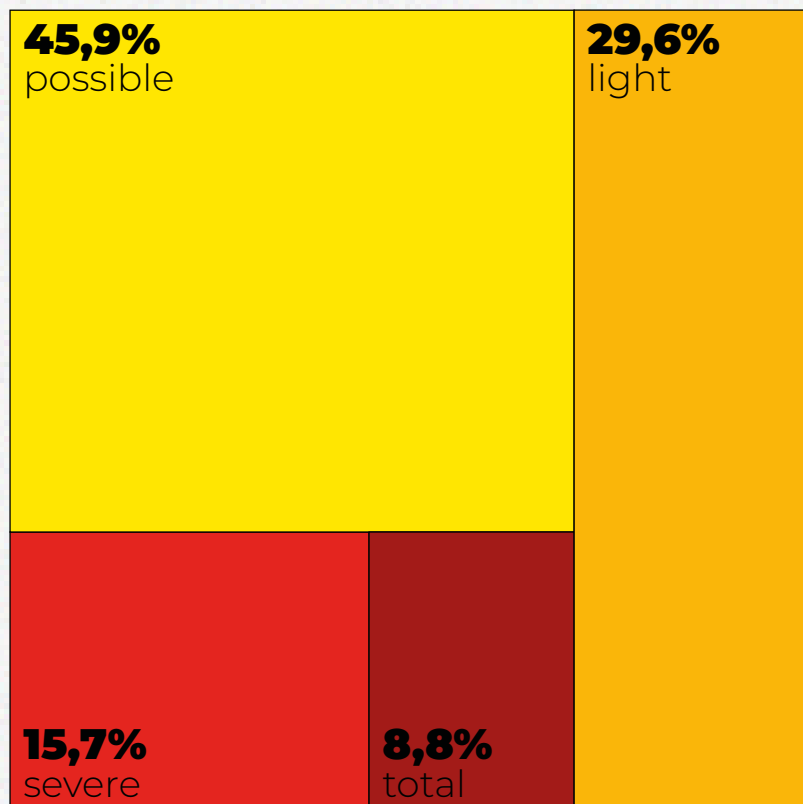


REBUILD

UA

SCALE OF DESTRUCTION

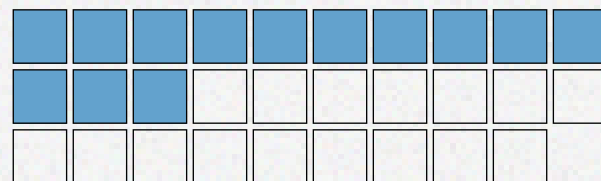
Level of destruction



Total damages
\$189,7 mln

Scale of destruction

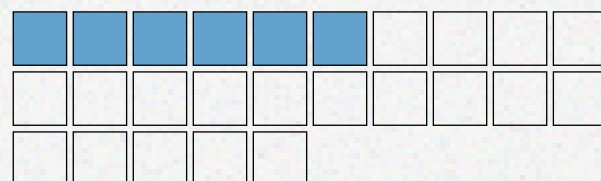
Utility buildings



130 / 285

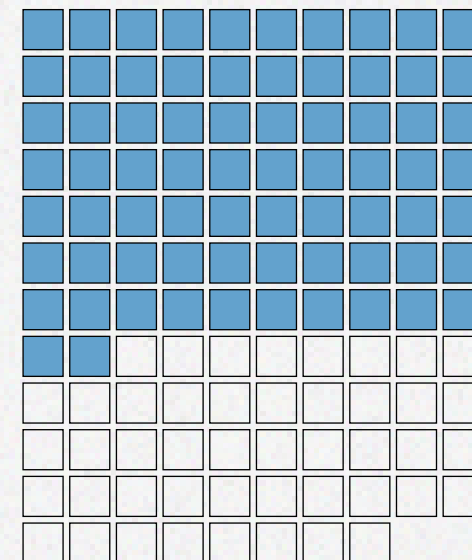
10 units

Construction



59 / 215

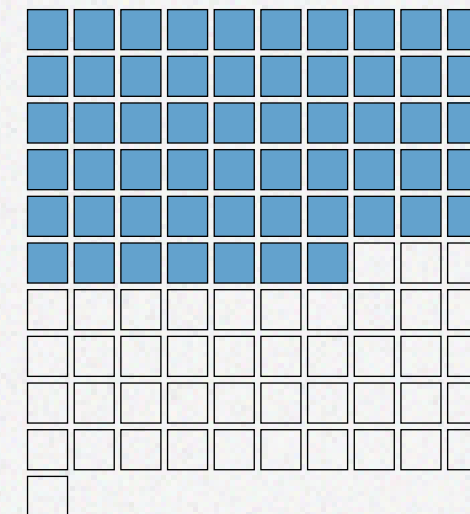
Industrial buildings



72 / 118

1 unit

Warehouses



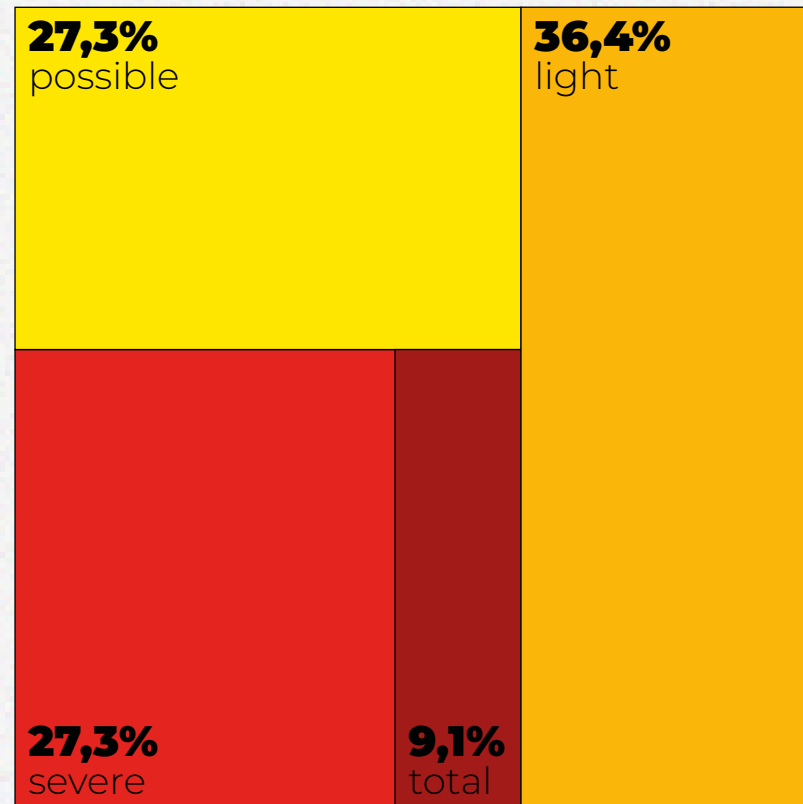
57 / 101

ADMINISTRATIVE INFRASTRUCTURE



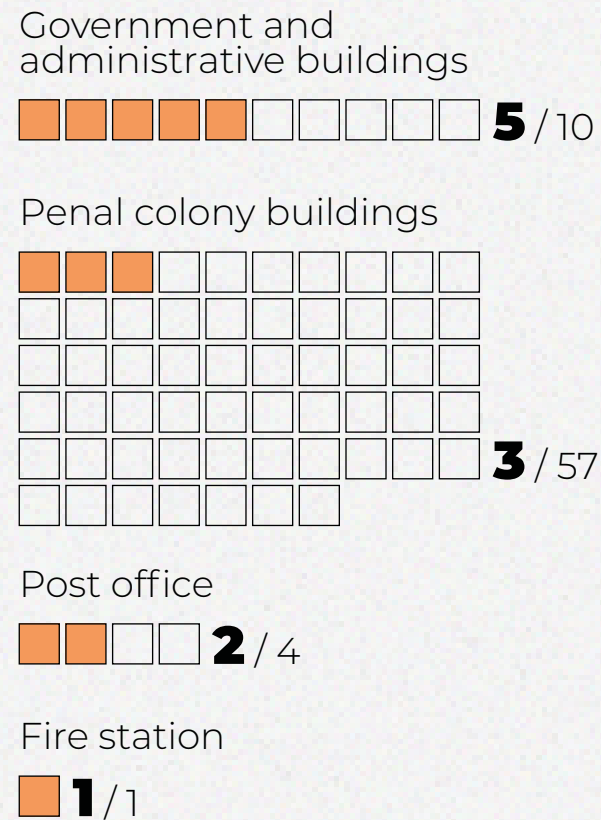
SCALE OF DESTRUCTION

Level of destruction



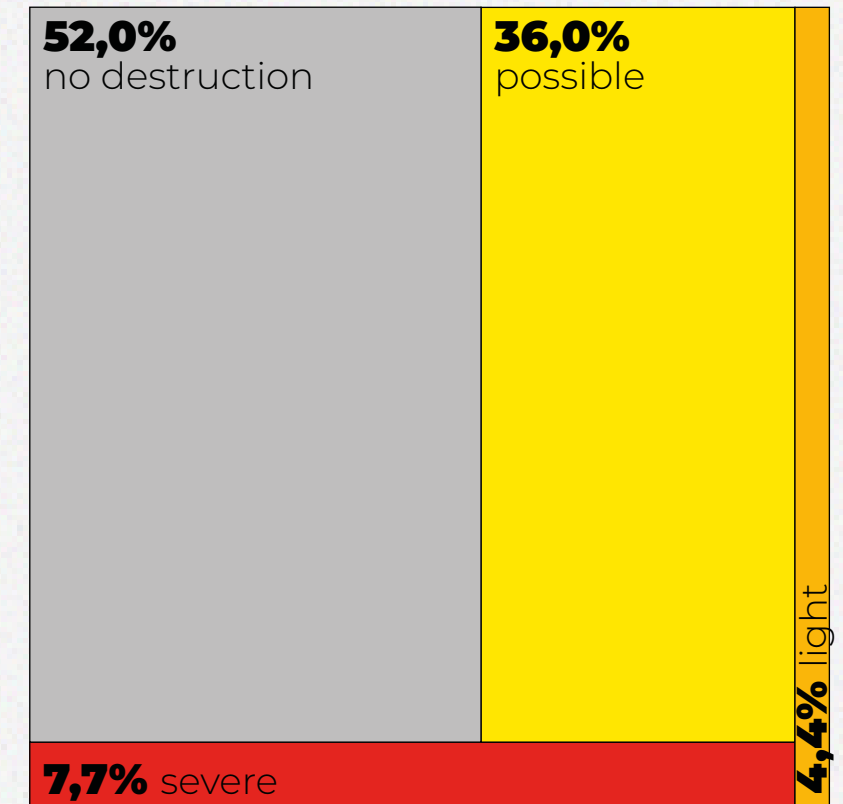
Total damages
\$2,5 mln

Scale of destruction



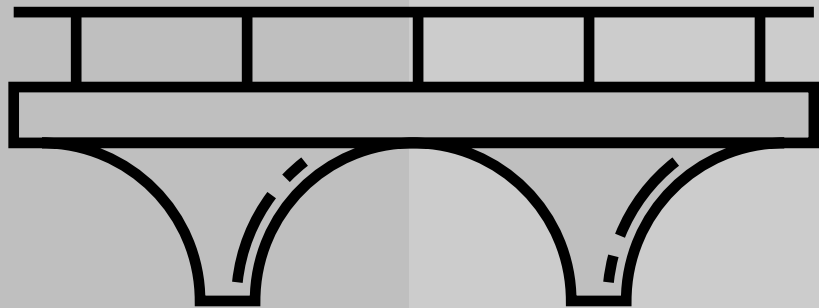
Lost working places
1 310 / 1 791

Area of destruction



Total area of damage
3,9 ths m²

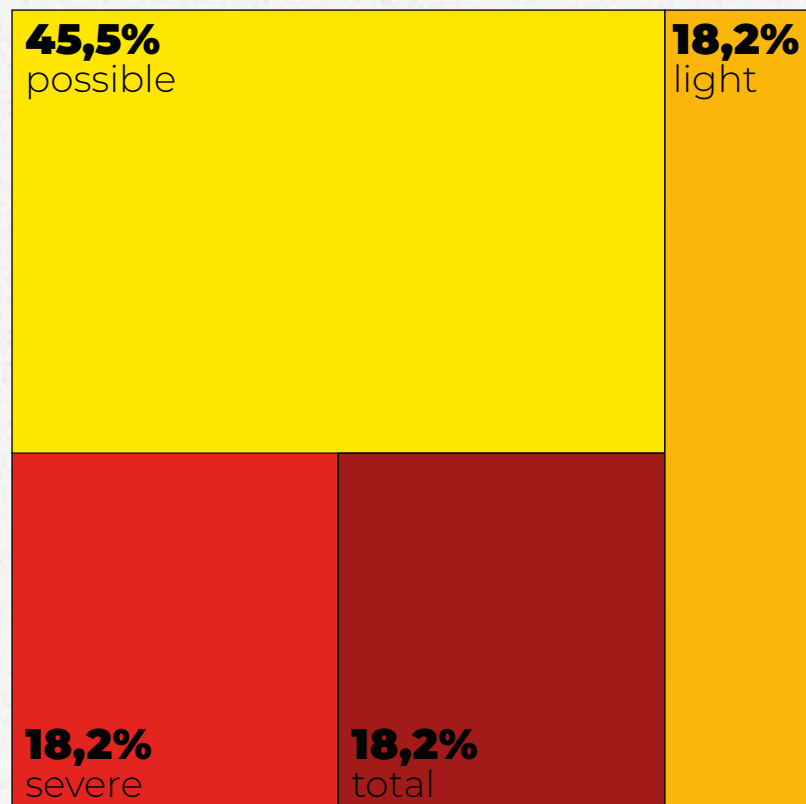
OTHER INFRASTRUCTURE



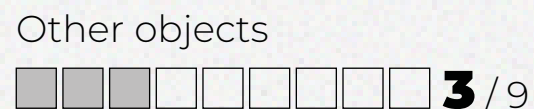
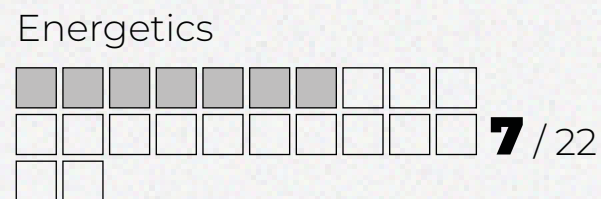
REBUILD 

SCALE OF DESTRUCTION

Level of destruction



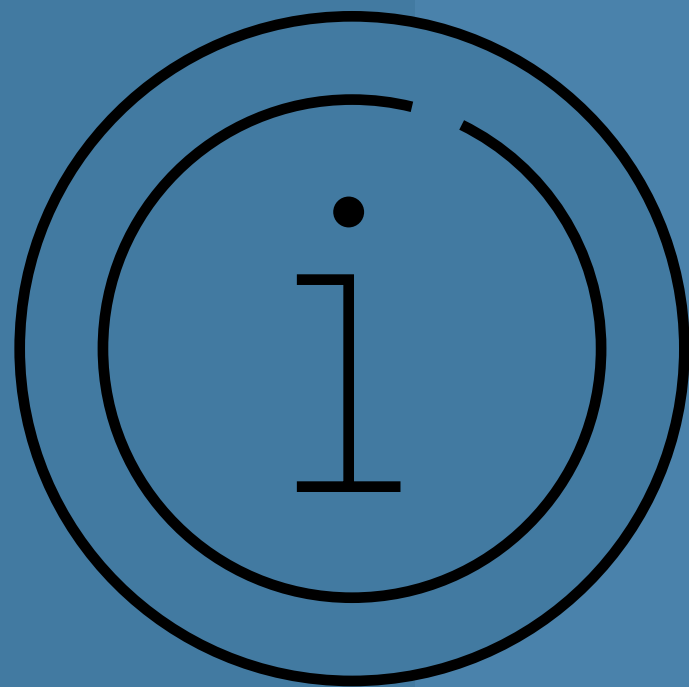
Scale of destruction



Public transport stop



METHODOLOGIES & ADDITIONAL INFORMATION



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).

HOW WE DETERMINE LEVELS OF DESTRUCTION

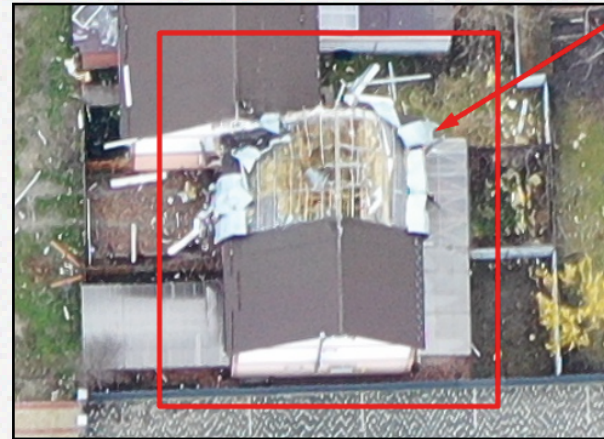
Total destruction



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.

PHOTO EVIDENCE

Kindergarten



School



Ambulatory



Supermarket



Palace of Culture



Glass factory



Private house



Private house



Apartment building



Industrial building



HOSTOMEL THROUGH THE EYES OF BEHOLDERS

Mass graves and destruction in Bucha and Hostomel



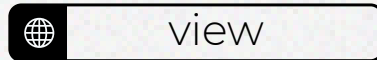
Escaping Hostomel. How a car, a manhole cover and a few minutes of silence saved the life of a Ukrainian family



Ukraine: a visual diary of horrors in Hostomel



Gunned down on a mercy mission: Witnesses say Russian troops killed Hostomel mayor and two volunteers



Ukrainian soldier on the battle that «changed the course of the war» and what he fears Russia will do next



Ukrainian military shows mass destruction of Hostomel as Russian forces retreat



Destroyed An-225 «Mriya» in Gostomel



Republic At Bombed Hostomel Airport: Watch The Complete Devastation As Russia-Ukraine War Rages



Ukrainian Military Assesses Destruction in Hostomel



GRATITUDE TO VOLUNTEERS

Being a volunteer is a necessary and responsible mission, because the contribution of every citizen is important for the reconstruction of the country. The active position, engagement and tireless work of volunteers support the work of the RebuildUA project team, bringing us closer to the desired result.

These people helped RebuildUA digitize the destruction of Hostomel:

Lida Kryshchuk

Anna Lomonos

Yulia Maksimova

Oleksandr Nabilskyi

Kateryna Pakhomova

Vasyl Peresta

Vladyslav Poda

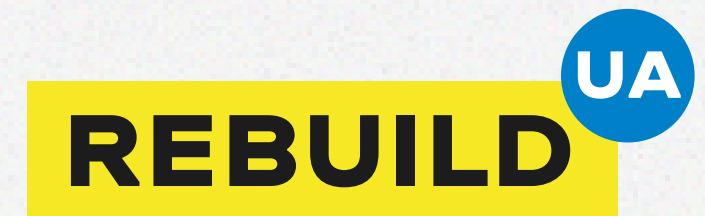
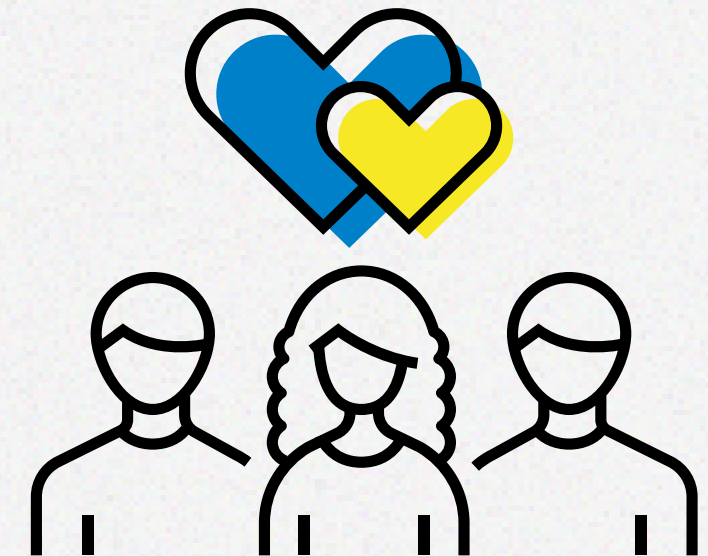
Serhii Ponomarenko

Anna Potanina

Vasyl Khodos

Anna Shynkarenko

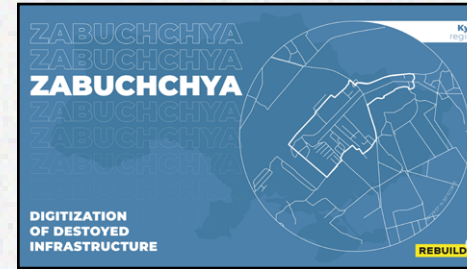
Valentyn Shklyarenko



PREVIOUS REPORTS



Moshchun,
Buchanskyi district,
Kyiv region



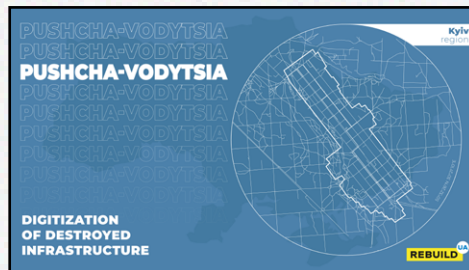
Zabuchchya,
Buchanskyi district,
Kyiv region



Horenka,
Buchanskyi district,
Kyiv region



Irpin,
Buchanskyi district,
Kyiv region



Pushcha-Vodytsia,
district of Kyiv



Bucha,
Buchanskyi district,
Kyiv region



Ozera,
Borodianskyi district,
Kyiv region



REBUILD

UA

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:

Assessment of losses and damages, budgeting:

KSE | Institute

Visual style and content:

TOP
LEAD

Shooting of settlements

 **CULVER AVIATION**

Digitization of geospatial information:

Урбанина

Support in cooperation with public authorities:

 Centre for Economic Recovery

Cooperation & analysis of community economy, Vkursi Hromada:

 Center for Innovations Development

Creation of an online map of destroyed new buildings

 **ЛУН**

Supported by:

