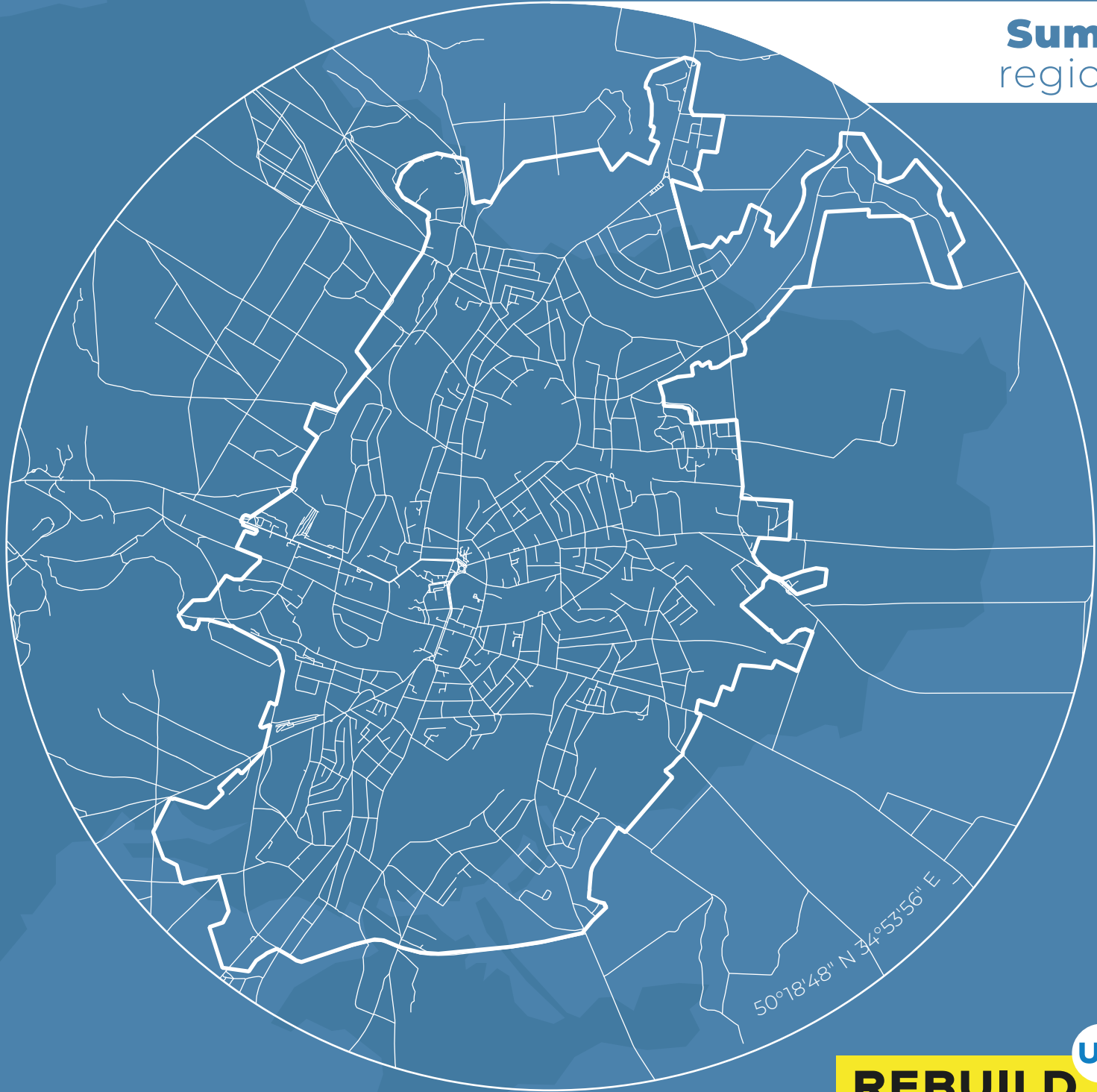


Sumy  
region



OKHTYRKA  
OKHTYRKA  
**OKHTYRKA**  
OKHTYRKA  
OKHTYRKA  
OKHTYRKA  
OKHTYRKA  
OKHTYRKA

**DIGITIZATION  
OF DESTROYED  
INFRASTRUCTURE**

**REBUILD** 



# ABOUT THE PROJECT

## Background

The Russian aggression has caused a large amount of damage and destruction in almost all regions of Ukraine — housing and infrastructure have been destroyed, and 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:



The initiative is being financially and technically supported by the United Nations Development Programme in Ukraine.

## 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

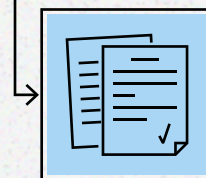
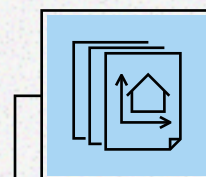
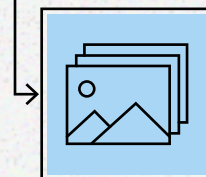
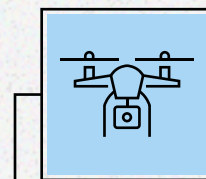
To ensure completeness of the input data, the project team captures photos and videos, as well as collects additional information from verified sources.

### 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](https://rebuildua.net)



# ABOUT THE LOCALITY

Okhtyrka is situated in 30 kilometers from Russian border, therein on February 24 it was among the first Ukrainian settlements to face the invaders. Both military forces and courageous residents could not stop the Russians: the town was shelled by "Hades" and avia bombs.

These atrocities caused severe damage to the residential area "Dachnyi": private houses were destroyed there, and apartment buildings seriously damaged by the explosions. The Russians also attacked the military station in the town: they almost erased it from the face of Earth, causing death of dozens of people.

Find out more about the destruction of Okhtyrka in our report.



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

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

Photo: gazeta.ua



Region  
District  
Community

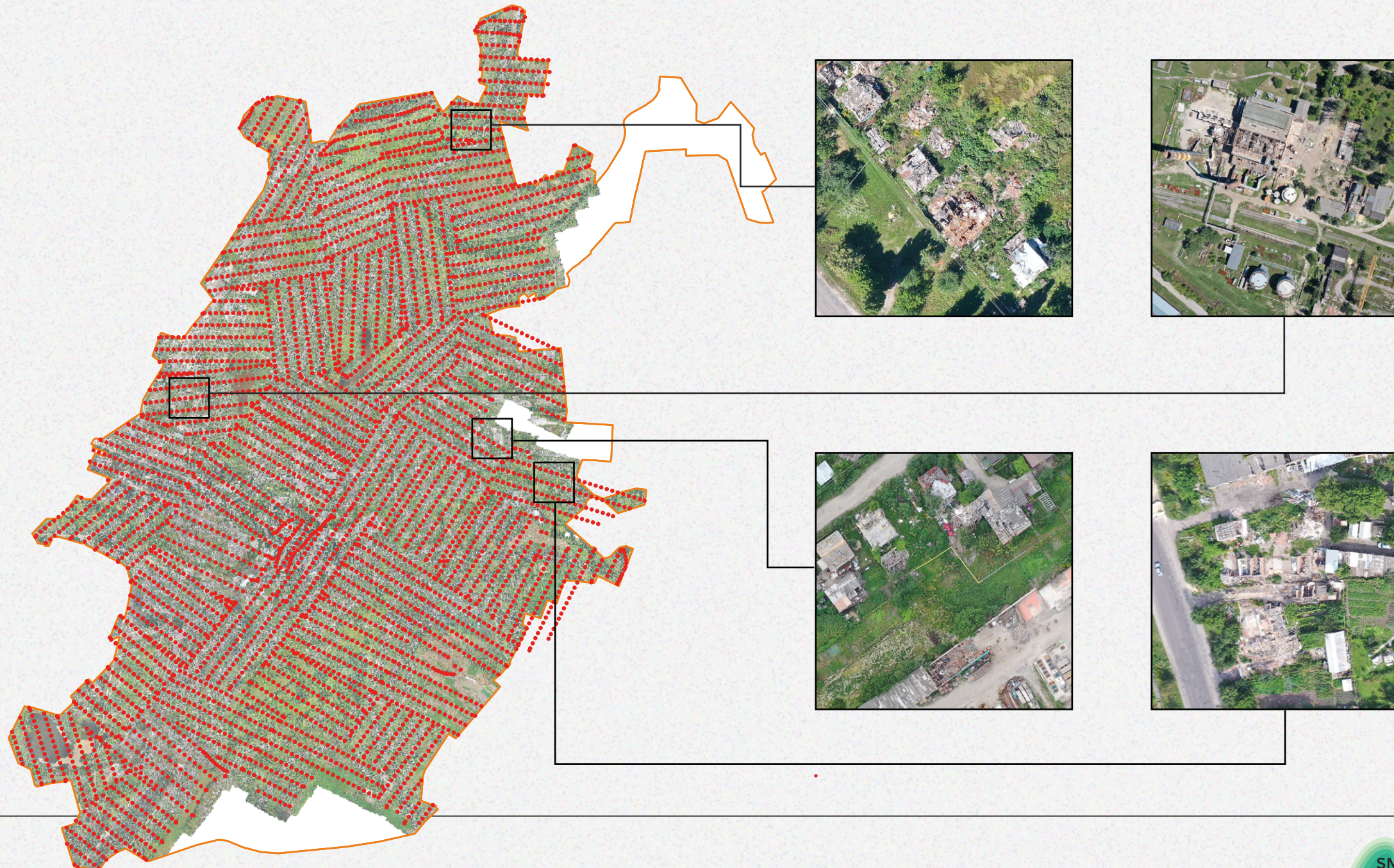
**Sumy**  
**Okhtyrskyi**  
**Okhtyrka**

Area  
**30 km<sup>2</sup>**

Population  
**47,603 people**



# DIGITIZATION PROCESS



**4,837** pictures for orthophoto  
**1,050** hours of data processing  
**56.6** Gigabytes of data

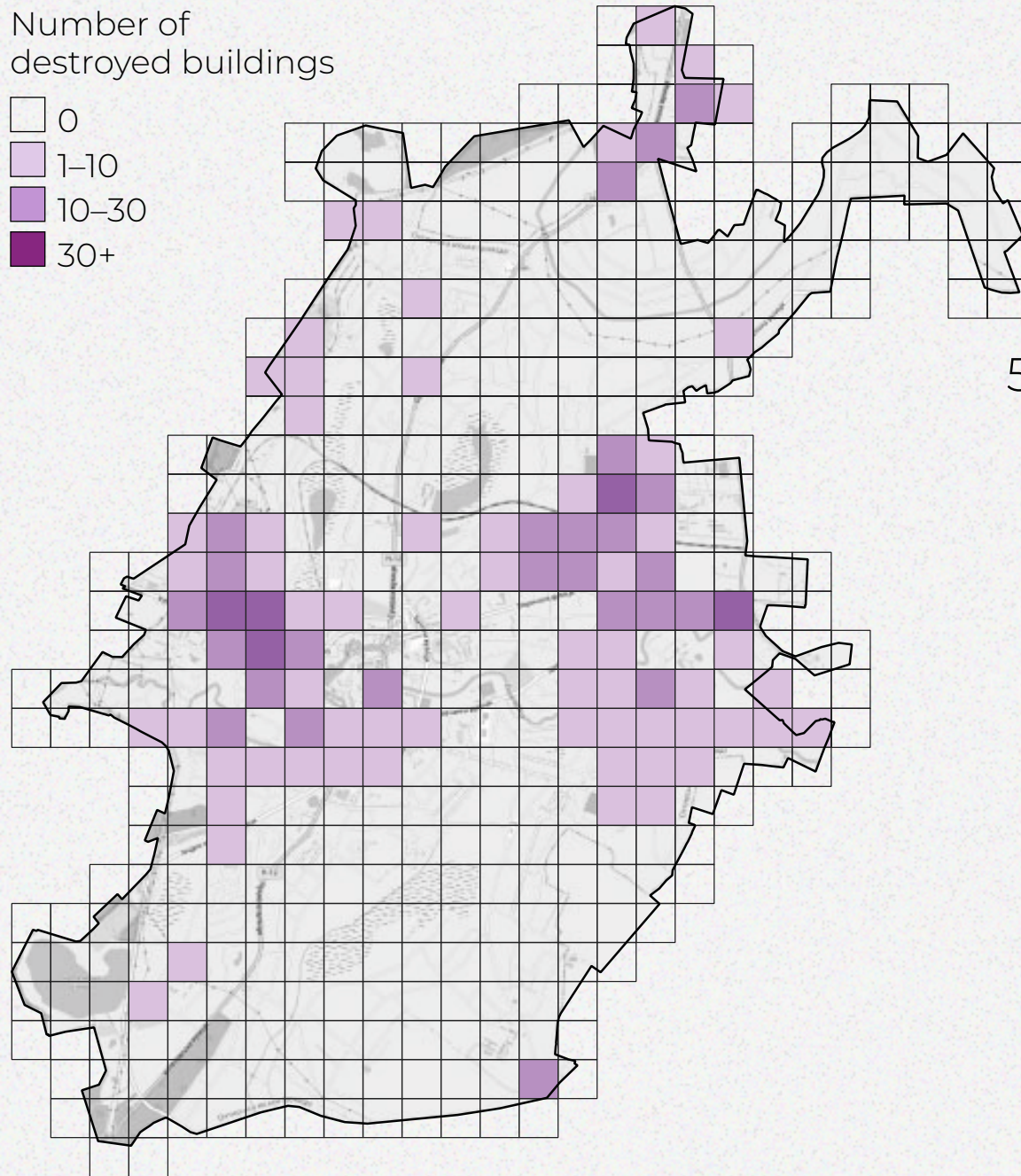
— border of the locality  
..... trajectory of drone shooting



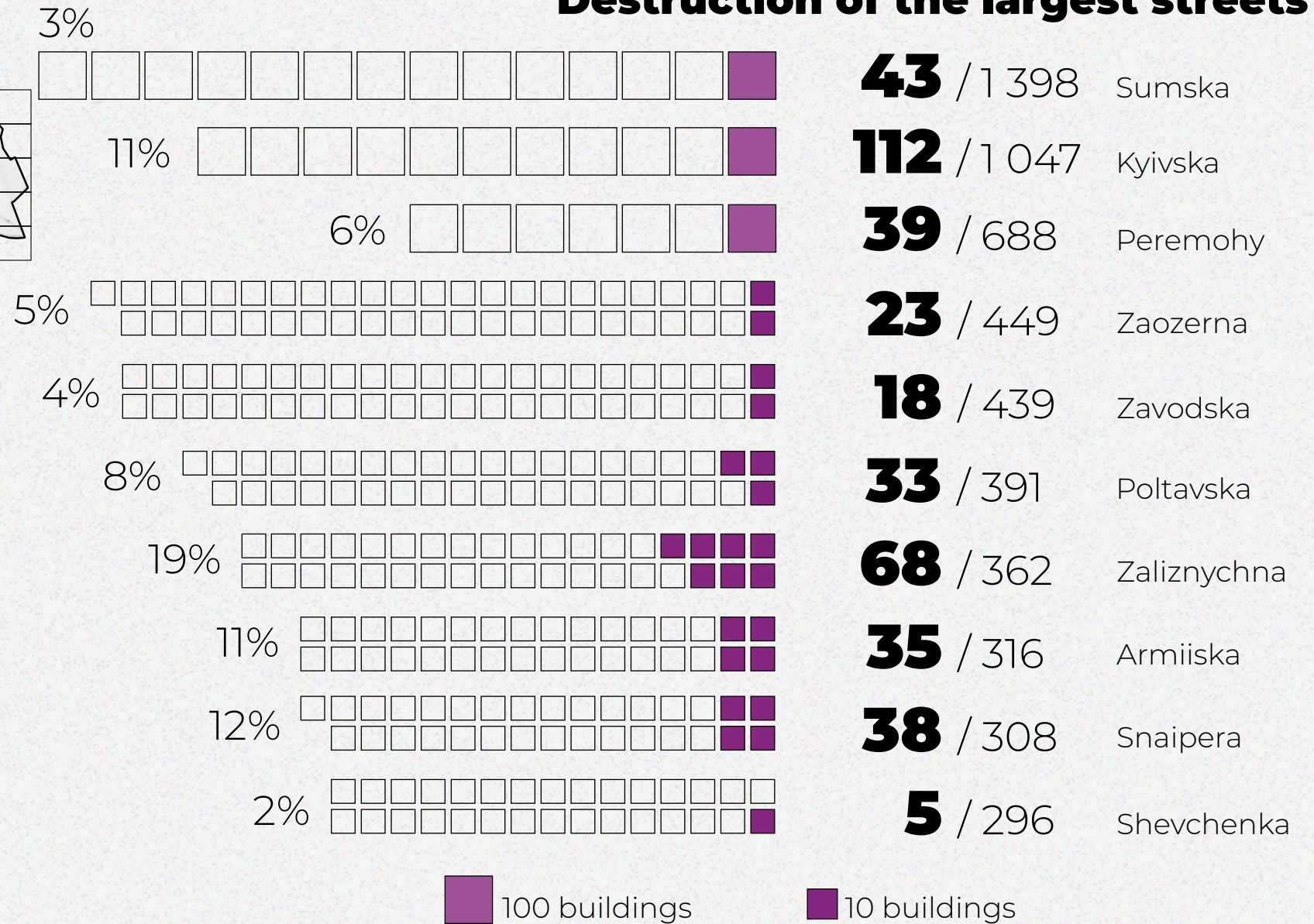
# THERMAL MAP OF DESTRUCTION

Number of destroyed buildings

- 0
- 1-10
- 10-30
- 30+



## Destruction of the largest streets



■ 100 buildings

■ 10 buildings

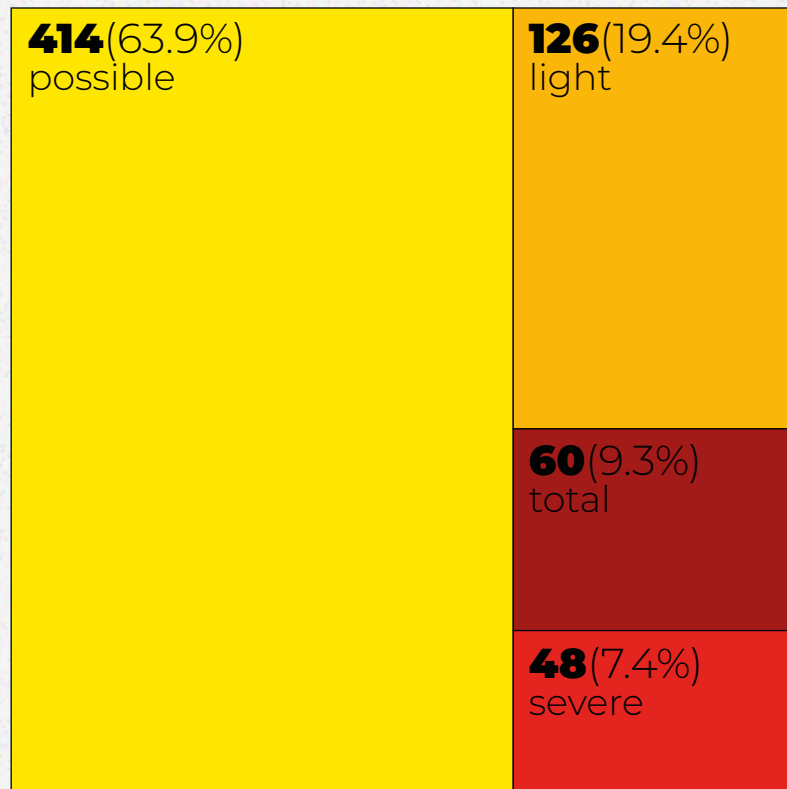


# LEVELS OF DESTRUCTION

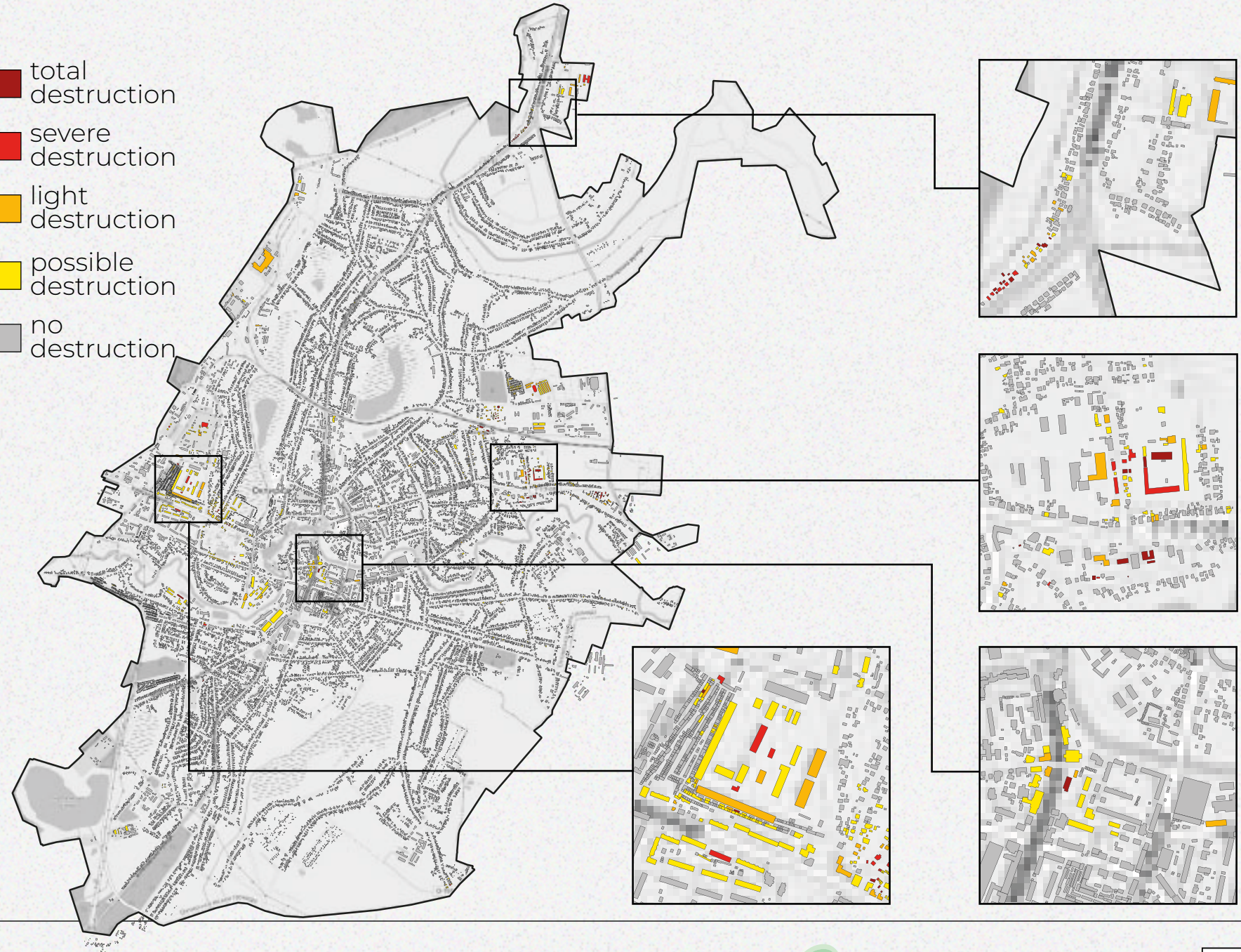
Buildings destroyed:

**648 / 32,656**

Level of destruction, number of buildings

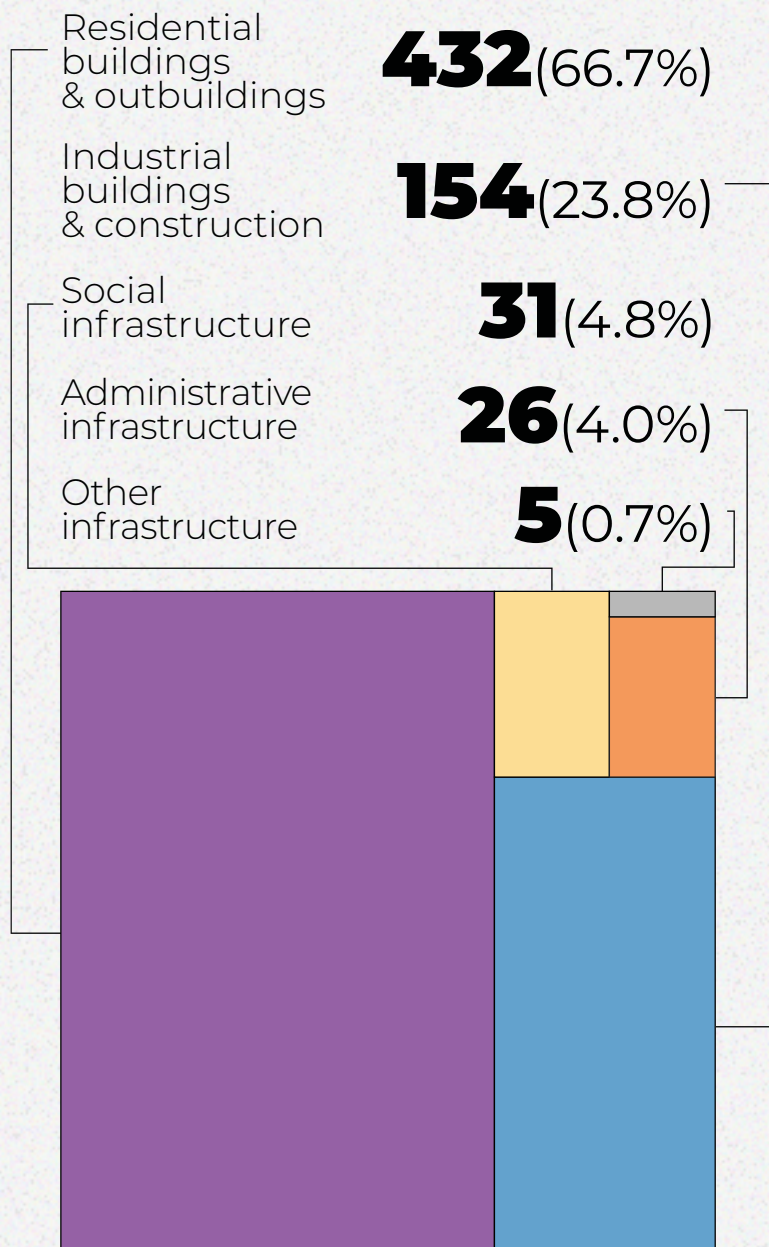


- total destruction
- severe destruction
- light destruction
- possible destruction
- no destruction

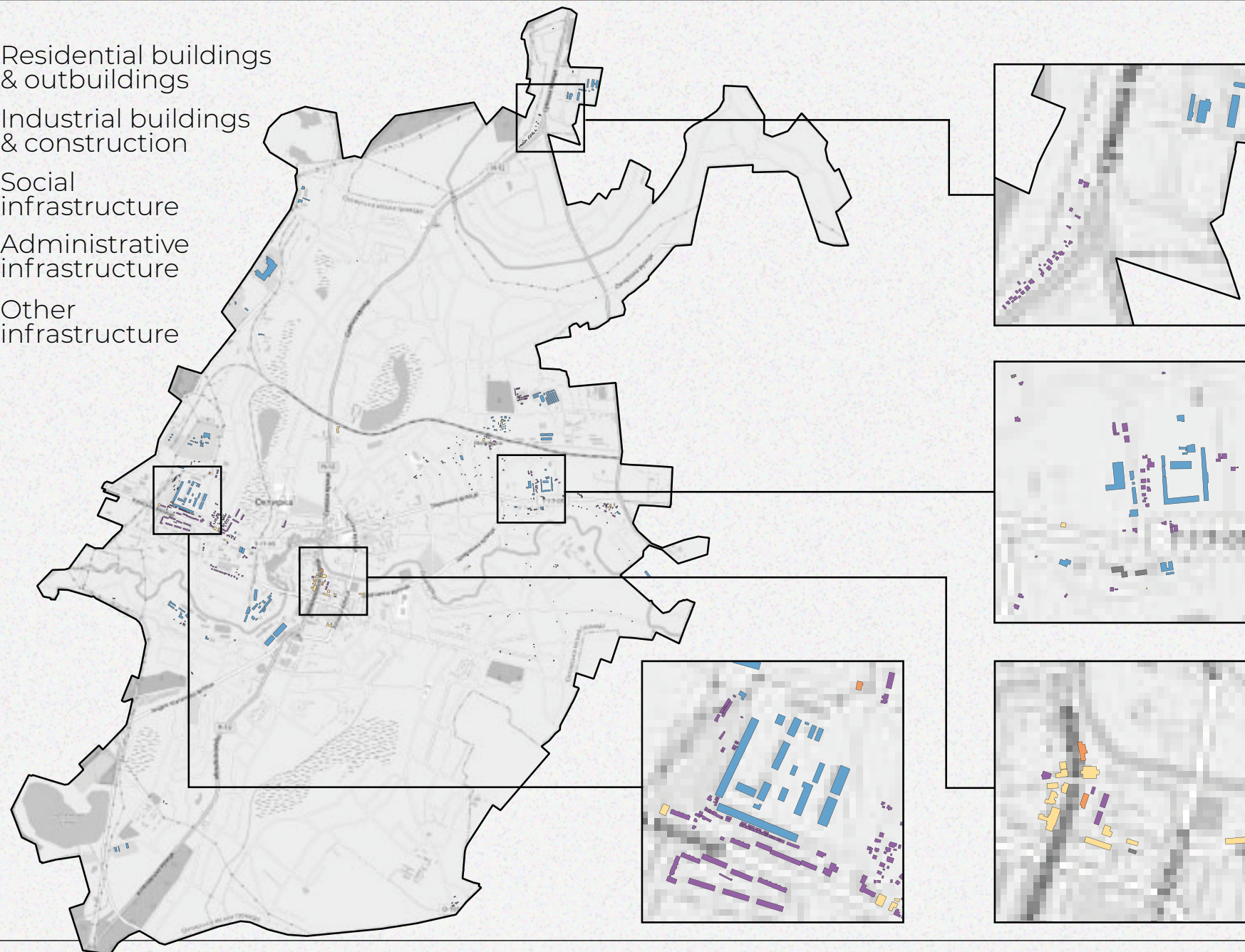




# TYPES OF DESTROYED OBJECTS



- Residential buildings & outbuildings
- Industrial buildings & construction
- Social infrastructure
- Administrative infrastructure
- Other infrastructure



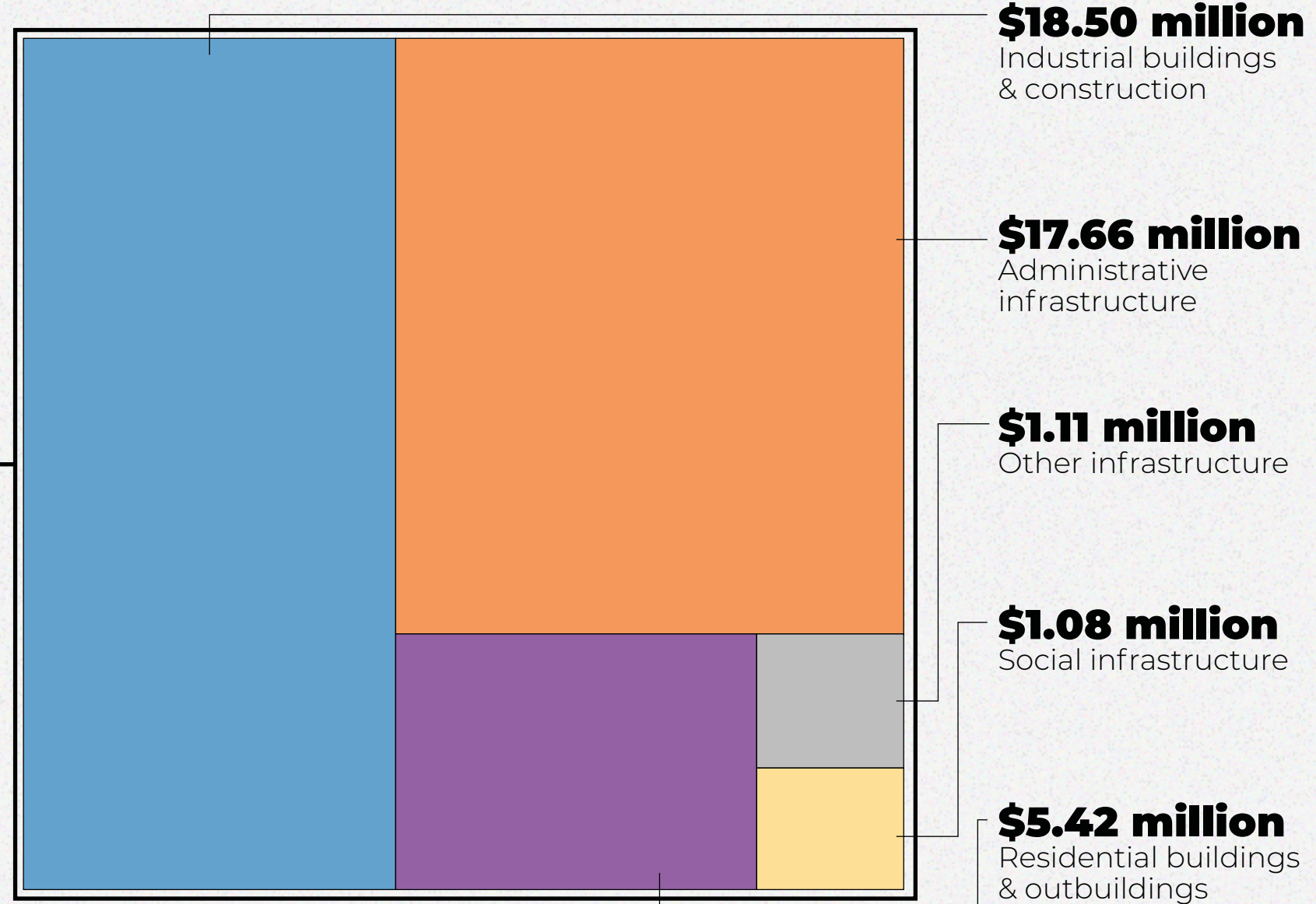


# ASSESSMENT OF DAMAGES

### Damages by types of buildings

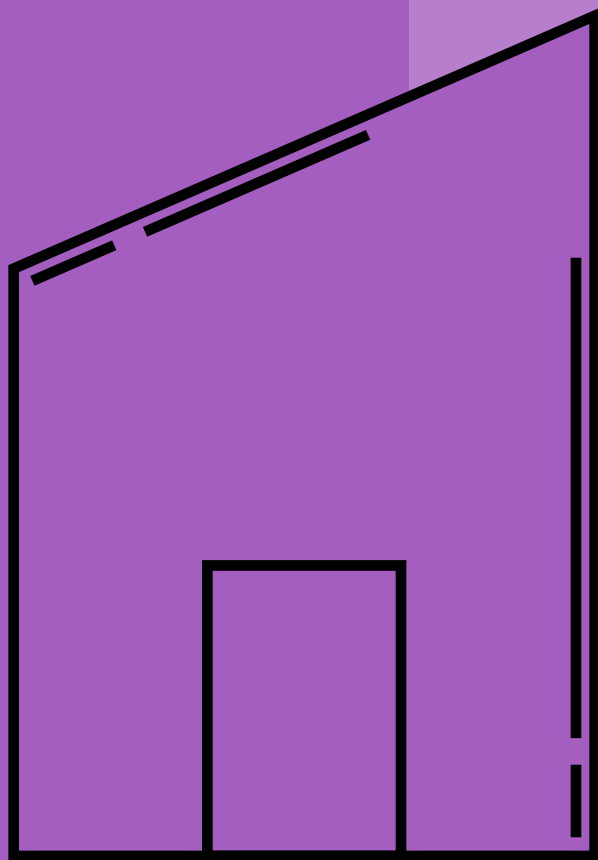
Total damages

**\$43.8 million**





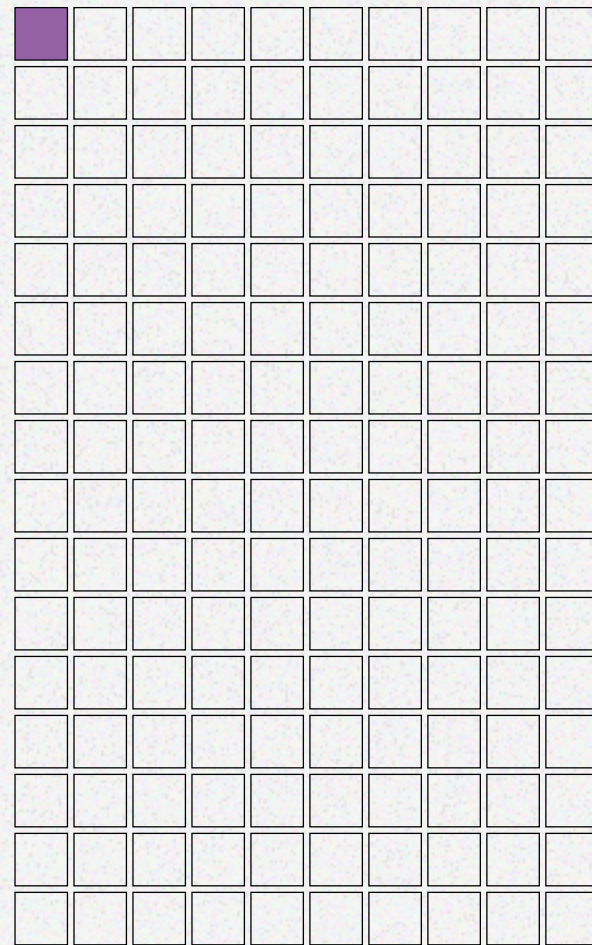
# RESIDENTIAL BUILDINGS & OUTBUILDINGS





# SCALE OF DESTRUCTION

Utility buildings



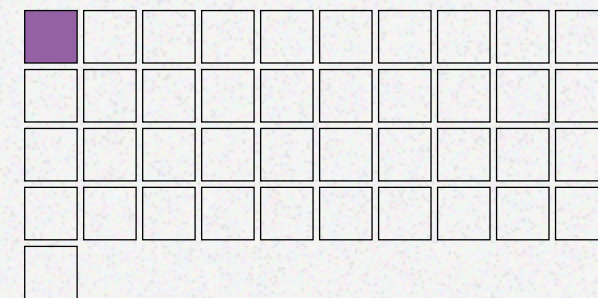
**144** / 15,974

Private houses



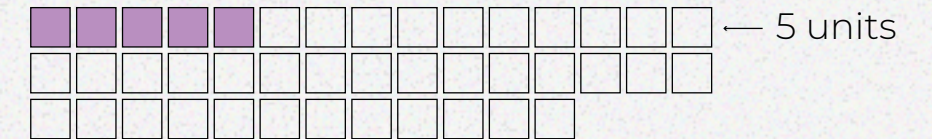
**123** / 9,683

Garages & parking spaces



**123** / 4,087

Apartment buildings



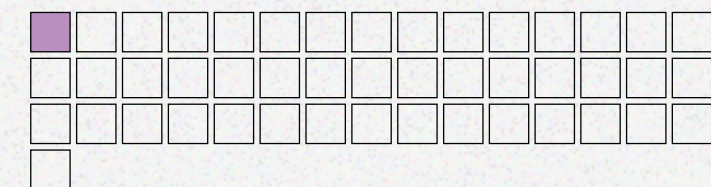
**30** / 210

Townhouses & cottages



**10** / 211

Greenhouses

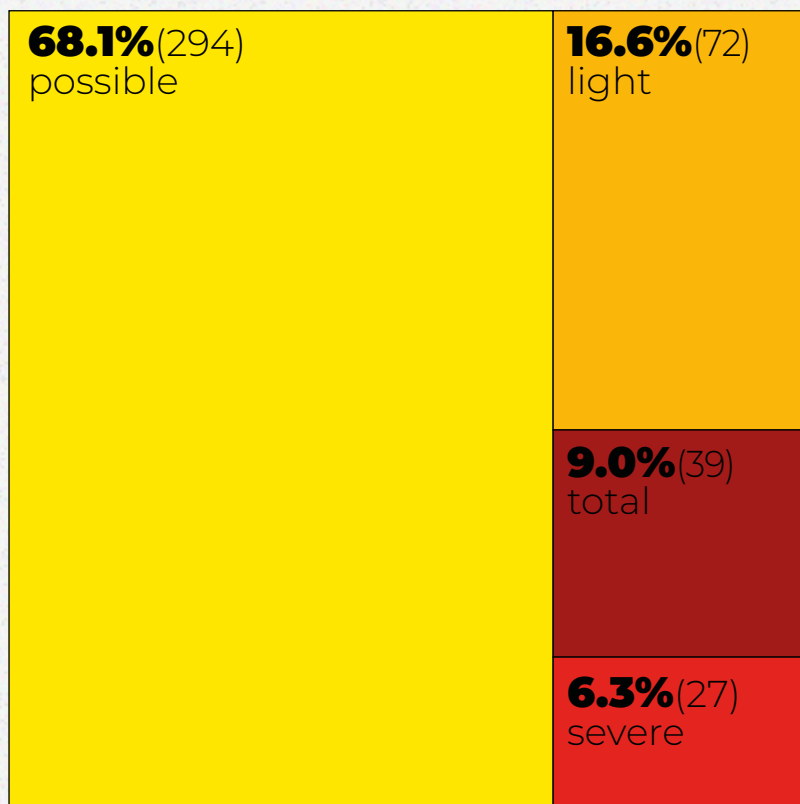


**2** / 229



# SCALE OF DESTRUCTION

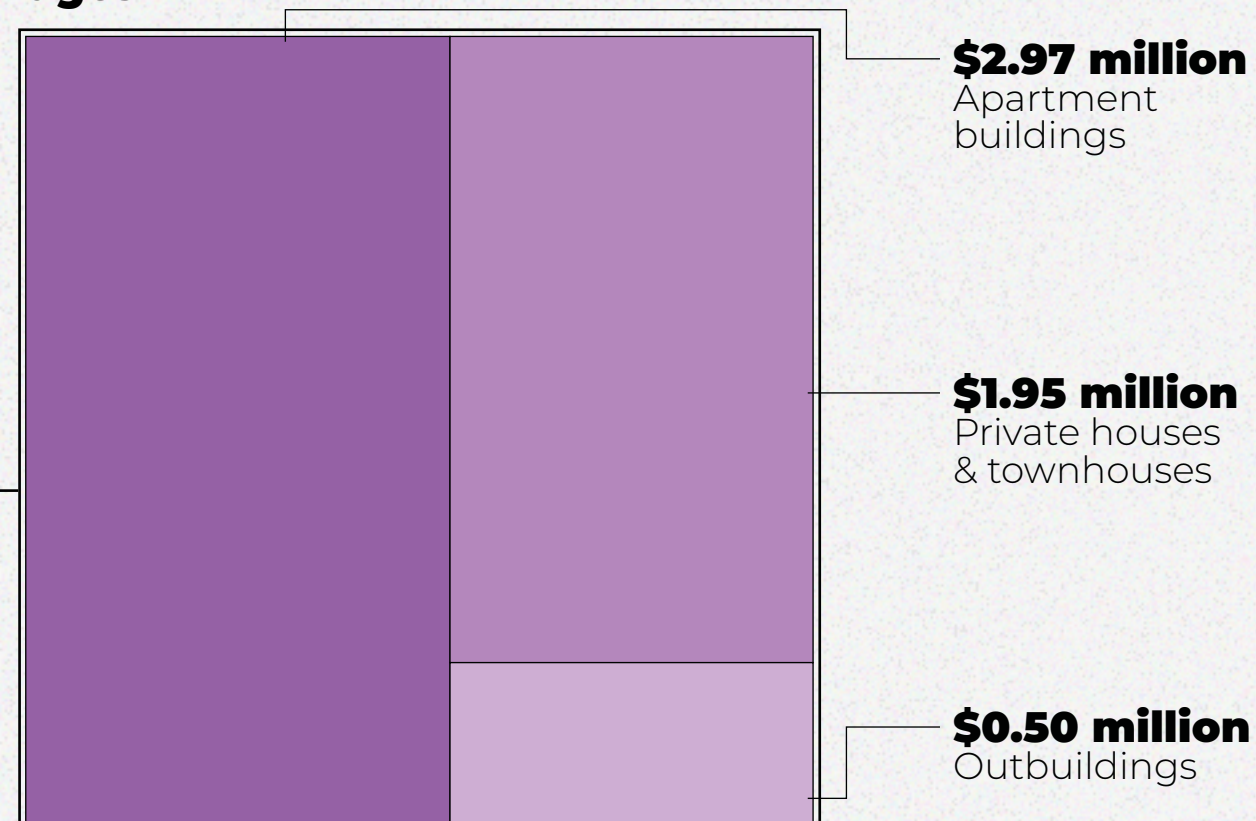
## Level of destruction



## Assessment of damages

Total damages

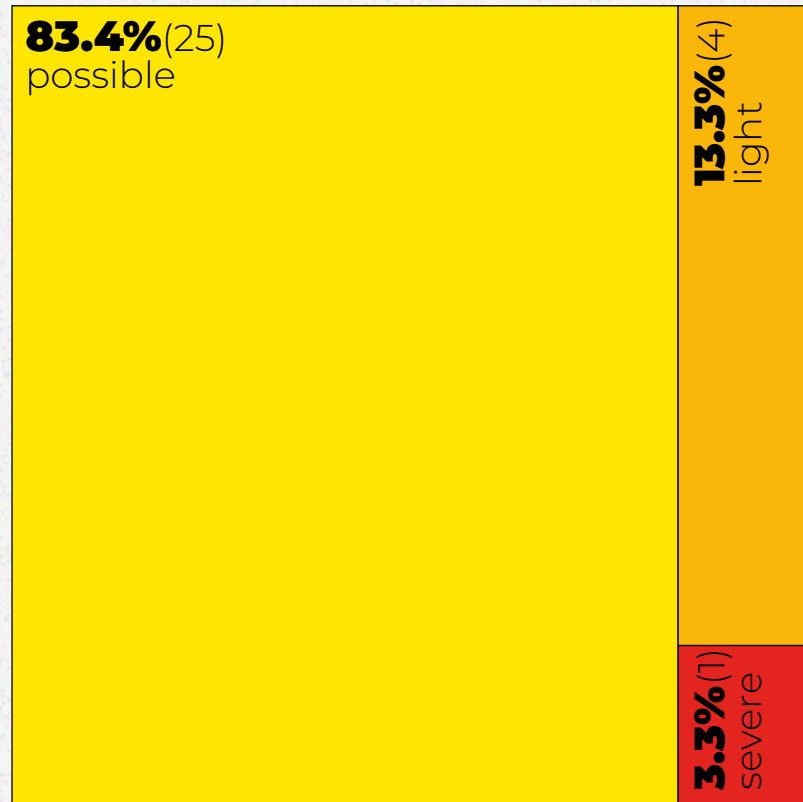
**\$5.42 million**





# APARTMENT BUILDINGS

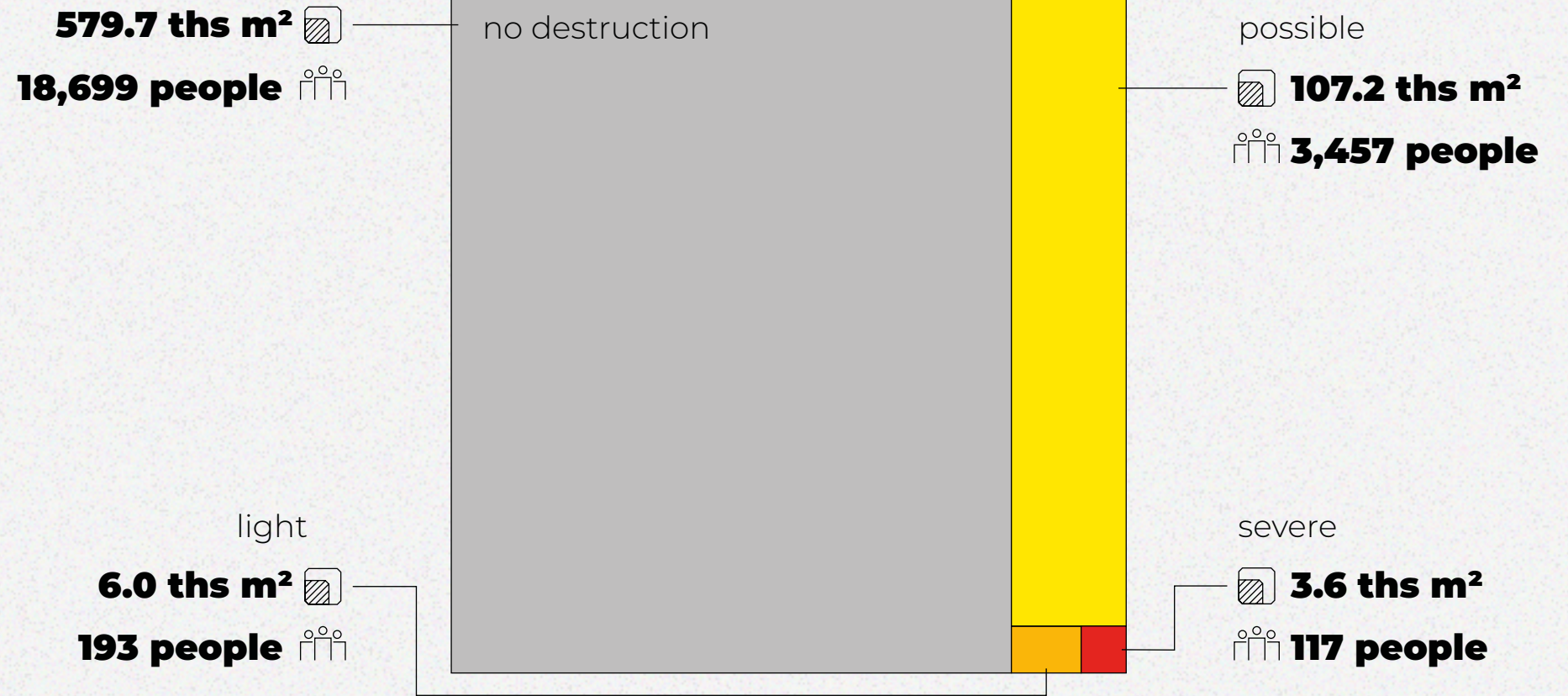
## Level of destruction



Total damages

**\$2.97 million**

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



Total area of damage

**116.8 ths m²**

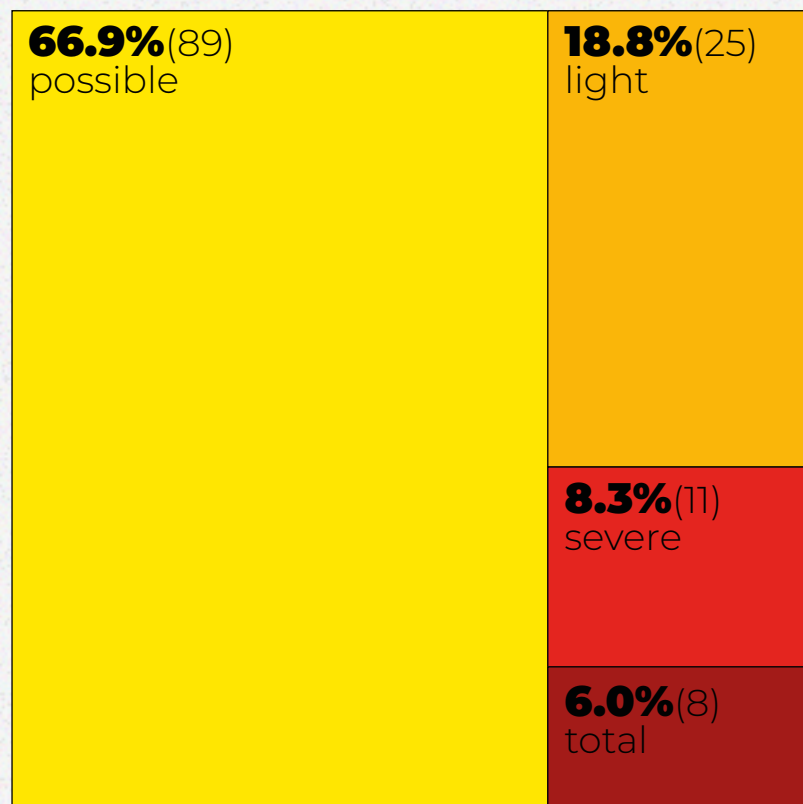
Number of residents affected

**3,767**



# PRIVATE HOUSES & TOWNHOUSES

## Level of destruction



Total damages  
**\$1.95 million**

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



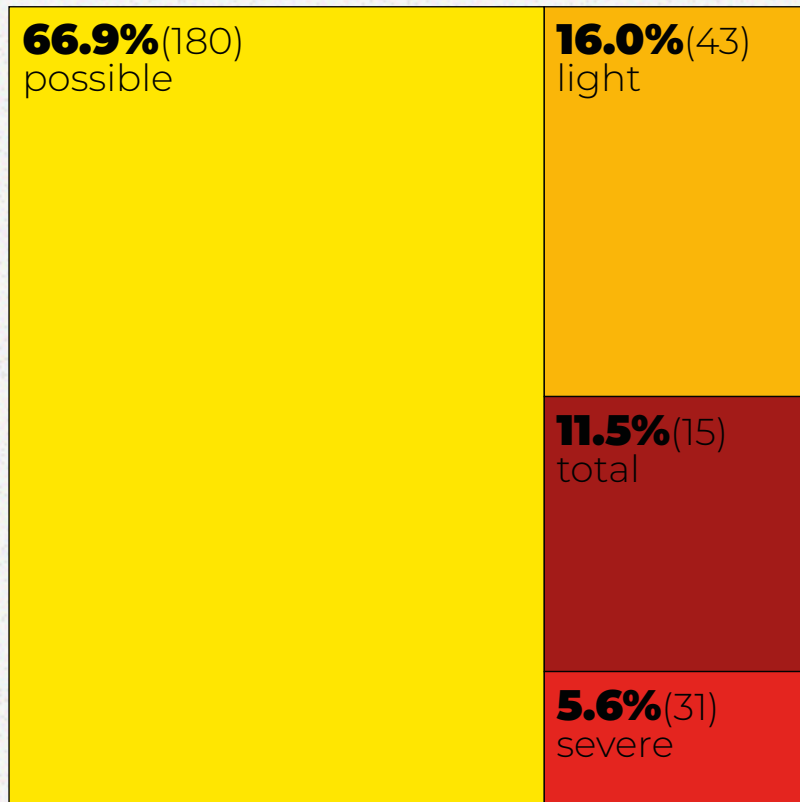
Total area of damage  
**18.8 ths m²**

Number of residents affected  
**347**



# OUTBUILDINGS

## Level of destruction



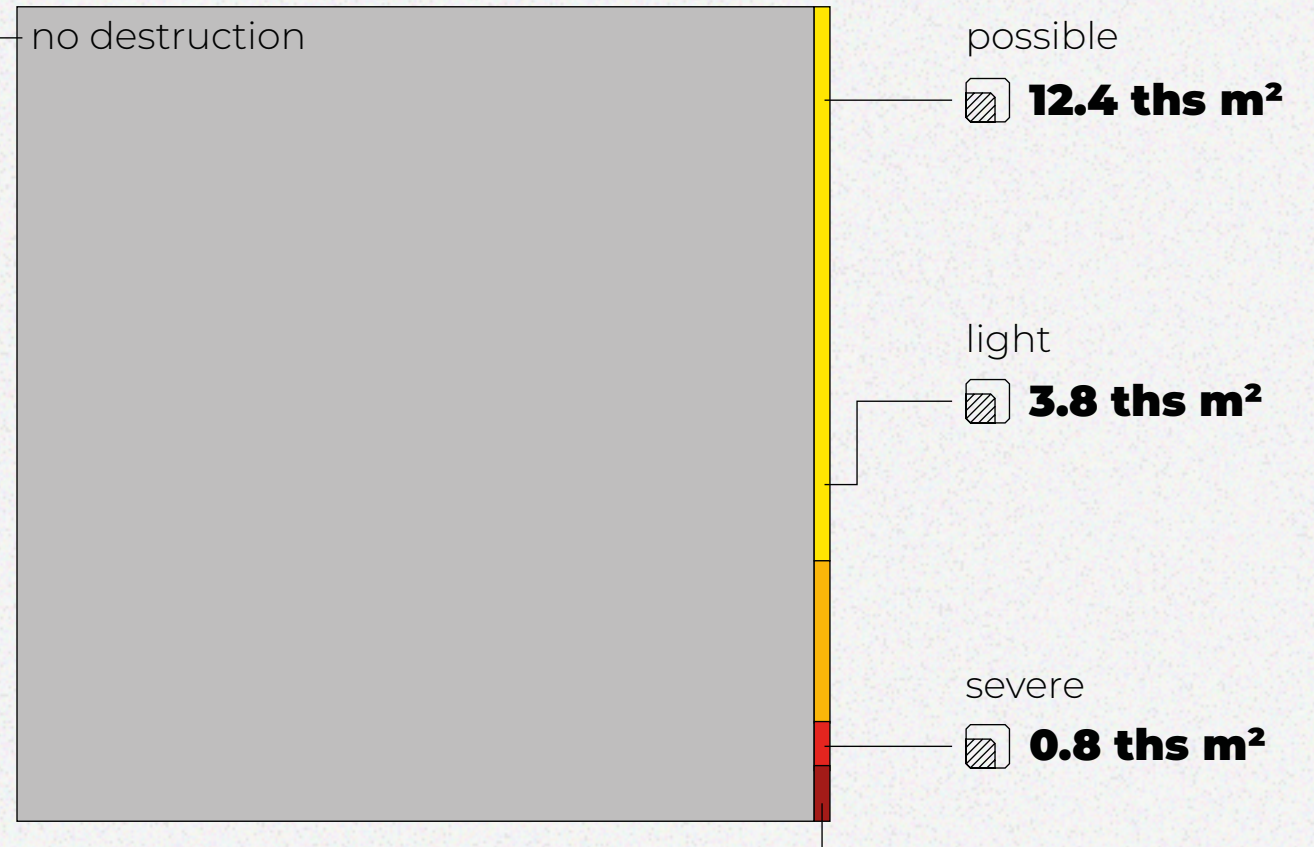
Total damages

**\$0.5 million**

## Area of destruction

**1,019.8 ths m<sup>2</sup>**

total  
**1.1 ths m<sup>2</sup>**



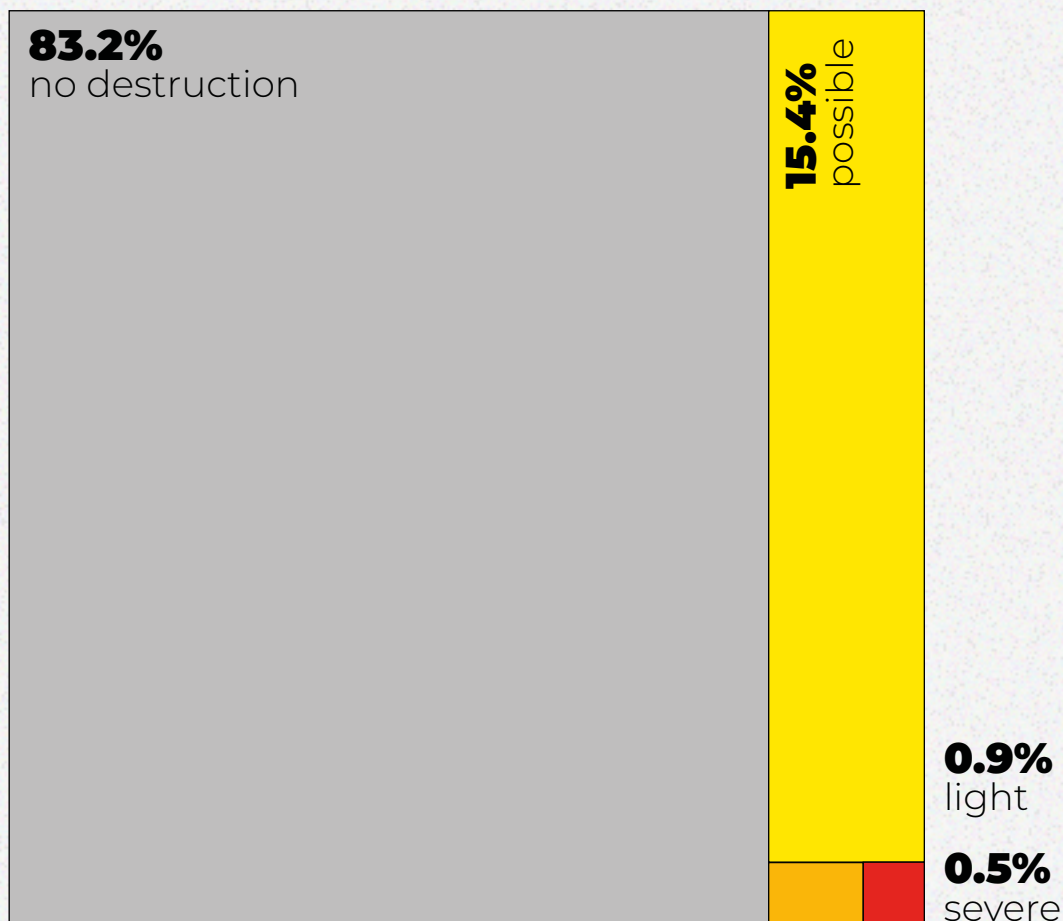
Total area of damage

**18.1 ths m<sup>2</sup>**



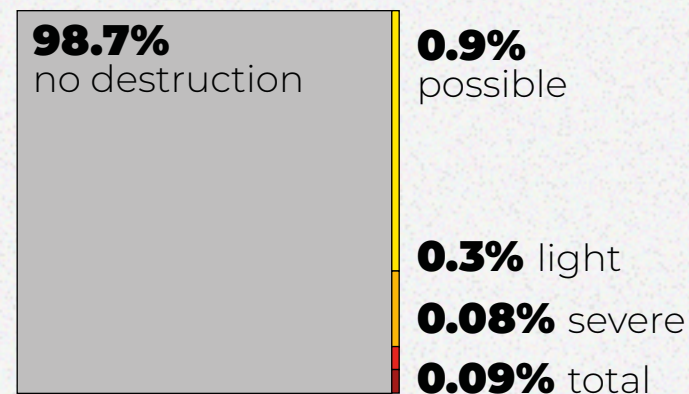
# AREA OF DESTRUCTION

## Apartment buildings



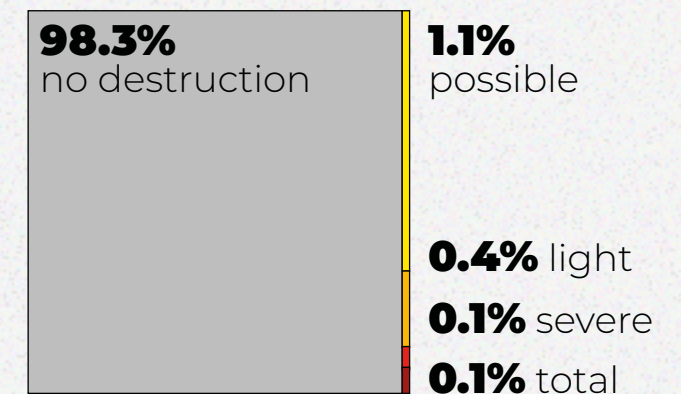
Total area of damage  
**116.8 ths m<sup>2</sup>** / 696.4 ths m<sup>2</sup>

## Private houses



Total area of damage  
**18.8 ths m<sup>2</sup>** / 1,443.5 ths m<sup>2</sup>

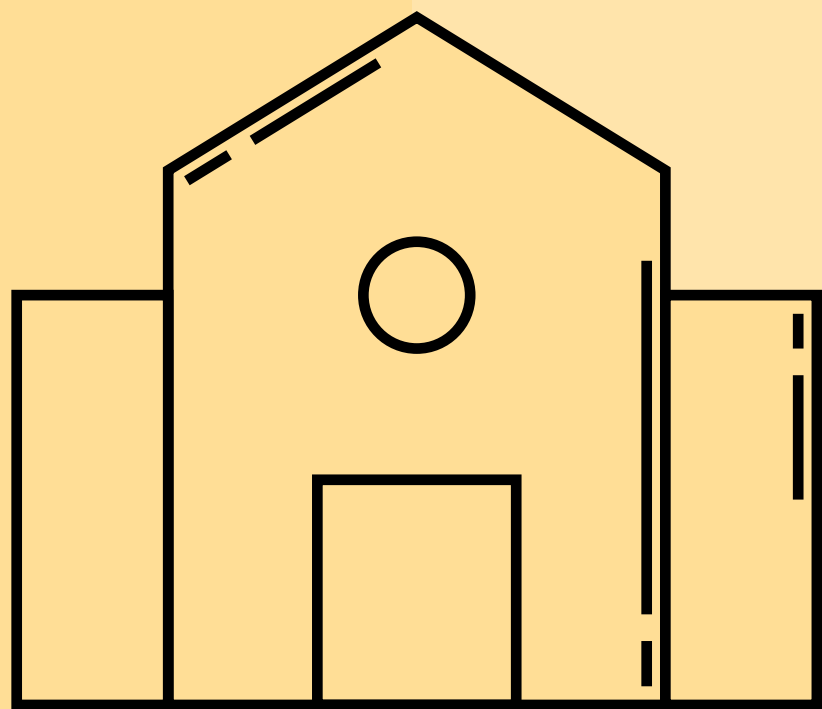
## Outbuildings



Total area of damage  
**18.1 ths m<sup>2</sup>** / 1,019.8 ths m<sup>2</sup>



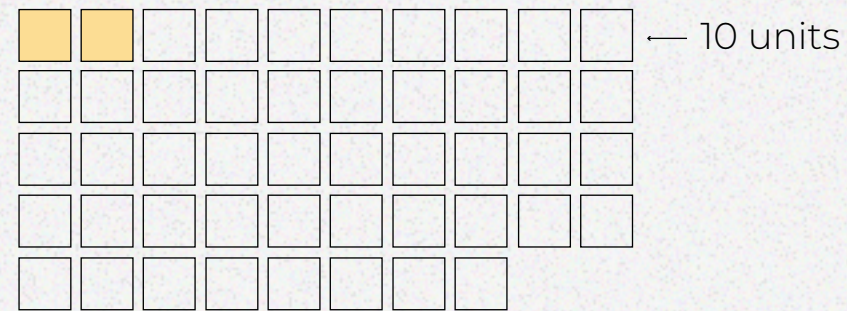
# SOCIAL INFRASTRUCTURE





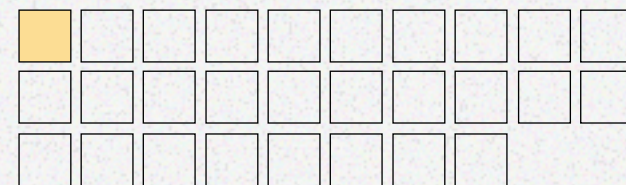
# SCALE OF DESTRUCTION

Trade & commerce



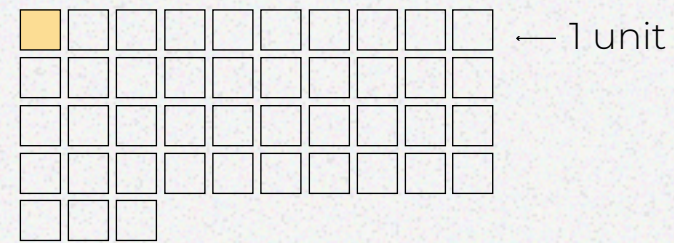
**20** / 482

Buildings of  
general purpose



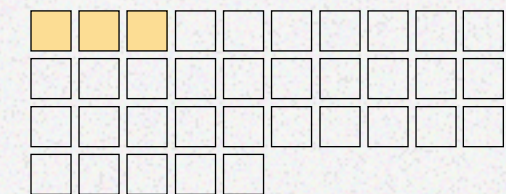
**5** / 283

Educational institutions



**1** / 43

Offices & conference centers



**3** / 35

Culture & religion  
institutions

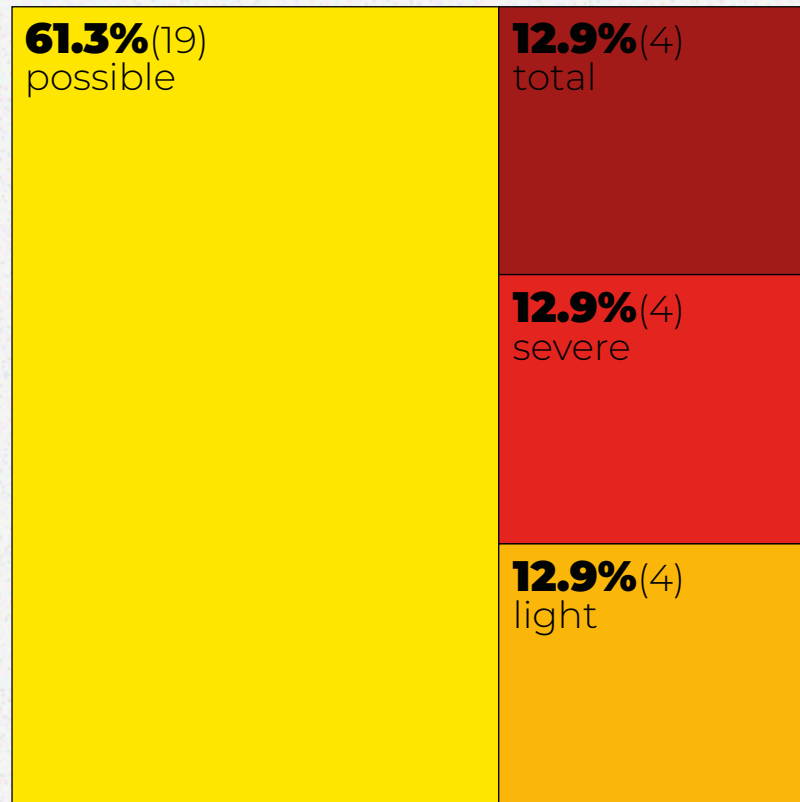


**2** / 16



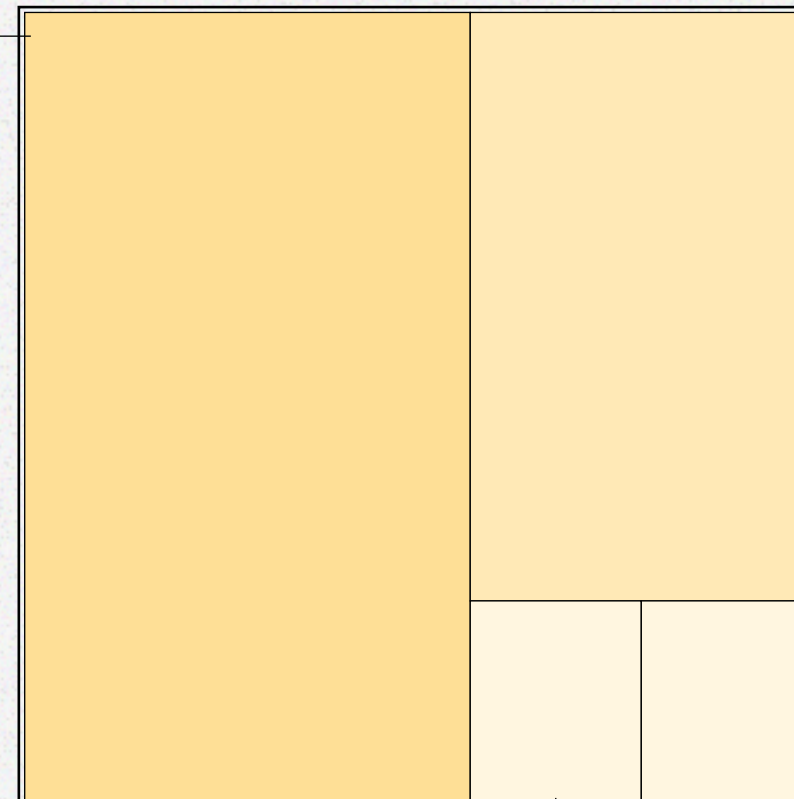
# SCALE OF DESTRUCTION

## Level of destruction



## Assessment of damages

**\$597.68 thousand**  
Trade & commerce



**\$352.46 thousand**  
Offices & conference centers

**\$64.10 thousand**  
Culture & religion institutions

**\$63.09 thousand**  
Buildings of general purpose

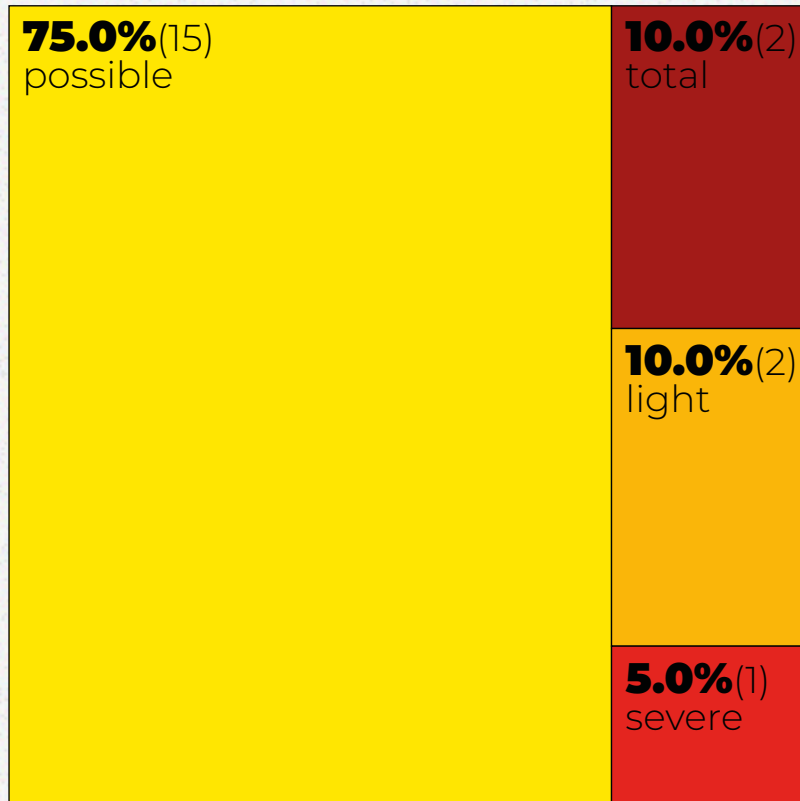
Total damages

**\$1.08 million**



# COMMERCIAL BUILDINGS

## Level of destruction

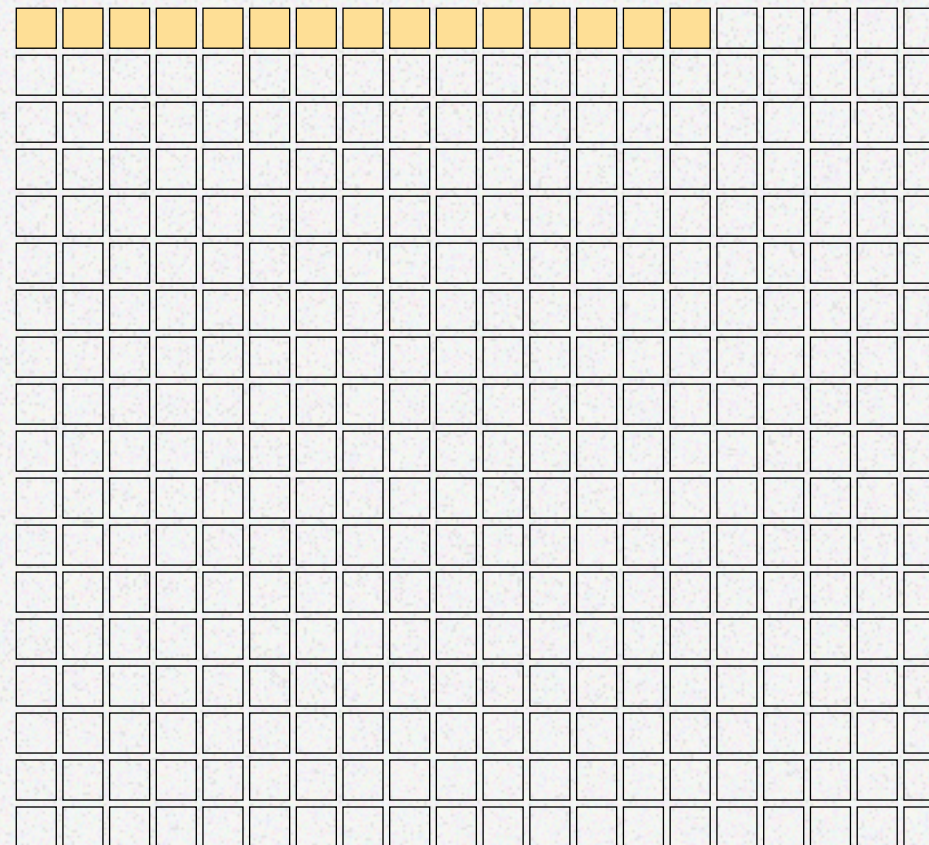


Total damages

**\$597.68 thousand**

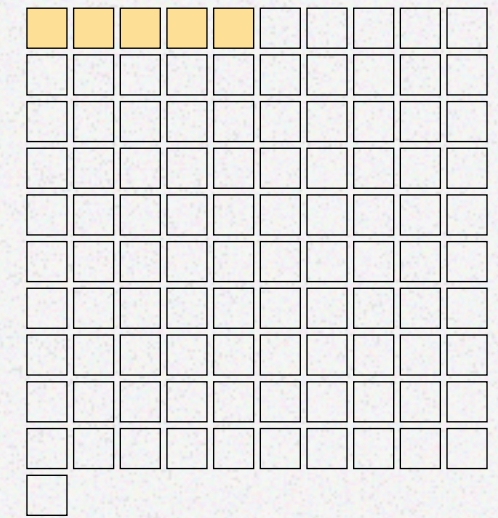
## Number of destroyed buildings

Trade



**15** / 360

Commercial services  
& institutions

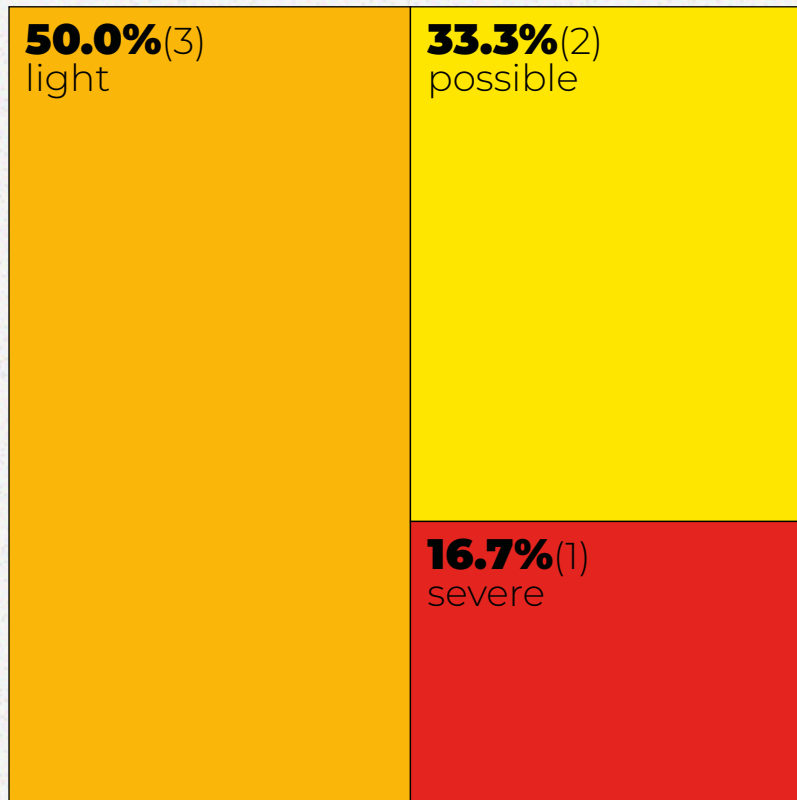


**5** / 101



# EDUCATION, CULTURE, OFFICES

## Level of destruction



Total damages

**\$416.55 thousand**

## Number of destroyed buildings

Kindergarten



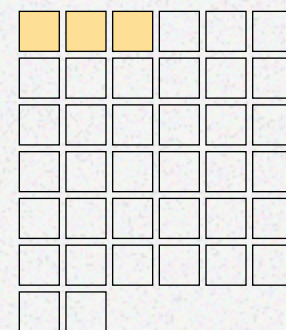
**1** / 12

Cultural institutions



**2** / 4

Offices

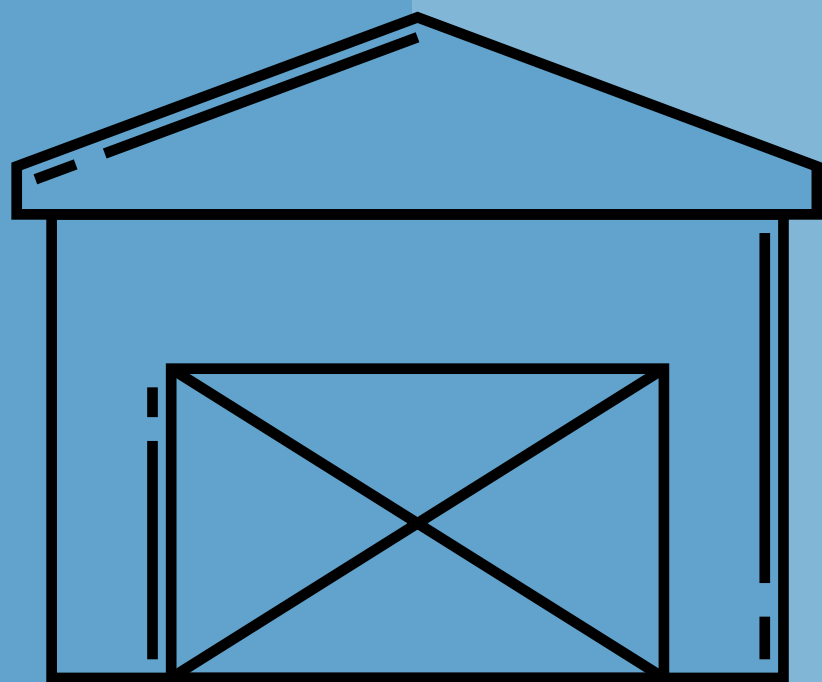


**3** / 38





# INDUSTRIAL INFRASTRUCTURE

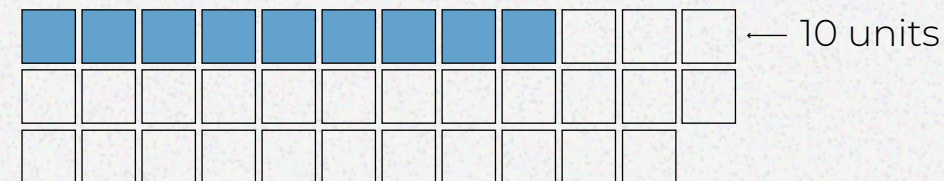




# SCALE OF DESTRUCTION

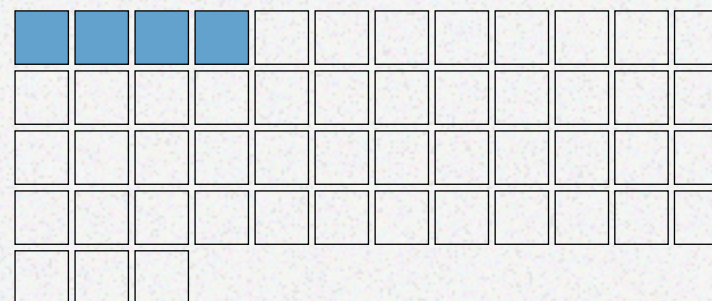
## Number of destroyed buildings

Industrial buildings



**85** / 351

Utility buildings



**36** / 508

Warehouses



**33** / 119

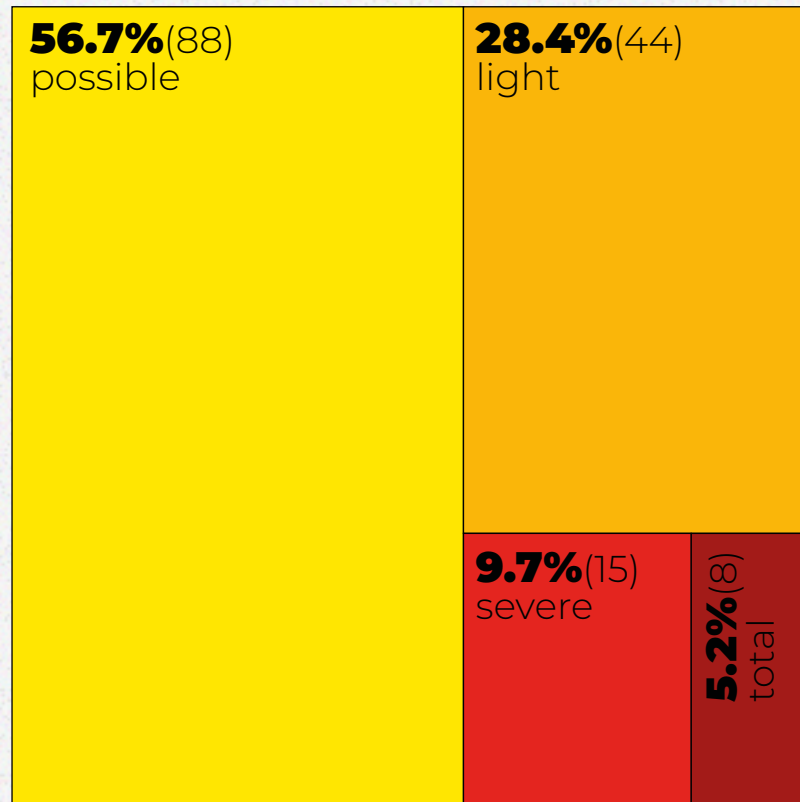
Farm





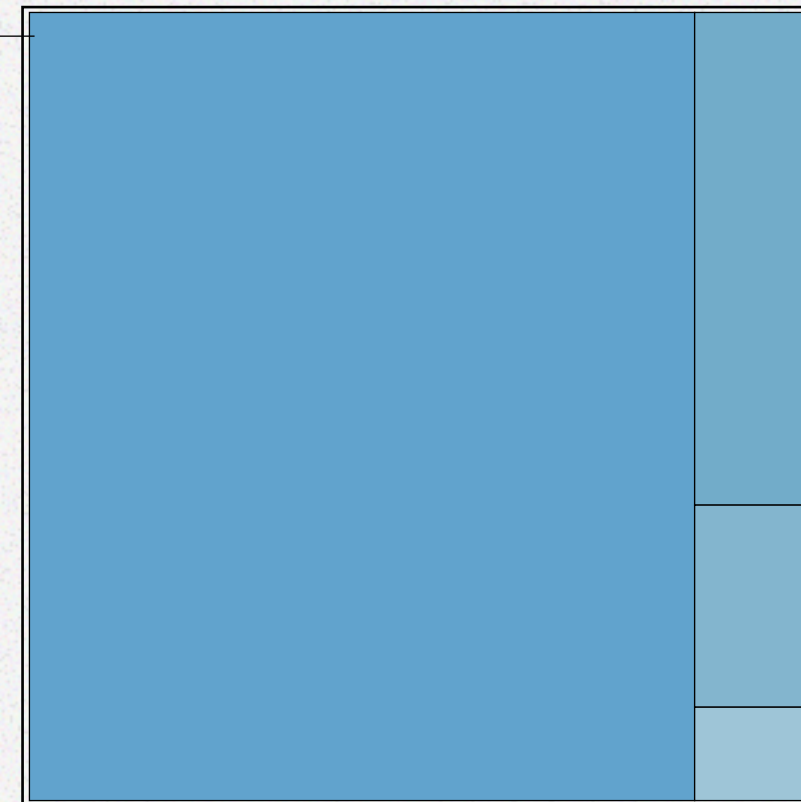
# SCALE OF DESTRUCTION

## Level of destruction



## Number of destroyed buildings

**\$15.64 million**  
Industrial buildings



**\$1.78 million**  
Agriculture

**\$0.74 million**  
Warehouses

**\$0.34 million**  
Utility buildings

Total damages

**\$18.5 million**



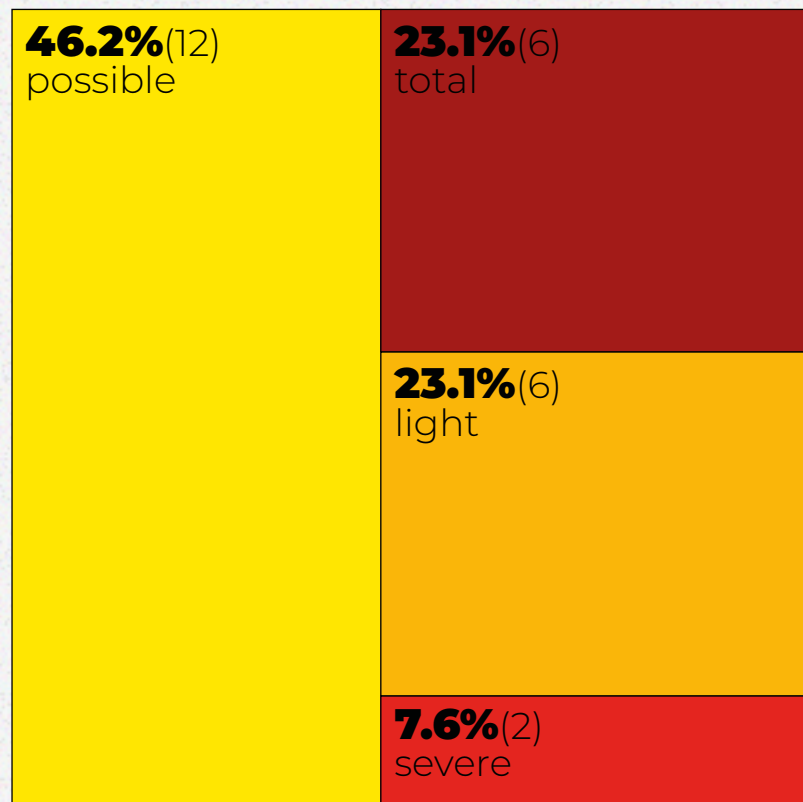
# ADMINISTRATIVE INFRASTRUCTURE





# SCALE OF DESTRUCTION

## Level of destruction



Total damages  
**\$17.66 million**

## Number of destroyed buildings

Government and administrative buildings



**3** / 20

Other buildings



**22** / 22

Post office

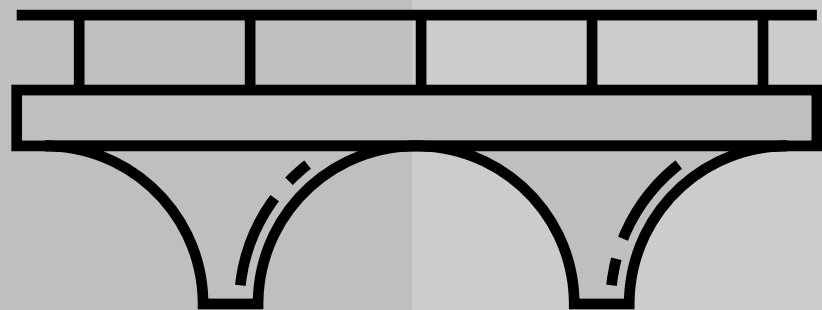


City council





# OTHER INFRASTRUCTURE





# SCALE OF DESTRUCTION

## Level of destruction

**75.0%**(3)  
total

**25.0%**(1)  
possible

Total damages

**\$1.11 million**

## Number of destroyed buildings

Water supply



**2/5**

Transport  
infrastructure



**2/4**

Radio tower



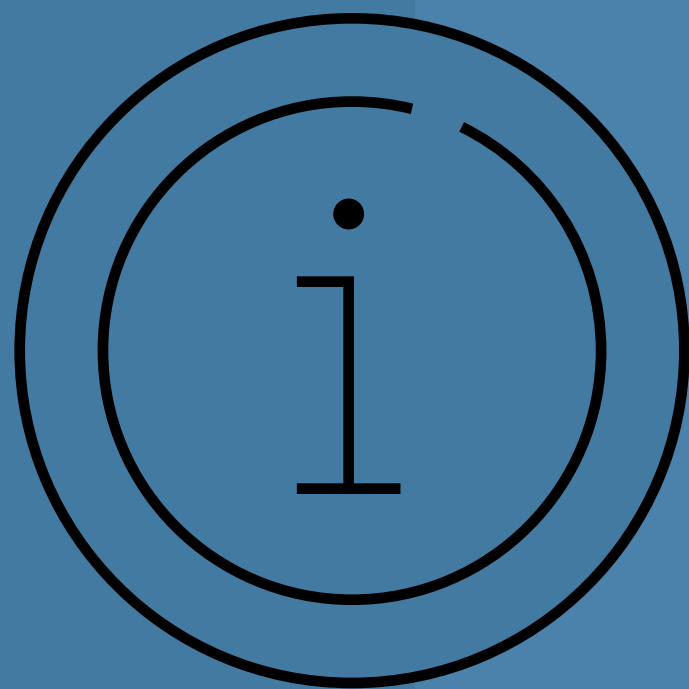
**1/1**

Thermal power station





# METHODOLOGIES AND ADDITIONAL INFORMATION





# HOW WE DETERMINE LEVELS OF DESTRUCTION

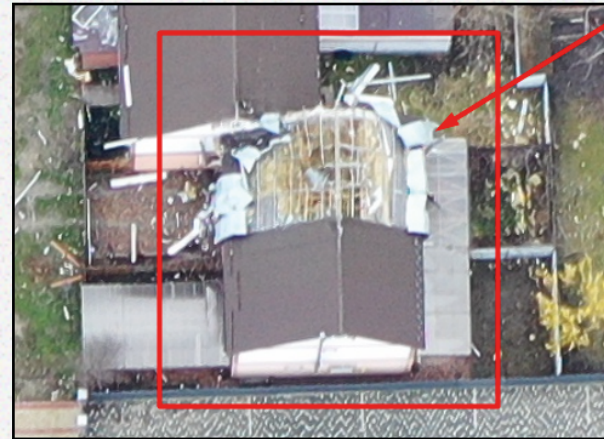
## Total destruction



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.



## 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).



# OKHTYRKA THROUGH THE EYES OF BEHOLDERS

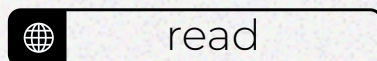
Okhtyrka: how to live under russian shelling



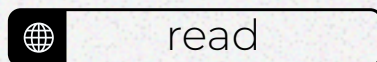
Between funerals, bombs and weddings. How the hero city of Okhtyrka survives



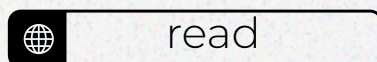
«Here I go and pray.» A resident of Okhtyrka rides her bicycle to work — to the hospital — under fire every day



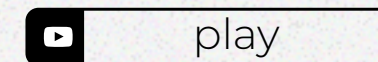
«I jumped onto the tank. It turned its muzzle at me and fired!» — how bombed-out Okhtyrka comes to life



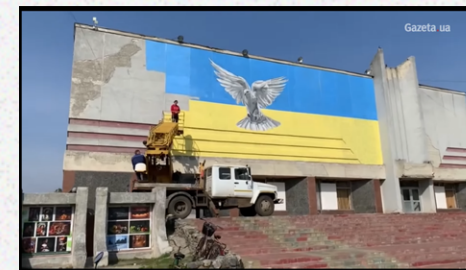
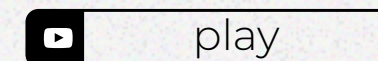
«This is not war, this is the extermination of civilians»: Okhtyrka is under Russian airstrikes again



Okhtyrka destroyed by russian missile strikes | Sumy region



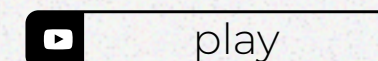
Okhtyrka. Heroic land, deadly sky



How Okhtyrka is recovering after russian bombings

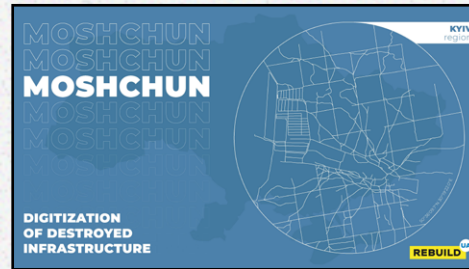


Okhtyrka: destroyed houses, shelled kindergarten and thermal power station

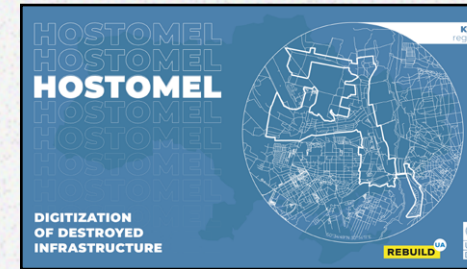




# PREVIOUS REPORTS



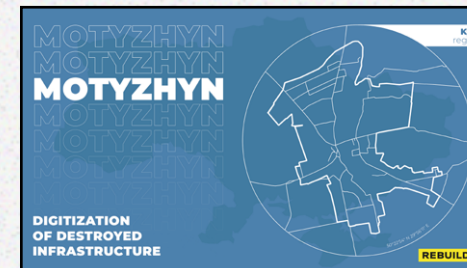
**Moshchun,**  
Buchanskyi district,  
Kyiv region



**Hostomel,**  
Buchanskyi district,  
Kyiv region



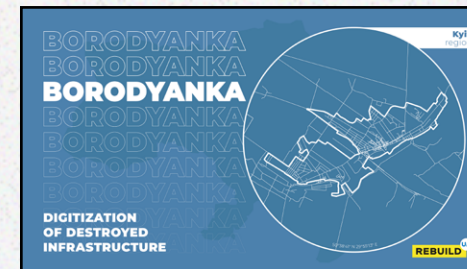
**Horenka,**  
Buchanskyi district,  
Kyiv region



**Motyzhyn,**  
Buchanskyi district,  
Kyiv region



**Irpin,**  
Buchanskyi district,  
Kyiv region



**Borodyanka,**  
Buchanskyi district,  
Kyiv region



**Bucha,**  
Buchanskyi district,  
Kyiv region



**Andriivka,**  
Buchanskyi district,  
Kyiv region





# REBUILD



[rebuildua.net](http://rebuildua.net)

## Partners

Assessment of losses and damages, budgeting:



Financial and technical support



Shooting of settlements



Digitization of geospatial information:



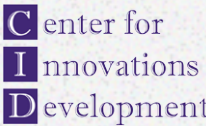
Visual style and content:



Support in cooperation with public authorities:



Cooperation & analysis of community economy, Vkursi Economy:



Creation of an online map of destroyed new buildings



## Supported by

