

2. Vulnerability Assessment

FLOODLABELGHANA

Flood Competence Center (HKC)

October 2023

CONTENT

- Building material
- Intrusion paths
- Vulnerability assessment in practice
- Vulnerability assessment in four steps
- Final result

BUILDING MATERIAL AND CONSTRUCTION

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Flood Competence Center
HKC Hochwasser
Kompetenz
Centrum e.V.



BUILDING MATERIAL

Roof

- Thatch
- Asbestos/ slate
- Aluminium sheets
- Metal Composites (Long span)
- Brick Tiles
- Concrete
- Tarpaulin



BUILDING MATERIAL

Foundation



BUILDING MATERIAL

Wall



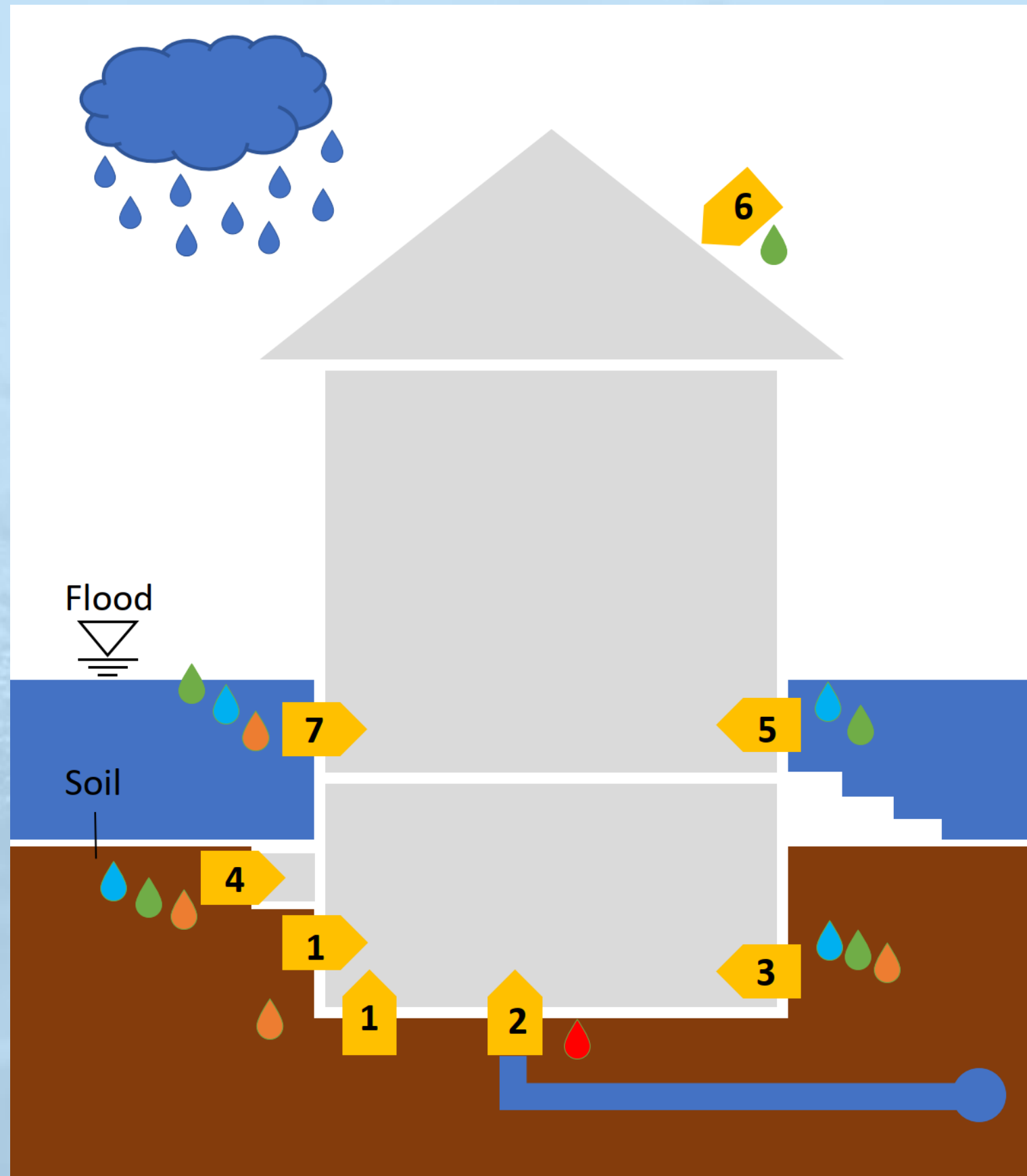
- Mud/ earth
- Wood
- Metal sheets/ Slates/ asbestos
- Stone
- Burnt bricks
- Cement blocks/ Reinforced concrete
- Landcrete (Mud/ earth and cement)
- Bamboo
- Palm leaves or thatch (grass) or raffia

BUILDING MATERIAL

In the event of flooding of buildings, the building structures are exposed to intensive moisture loads of varying duration. Flooding causes different moisture contents in different building materials.

| Building materials | Well suited | Moderately suitable | Unsuitable |
|--|-------------|---------------------|------------|
| Lime | X | | |
| Gypsum | | | X |
| Cement | X | | |
| Burnt building materials (depending on type) | X | X | |
| Clay (depending on exposure time) | X | X | X |
| Stoneware | X | | |
| Bitumen (paint and sheeting) | X | | |
| Metals (depending on type) | X | X | |
| Plastics (depending on type) | X | X | X |
| Wood (depending on type) | | X | X |
| Textiles | | | X |
| Absorbent materials | | | X |

INTRUSION PATHS



River Flood



Storm Water



Groundwater Flooding



Sewer Backflow

1

Penetration through basement wall base

2

Backwater through sewer system

3

Cable ducts

4

Light wells, Basement windows and doors

5

Window- and door openings

6

Leaking roof and rain gutters

7

Permeable outer wall

INTRUSION PATHS

Roof

- Leaking roof
- Rain gutters directs water to the house
- Roof directs water to the house



INTRUSION PATHS

Foundation

- Floor plate not above water level or not waterproof
- House connection not above water level or not waterproof
- Static of the house



The statics of the house can only be assessed by visual inspection!

INTRUSION PATHS

Wall



- Connection wall to base plate
- Walls, doors, windows, openings, cable ducts
- House connection

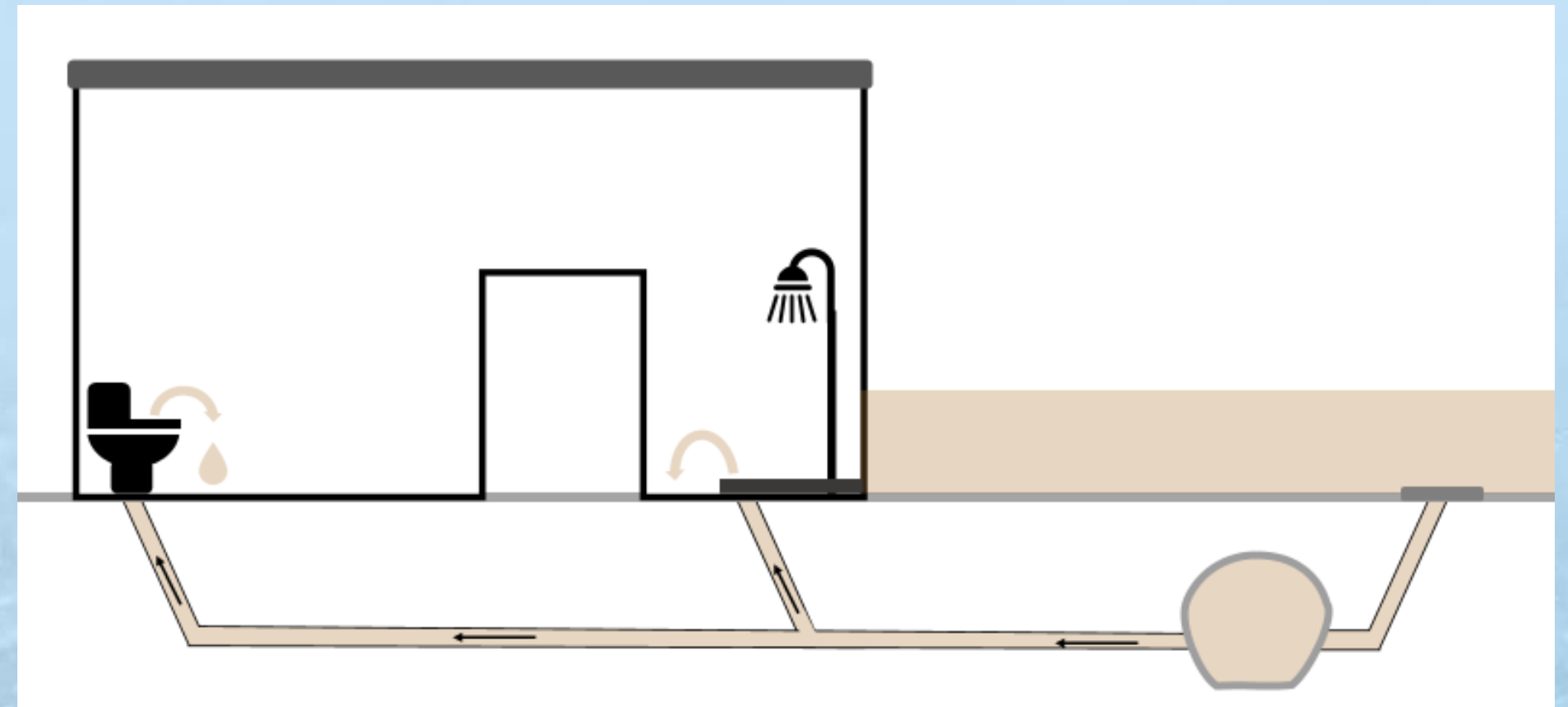


INTRUSION PATHS

Sewer System

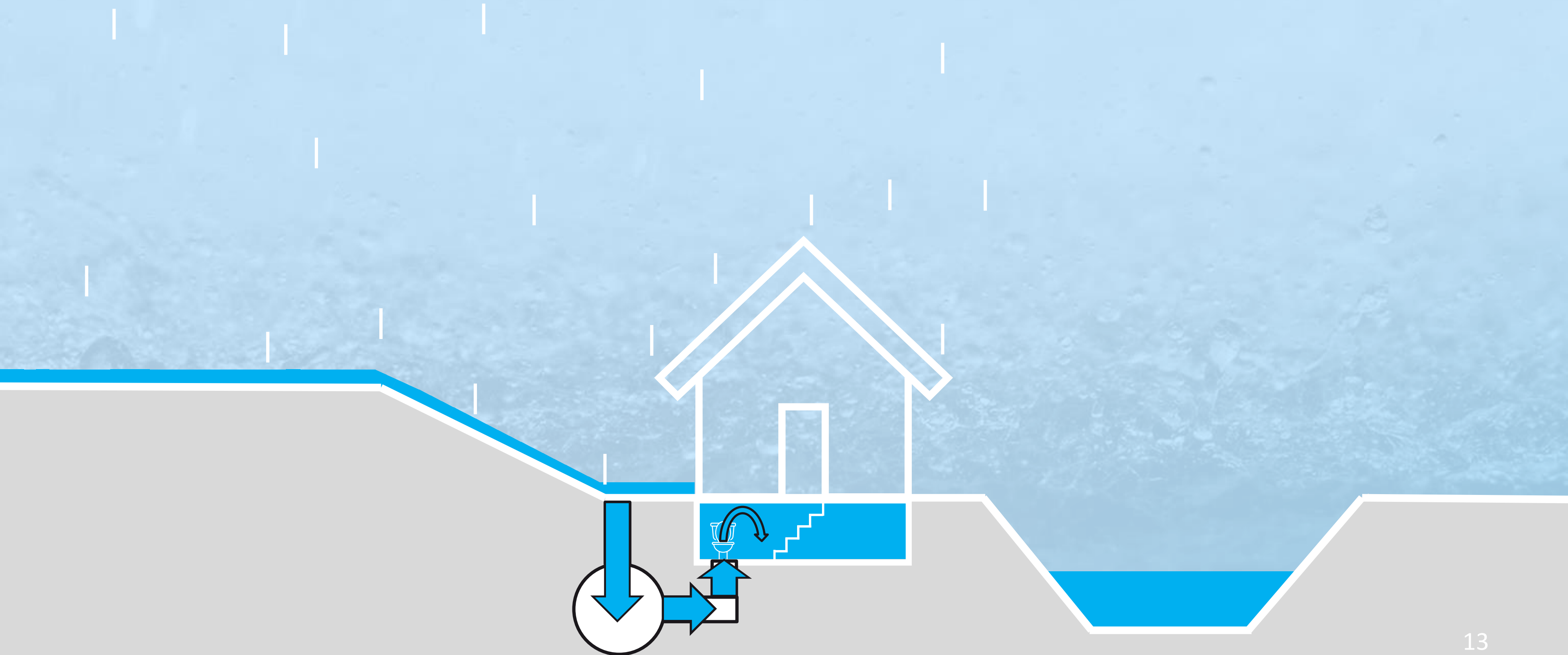
Due to the dimensioning of the sewer network, not every heavy rain event can be drained through it. A short-term overload of the drainage network and thus a backwater into the property drainage system is possible.

The wastewater can enter the building through gullies, washbasins or toilet facilities as a result of hydrostatic pressure.



FLOOD HAZARDS

Sewer backflow



VULNERABILITY ASSESSMENT In Practice

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FLOODLABEL FORM

Assessment

With the assistance of the homeowner

By visual inspection only

With construction plan

The valuation
can only be done visually
and with the support
of the owner

Construction plans
should be provided
(if available)



VULNERABILITY ASSESSMENT

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In 4 Steps

1



2



3



4



VULNERABILITY ASSESSMENT

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Step 1: Roof

Building material?

Roof

- Thatch
- Asbestos/ slate
- Aluminium sheets
- Metal Composites (Long span)
- Brick Tiles
- Concrete
- Tarpaulin
- Others

Others (Please specify)



Step 1: Roof

Roof waterproof?

Roof

No (red)

Yes

Roof directs water away from the house wall?

Roof

No (yellow)

Yes (green)

VULNERABILITY ASSESSMENT

Step 2: Foundation

Building material?

Foundation

- Cement/ concrete
- Earth or Mud brick
- Wood
- Terrazzo
- Others

Others (Please specify)



Step 2: Foundation

Is the static of the house obviously insufficient? (e.g., elevated houses on stilts)

Foundation

- Yes (red)
- No



Step 2: Foundation

Floor plate above water level or waterproof?

Foundation

- No (red)
- Yes

House connection above water level or waterproof?

Foundation

- No (yellow)
- Yes (green)

VULNERABILITY ASSESSMENT

Step 3: Wall

Building material?

Wall

- Mud/ earth
- Wood
- Metal sheets/ Slates/ asbestos
- Stone
- Burnt bricks
- Cement blocks/ Reinforced concrete
- Landcrete (Mud/ earth and cement)
- Bamboo
- Palm leaves or thatch (grass) or raffia
- Others

Others (Please specify)



VULNERABILITY ASSESSMENT

Step 3: Wall

Connection from house wall to base plate waterproof?

Wall

- No (red)
- Yes

Walls, doors, windows, openings waterproof up to the line?

Wall

- No (yellow)
- Yes

House connection above line or waterproof?

Wall

- No (yellow)
- Yes (green)



Step 4: Sewer System

Connection to sewer system?

Sewer system

- No (green)
- Yes

Maximal pressure level above house connection?

Sewer system

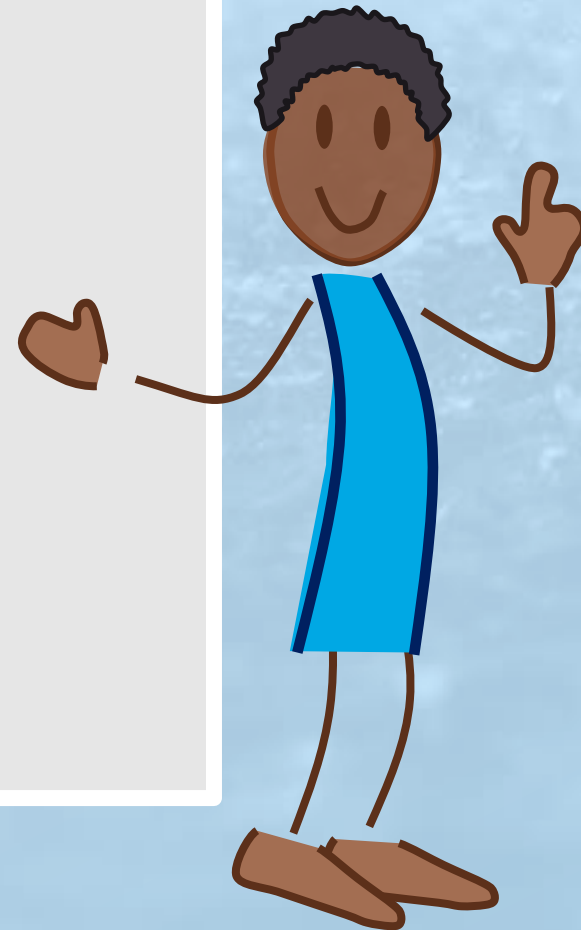
- No (green)
- Yes (red)

Fixed water levels

The house is protected to a water level of:

50 cm

100 cm



Fixed water levels

The house is protected to a water level of:

0,5 m

1 m

FLOOD LABEL CERTIFICATE

FLOOD LABEL GHANA



FLOOD LABEL GHANA

ADDRESS

DIGITAL ADDRESS: _____

STREET: _____

HOUSE NR: _____

POST CODE: _____

CITY: _____

DISTRICT: _____

REGION: _____

BUILDING INFORMATION

BUILDING TYPE: _____

BASEMENT: No: Yes:



Piloted with the University of Cape Coast



Your Flood Risk

This FLOOD LABEL shows the current hazard situation and flood risk for the building by visual inspection. For further details on the recommended measures please refer to the Measure Booklet.



Hazard Type

| | no | medium | high |
|------------------|--------------------------|--------------------------|--------------------------|
| Pluvial Flooding | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fluvial Flooding | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Coastal Flooding | <input type="checkbox"/> | | |

Flood Risk

| | no | medium | high |
|--------------|--------------------------|--------------------------|--------------------------|
| Roof | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Foundation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wall | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Sewer System | <input type="checkbox"/> | | <input type="checkbox"/> |

Final Score



Fixed Water Levels

The house is protected to a water level of:

0,5 m

1 m

DATE OF ISSUE

SIGNATURE

FLOOD LABEL CERTIFICATE

FLOOD LABEL GHANA



FLOOD LABEL GHANA

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Final Score



Fixed Water Levels

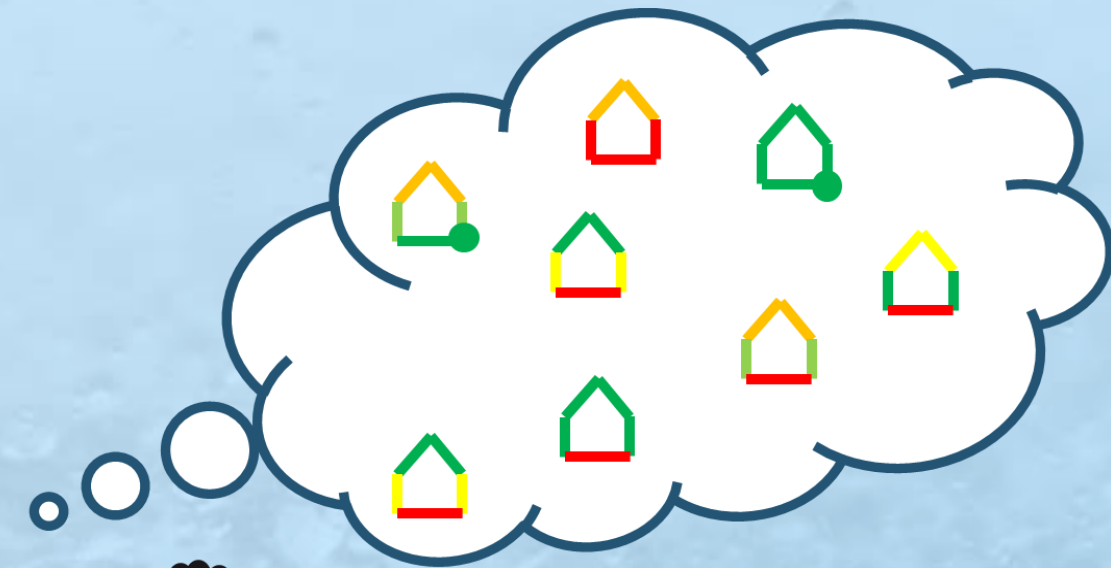
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DATE OF ISSUE

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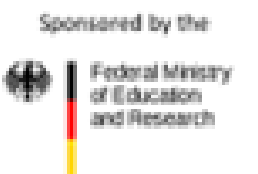
FLOODLABEL

KNOW YOUR RISK AND PROTECT YOUR PROPERTY

floodlabel.info

Contact us!

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