

## **B. Investigation of building/ construction site**

### **1/ Reseacher**

- a) Name:
- b) Date:

### **2/ Owner of the house:**

- a) Name:
- b) Age:
- c) Occupation:

### **3/ Building**

- a) Name of the house (if any):

#### ***(location)***

- b) Village:
- c) Gewog:
- d) Dzongkhag:
- e) GPS location:

#### ***(history)***

- f) Age of the house (how many generations):
- g) History (if any **written record or transmitted story**):

#### ***(General description)***

- h) Orientation:
- i) Description of topography:
- j) Dimension of the building (plan and height of each floor (floor to floor)):
- k) Construction type:
- l) Number of stories:
- m) Design **and material** of the roof:

#### ***(Observation)***

- n) Description of spatial planning and relationship with the surrounding landscape and prominent natural features:
- o) Past renovation, addition or alteration (approximate period). If there is past renovation, addition or alteration, the manner of repair works should be noted and supported by sketch :
- p) Evidence of renovation or addition:
- q) Damages and cause:
- r) Dimension of the largest floor plank:

- s) Dimension of joists and center to center dimension of **neighboring** joists.

#### **4/ Investigation of rammed earth wall**

##### *(Overall shape and dimension)*

- a) Is the wall tapered/leaning?-measure the degree (1/?) if possible
- b) Thickness of wall at the bottom and the topmost sections. –if different, how and where does it change?
- c) How many lifts/block in the total height of the wall?
- d) How many lifts in **each** floor?
- e) Height of the stone masonry footing from the ground level. - record the different variations.

##### *(Compaction work)*

- f) General observations of compaction layers (clearness, evenness, different variations if any)
- g) Thickness of single compaction layers
- h) Number of layers in one lift? Hardness of the wall? (by using a Yamanaka soil hardness meter. - Record the location of the measurement)

##### *(Material)*

- i) Observation of soil and other material characteristics.
- j) **Specific color of the soil by using standard soil color chart (Munsell color system)**
- k) Condition of the surface (**characteristics, weathering and failures**)

##### *(Construction manner)*

- l) Dimension of the lift and location of the measured lift (on the drawing, **photograph** or through description).
- m) Position of the ngashing holes; size of the hole; if the hole is filled up or not and with what material?
- n) **Overlapping of vertical joints at corners or not?**

##### *(Structural deformations)*

- o) Identify and locate the cracks in the drawings (plans and elevation)
- p) Characteristics of the cracks (vertical/ horizontal/ hairline cracks/ see through cracks)
- q) measure the depth and length of the cracks
- r) Identify and locate bulge if observed

##### *(Planning and Building layout)*

- s) Check the alignment of columns
- t) Check the use of cross walls

*( Check on seismic resilience)*

- u) Any alteration in the alignment and planning of the house if renovated?
- v) Identify and locate any conventional seismic resilient features adopted?
- w) Observation of reinforcement/ strengthening elements and their materials seen on the surface and in the section of broken walls. (with drawing and photograph showing the dimension and the position)
- x) Is there any coping on the walls?

**5/ Other information:**

- a) If specimen of the wall is collected, its location should be recorded.

***Photographs***

- snapshot of the owner
- location and the premises
- all elevations of the building
- interior of the building (two pictures for each room, plus attic)
- details of the walls (surface, section, corner. Record different variations if any)
- stone masonry footing
- peculiar features (such as reinforcing elements, potential indicators of building age)
- trace of renovation or addition
- state of damage, failure
- single unit of ramming with compaction layers (with measuring scale)
- slant of wall (with a perpendicular)
- etc...