GEOGRAPHY.
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4th Swiss Finals

20 october 2018

Fieldwork Exercise

There are 2 tasks at 3 different locations in the „Mattequartier".
You are given 40 minutes for each task. Your guide will take you to the locations.
Besides a calculator, it's forbidden to use any electronic devices.

Do NOT open the booklet before told to do so by a supervisor.

Autoren: SwissGeOlymp

1) Cross Section Profile and Water Flow Calculation

You are given the following information to solve task 1: The **riverbed** of the Aare is on <u>average</u> 495.3m a.s.l. while the **water surface** is 496.4m a.s.l. (at the red line on task 1a).

a) Location "Bärenpark Bushaltestelle" – Cross Section Profile (**20 minutes**)

i) Draw a cross section profile of the Aare (in flow direction) at the marked red line and describe the processes (within the map or as side text). Evaluate the width and add it to the sketch as well. Your result does not have to be proportional.

river width: ☐

496.4 m a.s.l.

495.3 m a.s.l.

ii) Indicate the areas where you estimate the highest & lowest relative water velocity within your sketch and justify/give reasons for your answer.

Do not turn the page!

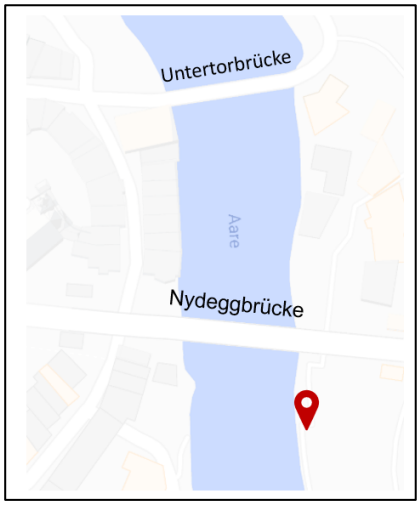
b) Location "Bärenpark Aareufer" – Water Flow Calculation (20 minutes)

i) Calculate today's water flow Q [m^3/s] of the Aare at the red line (task 1a). Use the following formula to calculate the water flow [Q]. Take the width from task 1a) to get the cross-sectional area [A] and find an adequate way to evaluate the surface water velocity [v] on your own.

$$Q = v \times A$$

v: surface water velocity [m/s]
A: cross-sectional area [m^2]

ii) The 23rd August 2005 was a flood event in Bern. The water flow was 600 m^3/s and had an average velocity of 3.2 m/s. Based on the assumption that the width and average depth of the riverbed stay the same, do you think the surface of the Untertorbrücke on 503.4m a.s.l. was flooded? Why? / Why not?



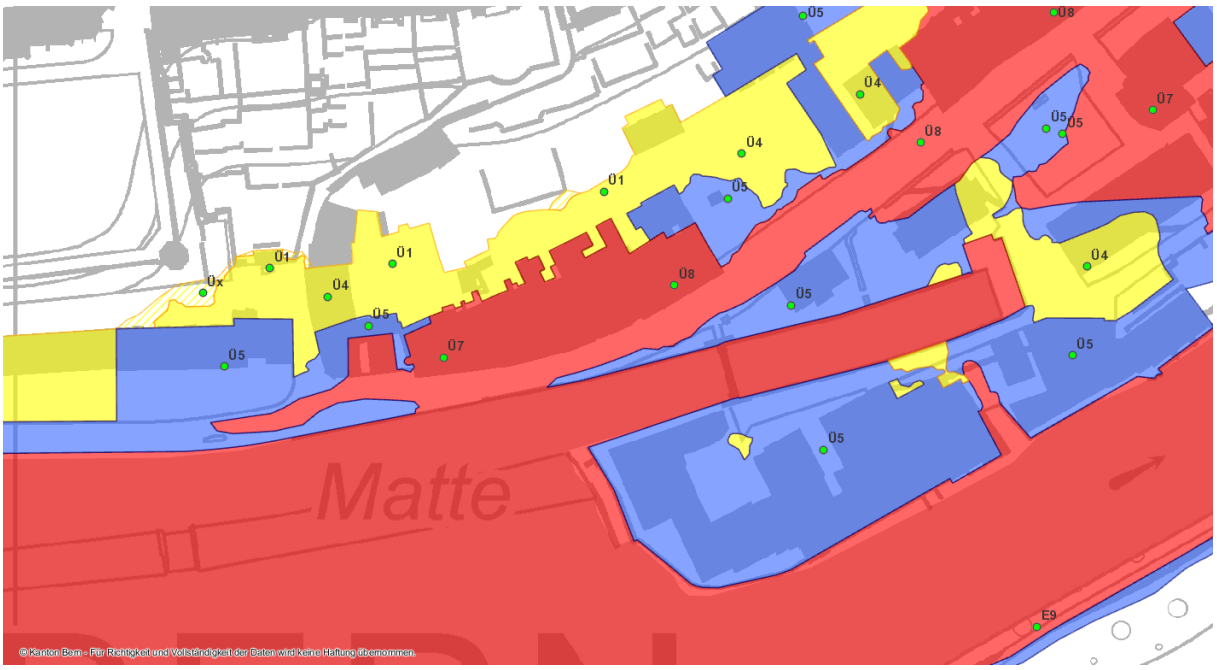
iii) As you can see, the bridge arch (granite) is made of a different material than the rest of the bridge (sandstone). Besides the aesthetic aspect, what could be the reason for that?

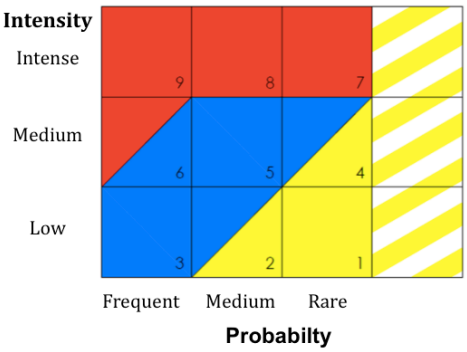
Do not turn the page!

1) Flood Protection Measures

a) Location "Matte" – Flood Protection Measures (40 minutes)

i) According to the Naturgefahrenkarte of the Mattequartier, how often and at what depth is the building at the Schifflaubestrasse 20 flooded?





Intensity	Depth of the water
Intense	h > 2 m
Medium	2 m > h > 0.5 m
Low	h < 0.5 m

Probability	Flood recurrence period
Frequent	T ≤ 30 years
Medium	30 < T ≤ 100 years
Rare	100 < T ≤ 300 years

ii) Draw the following aspects into the provided map on the next page:

(1) Which flood protection measures do you find in the area? Draw them into the map and make a legend for your results (on this page).

(2) Assuming that the Aare overflows the Wasserwerkkanal at the Tychsteg in the case of a flooding, where would the water flow through if every flood protection measure operates correctly? Draw the flow path into the map.