THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Modeling of Water Flow and Nutrient Transport in Green RoofsAnalysis of surface temperature of substrate of an extensive green roof**
Author's name:	**Bc. Razbar Wahab**
Type of thesis :	master
Faculty/Institute:	Faculty of Civil Engineering (FCE)
Department:	K143
Thesis reviewer:	RNDr. Václav Šípek, Ph.D.
Reviewer's department:	Institute of Hydrodynamics o the Czech Academy of Sciences

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	**ordinarily challenging**

How demanding was the assigned project?

The diploma thesis is focused on the modelling task dealing with the green roof field experiment with the special attention to water fluxes and BOD5. The thesis represents a standard modelling task fulfilling the requirements of the master thesis.

Fulfilment of assignment	**fulfilled**

How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.

The main aims of the thesis encompassing literature review, conceptualization of the green roof testbed and using the numerical model for the modelling task were accomplished.

Methodology	**correct**

Comment on the correctness of the approach and/or the solution methods.

The utilized methods do comply with current state-of-the-art approaches with one exception. I miss proper validation of the model or at least comparison of the modelled variables and fluxes with measured ones in the period of interest. This would enable reliable assessment of the model performance.

Technical level	**B - very good.**

Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?

The literature review which form the first part of the thesis is satisfactory suffering only from little mistakes as non-unified referencing and missing units when defining the variables of the presented equations. The level of presented information is proper for the diploma thesis and represents a good basis for the following experimental section.

In the experimental section the results of the ten-day experiment are presented. The topic of the thesis was to set-up the numerical model in order to describe water and nutrient follow in the green roof testbed system. As mentioned above I miss justification of the model performance. The thesis is not based on a standard calibration/validation scheme. This is plausible when only limited number of data is available, which was probably the case of this thesis. However, in this situation the model performance could be evaluated at least against the measured data in the period of model set-up. E.g. in Figure 12 you present moisture sensors that could be used for his purpose, most probably you have measured outflow and more over the combination of figures 32 and 33 could also help to disentangle this issue. On the other hand, using HYDRUS in its 2D/3D version is an interesting approach that proved technical ability of the student.

Formal and language level, scope of thesis	**B - very good.**

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

The master thesis contains only minor mistake ranging from non-unified referencing to some wrongly numbered figures.

Selection of sources, citation correctness	B - very good.
Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?	
I have no objections to this section.	

Additional commentary and evaluation (optional)
Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.
The results of the work are an interesting contribution to the issue of using green roofs as a tool for influencing the urban microclimate.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.
eq.13 for what?

The presented work deals with an interesting and perspective topic. The work as a whole is of standard quality and definitely meets the requirements for a diploma thesis. In my opinion, the only weakness of the work is the insufficient space devoted to justification of the model performance. The grade that I award for the thesis is **B - very good.**

Questions:

How exactly did you model evapotranspiration? On p. 46 you state that "Reference evapotranspiration (ET0) was calculated by (Petreje et al., 2023) using the Penman-Monteith equations, while evaporation rates were determined using the Penman equation." Did you model separately E and RET, if so how did you combine them at the end? The usual approach is the RET/PET should make the maximum amount of evapotranspired water from the modelling domain.

Can you please specify how was model calibrated and if so then how it was validated?

Date: **18.6.2024**   Signature: