VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
BRNO UNIVERSITY OF TECHNOLOGY

FAKULTA STAVEBNÍ
ÚSTAV POZEMNÍHO STAVITELSTVÍ

FACULTY OF CIVIL ENGINEERING
INSTITUTE OF BUILDING STRUCTURES

FOLDER A - TEXT PART
EVIDENCE PART

DETACHED FAMILY RESIDENCE

BAKALÁŘSKÁ PRÁCE
BACHELOR´S THESIS

AUTOR PRÁCE — VIKTOR GACH
AUTHOR

VEDOUCÍ PRÁCE — Ing. FRANTIŠEK VAJKAY, Ph.D.
SUPERVISOR

BRNO 2015

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
FAKULTA STAVEBNÍ

Studijní program	B3607 Civil Engineering
Typ studijního programu	Bakalářský studijní program s výukou v anglickém jazyce a prezenční formou studia
Studijní obor	3608R001 Pozemní stavby
Pracoviště	Ústav pozemního stavitelství

ZADÁNÍ BAKALÁŘSKÉ PRÁCE

Student	Viktor Gach
Název	Detached Family Residence
Vedoucí bakalářské práce	Ing. František Vajkay, Ph.D.
Datum zadání bakalářské práce	30. 11. 2014
Datum odevzdání bakalářské práce	29. 5. 2015

V Brně dne 30. 11. 2014

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ fakulta stavební DĚKANÁT -29-

.....	.....
prof. Ing. Miloslav Novotný, CSc.	prof. Ing. Rostislav Drochytka, CSc., MBA
Vedoucí ústavu	Děkan Fakulty stavební VUT

Podklady a literatura

Studie dispozičního řešení stavby, katalogy a odborná literatura, Zákon č.183/2006 Sb., Zákon č. 350/2012, kterým se mění zákon č. 183/2006 Sb., Vyhláška č.499/2006 Sb.,Vyhl. č. 62/2013, kterou se mění vyhláška č. 499/2006 Sb.,Vyhláška č.268/2009 Sb., Vyhláška č.398/2009 Sb., platné ČSN, Směrnice děkana č. 19/2011 a dodatky.

Zásady pro vypracování (zadání, cíle práce, požadované výstupy)

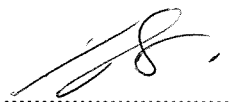
Zadání VŠKP: Projektová dokumentace stavební části k provedení novostavby rodinného domu vedený pod názvem "Detached Family Residence".
Cíl práce: vyřešení dispozice pro daný účel, návrh vhodné konstrukční soustavy, nosného systému a vypracování výkresové dokumentace včetně textové části a příloh podle pokynů vedoucího práce. Textová i výkresová část bude zpracována s využitím výpočetní techniky. Výkresy budou opatřeny jednotným popisovým polem a k obhajobě budou předloženy složené do desek z tvrdého papíru potažených černým plátnem s předepsaným popisem se zlatým písmem. Dílčí složky formátu A4 budou opatřeny popisovým polem s uvedením seznamu příloh na vnitřní straně složky.
Požadované výstupy dle uvedené Směrnice:
Textová část VŠKP bude obsahovat kromě ostatních položek také položku h) Úvod (popis námětu na zadání VŠKP), položku i) Vlastní text práce (projektová dokumentace dle vyhlášky č. 499/2006 Sb.) a položku j) Závěr (zhodnocení obsahu VŠKP, soulad se zadáním, změny oproti původní studii).
Příloha textové části VŠKP v případě, že bakalářskou práci tvoří konstruktivní projekt, bude povinná a bude obsahovat výkresy pro provedení stavby (technická situace, základy, půdorysy řešených podlaží, konstrukce zastřešení, svislé řezy, pohledy, detaily, výkresy sestavy dílců popř. výkresy tvaru stropní konstrukce, specifikace, tabulky skladeb konstrukcí – rozsah určí vedoucí práce), zprávu požární bezpečnosti, stavebně fyzikální posouzení stavebních konstrukcí.

Struktura bakalářské/diplomové práce

VŠKP vypracujte a rozčleňte podle dále uvedené struktury:

1. Textová část VŠKP zpracovaná podle Směrnice rektora "Úprava, odevzdávání, zveřejňování a uchovávání vysokoškolských kvalifikačních prací" a Směrnice děkana "Úprava, odevzdávání, zveřejňování a uchovávání vysokoškolských kvalifikačních prací na FAST VUT" (povinná součást VŠKP).

2. Přílohy textové části VŠKP zpracované podle Směrnice rektora "Úprava, odevzdávání, zveřejňování a uchovávání vysokoškolských kvalifikačních prací" a Směrnice děkana "Úprava, odevzdávání, zveřejňování a uchovávání vysokoškolských kvalifikačních prací na FAST VUT" (nepovinná součást VŠKP v případě, že přílohy nejsou součástí textové části VŠKP, ale textovou část doplňují).



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Ing. František Vajkay, Ph.D.
Vedoucí bakalářské práce

Annotation

The bachelor´s thesis is aimed on the solution of construction of "Detached family residence" in form of project documentation. The building is intended for one family while ensuring also needs for working place or accommodation for a guest. It is located on a moderately inclined plot 244/3, cadastral area Vysoká nad Labem, Královehradecký district. The building has two floors without basement. It is made from masonry covered with wooden facade.The timber porch is adjacent to main building. The roof is designed as shed roof with a slope of 16 %.

Key words

Family house, detached, timber truss system, shed roof, ventilated facade, clay blocks, gabion wall

Anotace

Bakalářská práce je zaměřena na konstrukční řešenísamostatně stojícího rodinného domu veformě prováděcí dokumentace. Rodinný dům je navržen pro jednu rodinu, ale zároveň poskytuje i prostor pro pracovní náplň nebo pro ubytování hosta. Objekt je situován na středně svažité a prostorné parcele č. 244/3, k.ú. Vysoká nad Labem, Královehradecký kraj. Dům je navržen jako dvoupodlažní bez sklepních prostor. Jedná se o zděnoustavbu, jejíž obálku tvoří provětrávaná dřevěnáfasáda.S hlavním objektem sousedí dřevěná veranda. Střecha hlavního objektu je řešena jako pultová se sklonem 16%.

Key words in Czech language

Rodinný dům, samostatně stojící, dřevěná příhradová konstrukce, pultová střecha, provětrávaná fasáda, cihelné bloky, gabionová zeď

Bibliografická citace VŠKP

Viktor Gach*Rodinný dům.* Brno, 2015. 41 s., 80 s. příl. Bakalářská práce. Vysoké učení technické v Brně, Fakulta stavební, Ústav pozemního stavitelství. Vedoucí práce Ing. František Vajkay, Ph.D.

Declaration:

I declare, that I worked out bachelor thesis alone and I stated all used information sources.

Prohlášení:

Prohlašuji, že bakalářskou práci jsem zpracoval samostatně a uvedl všechny použité informační zdroje.

V Brně dne 29. 05. 2015
(In Brno, date)

. . . . . .
podpis autora (signature)
Viktor Gach

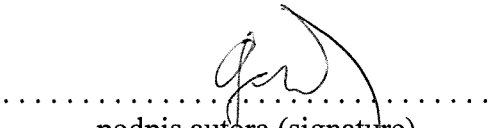
Acknowledgement:

I would like to thank my supervisor, Ing. František Vajkay, Ph.D. for the vocational guidance, helpful advices and time he has provided throughout the elaboration of my bachelor thesis.

Poděkování:

Děkuji Ing. Františkovi Vajkayovi, Ph.D. za odborné vedení mé bakalářské práce, za cenné rady a čas, který mi během zpracovávání věnoval.

V Brně dne 29. 05. 2015
(In Brno, date)

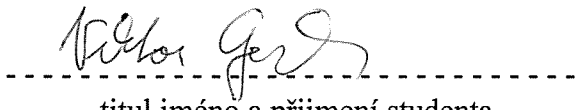


. . . . . .
podpis autora (signature)
Viktor Gach

PROHLÁŠENÍ O SHODĚ LISTINNÉ A ELEKTRONICKÉ FORMY VŠKP

Prohlašuji, že elektronická forma odevzdané práce je shodná s odevzdanou listinnou formou.

V Brně dne 29. 05. 2015



titul jméno a přijmení studenta
Viktor Gach

Content

Introduction

The bachelor´s thesis is aimed on the solution of construction of "Detached family residence" in form of project documentation. The building is intended for one family while ensuring also needs for working place or accommodation for a guest. It is located on a moderately inclined plot 244/3, cadastral area Vysoká nad Labem, Královehradecký district. The building has two floors without basement. It is made from masonry covered with wooden facade.The timber porch is adjacent to main building. The roof is designed as shed roof with a slope of 16 % . The family residence is situated on large plot. The inclined plot enables wide perspective to the countryside.

TEXT PART OF THE THESIS

A. Collateral report
B. Summary technical report
C. Technical report

VLASTNÍ TEXT PRÁCE

A. Průvodní zpráva
B. Souhrnná technická zpráva
C. Technická zpráva

0,000 = 263,300 m.a.s.l,B.l. / COORDINATION SYSTEM S - JTSK

TYPE OF WORK	BACHELOR THESIS		UNIVERSITY OF TECHNOLOGY BRNO FACULTY OF CIVIL ENGENEERING DEPARTMENT OF CIVIL ENGENEERING
AUTHOR	Viktor Gach		
SUPERVISOR	Ing. František Vajkay Ph.D.		
BUILDER	Jakub Smolný, Rašínova 92, 500 11, Hradec Králové		
BUILDING PLOT	cadastral area.: Vysoká nad Labem, plot 244/3		
NAME OF THE CONSTRUCTION	FAMILY RESIDENCE	FORMAT	A4
BUILDING	SO 01	DATE	05/2015
PART	A TEXT PART	DEGREE PD	DEC
TYPE OF WORK	COLLATERAL REPORT	SCALE -	NO. DRAWING -

CONTENT:

A.1 IDENTIFICATION DATA

A.1.1 CONSTRUCTION DATA

a) name of project
Detached family residence

b) the construction site
address: Vysoká nad Labem, Na vinici, No. 244/3
plot number: 244/3,
cadastral area: Vysoká nad Labem

c) the main subject of project documentation
The new building of family house including service connections, Vysoká nad Labem, No. 244/3

A.1.2 DETAILS ABOUT BUILDER

a) name, surname, adress (natural person)
Viktor Gach
Štechova 278
Hradec Králové, 500 09

b) name, surname, trading company, IN, field of trading (natural personality trading)
-
c) trading company or name, IN, (legal personality)
-

A.1.3 DETAILS ABOUT PROCESSOR OF PROJECT DOCUMENTATION

a) name, surname, trading company, IN, field of trading (natural personality trading) or trading company or name, IN, (legal personality)
-
b) name and surname of main designer including number under which he is certified in list of authorized persons of Czech chamber certified engineers and technicians active in construction with marked field or specialization of authorization or Czech chamber of architects

Viktor Gach
Štechova 278
Hradec Králové, 500 09

student of University of technology Brno

A.2 LIST OF INPUT DOCUMENTS

- cadastral map
- statement from the cadastral office
- declaration about existence of service connections

- topography and altimetry
- radon research

A.3 DATA ABOUT AREA

a) the extent of the area

New building of family house in Vysoká nad Labem placed on the plot no. 244/3. It is two floor building. The built up area is 190 m^2 . The terrain of plot is slightly inclined. The entrance to the plot is made by the entrance to garage and by the gate at the border of plot.

b) information about use of plot in the past

Considering plot was part of unbuilt meadow (in cadastr "other area"). It is determined as built up area in territorial plan.

c) Protective zones

In the area there are no protected zones or protected plants and animals there is no cultural heritage zone or flood area.

d) Runoff conditions

The plot is slightly steep and large part is covered by grass which enables soaking of water into ground. The paved areas are inclined in the direction from the building. The storm water sewage is connected into municipal single waste water sewage

e) information on compliance with spatial planning

Design is in accordance with spatial planning of municipal unit Vysoká nad Labem, cadastre area of Vysoká nad Labem.

f)information on compliance with the general requirements for land use

The design is in accordance with general requirements for land use as with regard to the territorial planning that it is planned to be used for building up.

g) information about fulfilling of requirements from concerned bodies

Requirements of the authorities concerned regarding the territory will be incorporated into the project documentation after their receiving.

h) information about exceptions

In terms of land use, there are no exceptions or reliever solutions.

i) a list of related investments

There are no related or conditioned investments.

j) List of plots and buildings affected by the placement of buildings (according to the cadastr register).

Plot intended for the building no. 244/3. Plots used to enter the plot - public transport plot and service connections: no. 1428/1, neighbouring plots: 1319/27, 244/1, 244/21

A.4 DATA ABOUT THE CONSTRUCTION

a) new construction or alterations of buildings
This is a new building.

b) purpose of usage of building
The building will be used for living purposes.

c) permanent or temporary structure
It is permanent structure.

d) information on the protection of buildings under other laws provisions1) (cultural monument, etc..)
Building is not culturally protected neither it is placed in any protected heritage zone.

e) information on compliance with the technical requirements for the construction and the technical requirements for barrier-free use of buildings
In frame of design of building the related regulations and directives were met according to the reg. 286/2009 Coll. and other regulations and technical requirements for buildings described in apex k). There are no requirements for wheelchair access.

f) Details of compliance with the requirements of the authorities concerned and the requirements arising from other legal regulations.

Requirements of the relevant authorities relating to structures will be incorporated into the project documentation after their acquisition.

g) The list of exceptions and concessional solutions
There are requsted no exceptions or proposed solutions reliever.

h) the proposed capacity building (built-up area, enclosed space, floor area, number of functional units and their size, number of users / employees etc.)
Built up area is 190 m^2, enclosed space is 724 m^3, utility area of family house is 218 m^2, 1 functional unit, designed for 4 people.

i) general balance sheet of the structure:(needs and consumption of media and materials, rain water, the total amount produced and the types of wastes and emissions class energy performance of buildings, etc..);
-

j) the basic assumptions of construction (the timing of the implementation of the construction, stages or phases)
First stage will start at 5/2016. Approximate time for finishing of the building is 15 months.

k) approximate cost of construction
Aproximate cost of construction is 4 mil CZK.

0,000 = 263,300 m.a.s.l,B.l. / COORDINATION SYSTEM S - JTSK

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AUTHOR	Viktor Gach		
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BUILDING PLOT	cadastral area.: Vysoká nad Labem, plot 244/3		
NAME OF THE CONSTRUCTION	FAMILY RESIDENCE	FORMAT	A4
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PART	A TEXT PART	DEGREE PD	DEC
TYPE OF WORK	SUMMARY TECHNICAL REPORT	SCALE -	NO. DRAWING -

CONTENT:

B.1 DESCRIPTION OF BUILDING

a) characteristics of the plot

Building site has moderately inclined terrain, in direction to the South, it has rectangular shape. Locality is to be considered as for construction of family houses. Site is directly connected to the newly built road. In cadastral map it is classified as other area.

b) listing and conclusions of completed surveys and analyzes (geological exploration, hydro-geological survey, construction and historical research, etc..)

Geological conditions: Slope sediments (clay, stone), Age: Quaternary, Type of rock: unconsolidated sediments, Geological region: quaternary of Českého massive and Karpat, soils: calcareous clay stone, marlite, calcareous siltstone. According to classification for foundation soils from CSN 72 1001 and CSN 73 1001 the soil was classified of grade R4 - rocks with low stiffness. The value of radon index was assessed as low. The water table was assessed as deep enough there are not made any action against groundwater.

c) the existing protective or any safety zones

In the area there are no protected zones or protected plants and animals.

d) the position regarding flooding line or existence of undermined territory

The affected area is not in any flooding or undermined territory.

e) the impact of construction on the surrounding buildings and landscape, protection of environment, impact of construction on runoff in the area

Landscape is already covered by constructions of same type so there is no effect on surroundings. Affected area will stay within the 70 % of original grass covered surface.

f) requirements for decontamination, demolition, timber felling

There is a need of removing low bushes. No trees necessary to remove on the site. No waste to decontaminate. No construction for demolition presented.

g) requirements for the maximum occupation of agricultural land, resources and land designated for the fulfillment of forest functions (temporary / permanent)

There is no occupation of agricultural land neither of the area with forest function.

h) land-use technical terms (in particular, the ability to link to existing transport and technical infrastructure).

Building site is connected to the existing transport infrastructure. This connection to the transport infrastructure and service connections will be solved on the plot no. 1428/1.

i) material and time link building, incidental, contingent upon compliance investments

At the time of the preparation of project documentation are not induced any investments.

B.2 COMPLETE DESCRIPTION OF BUILDING

B.2.1 Purpose of use of the building, basic capacity of functional units

The building is designed as family house with one functional unit for 4 users with workroom for one person.

B.2.2 Total urban and architectural design

a) Urbanism - territorial control, spatial composition solutions;

The family house is placed into the location with other buildings of the same purpose.

Arrival to the proposed building is allowed from the street Na vinici in direction from Vysoká nad Labem.

b) Architectural design - shape of the composition, material and color solutions, etc.

The proposed solution of building has rectangular shape of floor plan. It has two floors. The main load bearing system is from blocks HELUZ. The ceiling above ground floor is designed as reinforced concrete slab and the ceiling of first floor is suspended on the structure of timber truss of the roof. It has one sloped inclined roof with cover from metal sheets. The solution of facade will be designed with decking from wooden planks Thermwood.

B.2.3 Total operating solutions, technology

The access to the building and arrival is proposed from the south. The entrance to the building is designed from the south as well. After the entering to the building there is vestibule from which there is possibility to continue to the corridor with staircases. The corridor leads to the open living room with kitchen, on the other side to the technical room connected with the WC and shower. In the living room there is entrance to working room. The stairs lead to the first floor where the bathrooms and bedrooms are situated creating the relaxing zone.

B.2.4 Use for disabled in the building

The requirements for use by persons with limited mobility were not demanded.

B.2.5 Safety in use of the building

The building is designed and will be implemented in such a way that during its use or operation do not present unacceptable risks of accidents or damage, for example. slipping, falling, collision, burns, electrocution, injury explosion and burglaries. During use of the building will comply with all relevant legislative regulations.

B.2.6 Basic characteristics of objects

a) Building Solutions

The internal layout of floors is designed according to the needs of four person family. Ground floor consists of kitchen, living room, working room, technical room, toilet and shower. First floor is designed as calm zone for sleeping with bathroom and toilet.

b) The design and material solutions

The foundations of proposed building are from plain concrete. Building has two floors. The main load bearing system is from blocks HELUZ. The ceiling above ground floor is designed as reinforced concrete slab and the ceiling of first floor is suspended on the structure of timber truss of the roof. It has one sloped inclined roof with cover from metal sheets. The solution of facade will be designed with decking from wooden planks Thermwood.

c) Mechanical resistance and stability

All structural components are traditional materials, sizes and technologies. Load bearing capacity of building materials is guaranteed by the system manufacturer. Mechanical durability and stability will be ensured by standing by the technological prescriptions and drawings.

B.2.7 Basic characteristics of technical and technological equipment

a) Technical equipment

The proposed building will have the connection to the low voltage distribution network, the potable water connection from public water supply system, the sewage connection of waste water to public sewers. Disposal of rain water is dealt with connections to public sewers. The gas is led into the object from public distribution system. The building is heated by the condensation boiler running on gas in boiler room with the power 20 kW. Hot water for kitchen will be prepared in the kitchen with a small electric heater a volume of 10 l.

b) List of technical and technological equipment

There are not any. The building does not have production purpose.

B.2.8 Fire safety solutions

See the documentation for Fire safety solution D.1.3

B.2.9 The principles of energy management

a) Technical evaluation criteria for energy (heat) consumption,

See the apex no. 6 - Building physics.

b) the energy performance of buildings

See the apex no. 6 - Building physics.

c) assessment of the use of alternative energy sources

-

B.2.10 Hygiene requirements for the constructions, requirements for work and community environments

Ventilation space in the building is provided by a natural opening windows and doors without

use of air-conditioning units. The building is heated by the boiler running on natural gas. The illumination is ensured by the proposed glass surfaces fillings. There in proposed building will be installed no significant source of vibration and noise, which could worsen the current noise ratios for the area. Construction will ensure that the noise and vibration to the user is at a level that does not endanger the health and good for the environment and workplace. The garbage will be stored in a bin on the edge of the plot. It will be emptied regularly.

B.2.11 Protecting buildings against negative environmental effects

a) Protection against the ingress of radon from soil

On the site the radon Index was assessed as low. There is no need of special protection.

b) Protection against stray currents

Corrosion survey and monitoring stray current was not carried out, it is a common construction, which is not with a basement. Significant stress stray currents are not expected.

c) protection technique seismicity

Stress technical seismicity (e.g. Blasting, transport, and industrial activities, pulsating water jet, etc.) in the vicinity of the construction is not expected,
specific protection is not designed.

d) Protection against noise

There is not installed any source of vibration and noise in the vicinity of proposed building. The locality is calm. Acoustic properties are evaluated in the apex no. 6 - Building physics.

e) Flood control

-

f) Other effects

The proposed construction will resist to effects of soil moisture and groundwater by waterproofing layers. Designed peripheral structures and roof to effects of atmospheric and chemical effects.

B.3 CONNECTION TO THE TECHNICAL INFRASTRUCTURE

a) Branch locations of technical infrastructure

- the sewage connection will be connected in the revising chamber, which is placed next to the paved path to entrance
- water service pipe will be connected on the border of plot
- the power cables will be laid in underground, connected in revising box of electrometer on the border of plot
- the gas piping will be laid in underground, connected in revising box of gas meter on the border of plot

b) Connection dimensions, performance capacities and lengths

- sewage DN 150 PVC, 24,1 m
- power cables 15 m
- water service pipe, 23,5 m
- gas connection 22,5 m

B.4 TRAFFIC SOLUTIONS

a) Description of the transport solution

Transport solutions is handled by the existing traffic roads.

b) Connection to the existing transport infrastructure

The location is accessible from the south after local paved road - plot 1428/1.

c) Transport in the calm

The parking place is designed by the garage.

d) Walking and cycling trails

Hiking and cycling trails will not be affected by the proposed construction.

B.5 SOLUTION OF VEGETATION AND RELATED LANDSCAPING

a) Landscaping

The landscaping will be made before the construction of proposed building. Since the terrain is inclined, it will be leveled according to the site plan. At the north of building there will be made the retaining wall from gabions. In the surroundings of the buildings there will be paved areas, the fencing of the plot, the most of the area of the plot will be covered by grass, new vegetation will be planted.

b) Used vegetation elements

The most of the area of the plot will be covered by grass, new trees and bushes will be planted.

c) Biotechnical measures

-

B.6 DESCRIPTION OF EFFECTS ON BUILDINGS AND ITS ENVIRONMENT PROTECTION

a) Impact on the Environment

Construction of its operation will not adversely affect the environment in the area. Nevertheless there is possibility of higher occurrence of dusty particles in air , in that case it has to be sprayed by water. Also higher intensity of noise during construction can occur. With garbage there have to be dealt according to law 185/2001 Coll.

b) Impact on nature and landscape

The building will not have a negative impact on nature and landscape. On the plot no. 244/3 there are no protected trees, plants or animals.

c) The impact on the system of protected areas Natura 2000

In the range of building is not located protected European locations or bird areas under

protection of Natura 2000. The construction will not affect the system of protected areas Natura 2000 .

d) Draft into account the conditions of the conclusions of the fact-finding proceeding or opinions

EIA

The inquiry proceedings and the EIA in this type of construction is not required.

e) Proposed protective and safety zones, range limitations and conditions

The plot does not belong to any protected or safe locality.

B.7 PROTECTION OF POPULATION

There will be no influence of building on the protection of population. During the construction process the building site has to be secured against the entering of unauthorized people.

B.8 PRINCIPLES OF CONSTRUCTION ORGANIZATION

a) The needs and critical consumption of media and materials

On the construction site there have to be ensured the supply of electricity and water. The portable WC will be present during the construction process.

b) Drainage construction site

The building does not have a basement. The drainage of water in the case of heavy rains will be ensured by drainage grooves.

c) The connection of the site to existing transport and technical infrastructure

The connection of building to transport infrastructure will be done at the south part of the plot. Connection to the technical infrastructure will be made temporarily on the border of plot.

d) The effects of construction on surrounding buildings and land

During construction is necessary to minimize impacts on the environment in terms of site

noise, vibration, dust. The run of the construction site has to be limited by time due to disturbance of neighboring plots. In the place of entering of building vehicles on the public infrastructure there is necessary to clean wheels in case of need to protect the public infrastructure from dirt.

e) Environmental protection and site requirements related to cleaning, demolition, tree felling

No demolitions neither the cutting down of trees will be executed .

f) The maximum occupation for the site (temporary / permanent)

The permanent occupation of site will be executed on the plot no. 244/3. Temporary occupation of site will be done in the smallest possible scope as necessary and will be pre-arranged with the relevant landowner and network administrator.

g) Maximum production rate and types of wastes and emissions during construction, their
demolition

Wastes that arise during the construction will be in accordance with the law č.154 / 2010 Sb. about waste, its implementing rules and regulations, including all related disposed to construction, refuse to a waste disposal or landfill for the purpose.

17 01 01 Concrete
17 01 02 Brick
17 02 01 wood
17 02 02 Materials
17 02 03 plastics
17 04 05 iron / steel
17 05 01 soil / blocks
17 09 04 mixed construction and demolition waste

h) Balance of earthworks requirements for supply or depositions earth

As the main excavation work there will be carried out removing of fertile soil and excavations of foundations. Excavated soil from the foundations will be re-used on embankments around the building, eventually transported on the dump site.

i) Protection of the environment during construction

Only the machinery which is in proper shape can be used during the construction process to prevent eventual leak of oil or fuel which could pollute the soil or ground water.

j) Safety and health at work on a building site assessment

During the construction works there have to be complied regulations of government no. 591/2006 Coll., about minimal requirements on the safety and protection of the health during works and regulations of government no. 362/2005 Coll. about additional requirements on the safety and health protection during construction works with danger of falling down from the height or to the depth. The workers have to have proper training they must wear protective equipment and must follow all the rules of safety.

k) Adjustment for barrier-free use of buildings affected by construction

The building will not affect the other building in terms of barrier-free use.

l) Principles for traffic engineering measures

-

m) Determination of special conditions for execution of the project

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n) The construction procedure, a crucial component terms

Supposed period of the construction process is 15 months.

Procedure of construction process:

- removal of fertile soil, setting out of the building, excavation works
- connections
- foundation structures
- walls of ground floor
- ceilings of ground floor
- walls of first floor
- roof structure
- ceiling of first floor
- fillings of openings in peripheral structures
- wiring
- partitions, floors
- treatment of walls, floors
- finishing works

0,000 = 263,300 m.a.s.l,B.l. / COORDINATION SYSTEM S - JTSK

TYPE OF WORK	BACHELOR THESIS	UNIVERSITY OF TECHNOLOGY BRNO FACULTY OF CIVIL ENGENEERING DEPARTMENT OF CIVIL ENGENEERING	
AUTHOR	Viktor Gach		
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BUILDER	Jakub Smolný, Rašínova 92, 500 11, Hradec Králové		
BUILDING PLOT	cadastral area.: Vysoká nad Labem, plot 244/3		
NAME OF THE CONSTRUCTION	FAMILY RESIDENCE	FORMAT	A4
BUILDING	SO 01	DATE	05/2015
PART	A TEXT PART	DEGREE PD	DEC
TYPE OF WORK	TECHNICAL REPORT	SCALE -	NO. DRAWING -

CONTENT:

D.1.1.a.1 GENERAL PART

D.1.1.a.1.1 Purpose of building

The design documentation is carried out as a documentation for building works of family residence with design office in Vysoká nad Labem, number of plot 244/3. The family residence with the design office is detached building without basement, with two floors. The roof is designed as shed (one sloped) roof. The floor plan has rectangular shape of dimensions 10x 12 m. The plot has slightly inclined terrain.

D.1.1.a.1.2 Function

The new building of family house is intended for 4-5 people family. In the ground floor there are placed social and working rooms. In the first floor it is solved mainly as a relaxation area for inhabitants. The design office is included in the ground floor as well as the workshop room which is accessible from the outside from the north side of the building.

D.1.1.a.1.3 Capacity data

-built up area is 190 m^2
- enclosed space is 724 m^3
- utility area of family house is 218 m^2

D.1.1.a.2 ARCHITECTONICAL AND LAYOUT SOLUTION

D.1.1.a.2.1 Ground floor

The access to the building and arrival is proposed from the south. The entrance to the building is designed from the south as well. After the entering to the building there is vestibule from which there is possibility to continue to the corridor with staircases. The corridor leads to the open living room with kitchen, the main dominant of the open living room is in-built fire place in the wall which optically divide kitchen from the living room. In the living room there is entrance to design office. On the other side of the corridor we can enter to the technical room connected with the WC and shower, this side of the corridor is also accessible from living room . The stairs lead to the first floor.

D.1.1.a.2.2 First floor

Into the first floor we can get by the reinforced concrete once broken stairs. The children rooms with sufficient light from large windows are placed in the direction to the south. To the north there are positioned two bathrooms and guest room. The bedroom for parents is in back position facing comfort view on the west. In all the rooms intended for living the sufficient spaces for storage of goods and clothes are designed. The south oriented rooms are protected from the summer

overheating by passive measure which is prolonged overlap of the shed roof which creates the partial shading.

D.1.1.a.3 CONSTRUCTIONAL TECHNICAL AND MATERIAL SOLUTION

D.1.1.a.3.1 Foundation

a) foundation conditions

The plot is located on the inclined (14 %) terrain. According to classification for foundation soils from CSN 72 1001 and CSN 73 1001 the soil was classified of grade R4 - rocks with low stiffness. The value of radon index was assessed as low. The water table was assessed as deep enough there are not made any action against groundwater. Excavations will be carried out by the help of machinery after the removal of fertile layer of soil. The fertile soil will remain on the plot for the final landscaping stored to the maximum height of 1,5 m. The treatment of bottom layer of excavations will be made manually directly before the casting of concrete. Since the cohesion of sub soil is very good there is no need of bracing of the excavations.
At the south part of the building there the gabion wall is designed therefore behind the intended wall the landscaping has to be made with the safe inclination of terrain.

b) the structure of foundations

The foundations will be carried out as the monolithic foundation strips from plain concrete of grade C 20/25, environment class XC1. It will be made according to relevant drawing documentation. The casting of foundation strips will be executed in two layers. The proper connection between these layers must be ensured. The pervades for engineering connections will not be made since it is designed to pass it under the foundation base layer.On these strips the foundation slab of the thickness 150 mm will be carried out with the reinforcement of KARI mash with openings of dimensions 150/150/8 mm. The cover of the mash has to be at least 20 mm. The KARI mash will be doubled under the place of stairs. The layer of gravel of thickness 100 mm will be placed under the foundation slab for the reason of ensuring of evenness of surface of slab.
The foundations under the gabion wall are designed also into unfreezing depth. The base layer is designed from concrete slab of thickness 200 mm and above that there is the layer of gravel.
The curing of concrete foundations by water has to be ensured for the period of 5 days not to disrupt the process of hydration of concrete.

D.1.1.a.3.2 Vertical structures

a) load bearing structures

The peripheral walls will be carried out from cavity blocks HELUZ FAMILY 25 with compressive strength P 10, as the binder the PU foam is used. Internal load bearing walls are designed from HELUZ FAMILY 30 compressive strength P 10, as the binder the PU foam is used as well. During the laying of brickwork proper overlapping of individual layers has to be ensured. During the construction the

technological prescriptions have to be fulfilled. Bricks have to be during storage and construction protected against severe weather conditions - rain, snow. Due to binding by the PU foam the temperature of exterior can drop to - 10 °C during brick laying.
The system of ventilated facade of external walls is used. The ventilated layer is created by the help of timber frame from laths 40 x 60 mm anchored by the steel L-shaped elements to the load bearing walls. Between the wall and frame there is thermal insulation secured from leak of water by waterproofing. The external layer of facade is designed from timber decking from Thermwood.

b) separating structures

The internal non- load bearing vertical structures will be made as gypsum board partitions Knauf. The reason is to have complex one system solution in the attic to provide perfect solutions of connections to the gypsum board ceiling. The procedure of construction is described in the manufacturer manual.

D.1.1.a.3.3 Horizontal load bearing structures

a) ceiling structures

Ceiling structure above the ground floor is designed as reinforced concrete two way supported slab of thickness 250 mm. The concrete class C 20/25 and reinforcement B 500 B will be used. It will be supported by load bearing walls of dimensions 250mm and 300 mm. The slab will be insulated by expanded polystyrene plates EPS - see design drawings. For the ceiling structure above first floor the lower chords of truss system are used. Below them there is designed suspended ceiling from gypsum boards of company Knauf. The procedure including details of connections will be according to the manual of manufacturer.

b) lintels

Lintels HELUZ 23,8 are used from precast lintels of company HELUZ. The lintels have to be placed according to the manual of manufacturer. Above the corner opening in first floor there is designed reinforced concrete lintel. The amount of necessary reinforcement will be calculated by static designer.

D.1.1.a.3.4 Chimney

The chimney is designed as in built as the part of wall made structure made for this purpose in the living room. The structure of chimney will be hidden between two partition walls which are designed from bricks HELUZ of thickness 80 mm. The chimney will have two shafts one for the shaft from the fire place and one for the exhaust gases from the kitchen hood. The type of chimney is HELUZ KLASIK-HAK , it will be installed by the company HELUZ.

D.1.1.a.3.5 Stairs

The stairs are designed as reinforced concrete once broken flight. It will be casted on the site. It is designed as cantilevered into the load bearing walls of ground

floor. The reinforcement will be designed by static designer. The surface layer of the stairs is designed from wooden elements.

D.1.1.a.3.6 Roof structure

The roof is designed as shed (inclined) roof. The load bearing structure of roof is timber truss system. The individual trusses are stiffened by bracings and by decking from OSB boards. It has a function of cold roof which is ventilated by air. The roof cover for the low inclination is designed from metal sheets connected by vertical joint. For the composition of roof structure see the list of compositions.

D.1.1.a.3.7 Insulations

a) waterproofing

As the waterproofing against the ground moisture the bituminous belts SBS are used- type ELASTOBIT GG 40 TL. The thickness of one layer of belt is 4 mm. There will be used two layers . The belts are connected by the means of welding.
In the case of water proofing of roof the metal sheeting is sufficiently water resistant nevertheless the additional layer of vapor diffusive foil PK-FOL MP
is added underneath it. Furthermore there is is also the waterproofing vapor diffusive layer PK-FOL MP on the top of the thermal insulation of attic.

Other waterproofing layer at the form of vapor diffusive layer PK-FOL MP is at the inner side of the ventilated cavity of external walls.

b) thermal insulation

The thermal insulation of foundations is designed from extruded polystyrene - plates Synthos XPS Prime 30 L in thickness of 120 mm. Plates will be laid into gluing foam layer and anchored mechanically by plastic anchors with washers.
In the floor of ground floor the plates from expanded polystyrene Isover EPS 100 S are used in the thickness of 160 mm. Plates will be laid freely while loaded by the upper composition of floor.

Thermal insulation of attic is designed from blown cellulose Templan. The first layer is above the suspended ceiling - 100 mm. The second one between the lower chords of truss system and third layer is above the lower chords also in the thickness of 100 mm.

The facade is insulated by thermal insulation from mineral wool of thickness 160 mm. The wool will be anchored to the the plastic anchore of ø 8 Ejoterm with length 210 mm and washer of ø 60.

c) impact noise insulation

In the floor of first floor there will be placed insulation against the impact noise. The plates from expanded polystyrene Isover EPS 100 S are used in th. 50 mm.

D.1.1.a.3.8 Fillings of openings

Windows will be wooden framed, Eurokna IV 78 Economic. Windows can be tilted or fully opened some of parts of windows are fixed. Different dimensions of windows are windows 1500x 2000, 1500x 3000, 1500x 1000, 1000x 1000, balcony doors 2000x 2250. All the windows have the coefficient of thermal transfer Uw=1,1 W/(m2.K). The frame surface is treated by Lazura Remmers. Windows are fixed according to the manual of manufacturer.

Entrance doors are wooden EURO 4-88 with the same surface treatment. Interior doors are from lightened composite wood with paint of oak color. The interior door frames are casing type.

D.1.1.a.3.9 Tin- smith works

The flashing of parapets and finishing of roof will be made from galvanized metal sheets. Sheets have thickness 0,6 mm, the color is black. See the parameters in the list of tin smith works.

D.1.1.a.3.10 Locksmith works

The indoor staircase railing is designed from the galvanized steel. The porch above the main entrance is anchored by stainless steel anchor ties. Anchoring elements see the list of locksmith elements.

D.1.1.a.3.11 Floors

Types of floors are designed according to purpose of individual rooms. Floors in the majority of the building are made as floating floors. There has to be made proper dilatation in connection to vertical structures. Ceramic tile floors are finished with ceramic foot of the height 100 mm.

The connection of different types of floors will be solved by transition laths.

D.1.1.a.3.12 Plasters, facade

a) plasters

Internal plasters will be made as lime cement plasters. Composed from the core layer and lime cement layer. In corners there will be added corner laths.

b) facade

The system of ventilated facade of external walls is used. The ventilated layer is created by the help of timber frame from laths 40 x 60 mm anchored by the steel L- shaped elements to the load bearing walls. Between the wall and frame there is thermal insulation secured from leak of water by waterproofing. The external layer of facade is designed from timber decking from Thermwood.

D.1.1.a.3.13 Communications and paved areas

Paved areas will be carried out after the finishing with the construction. The rigid floor of porch which is accessible from living room will be carried out by the means of earth screws Krenner, made according to the manual of manufacturer. Than

the timber beams are anchored to the heads of screws. The top layer is made of wooden decking.

The path to the main entrance and from the garage is made from blocks of concrete grassing blocks Press beton. The path around the house is made from pavement Press beton.

D.1.1.a.3.14 Tiling

Tiling will be made in the rooms according to design drawings- hygienic rooms, kitchen. Tile will be treated at the corners by corner profiles.

D.1.1.a.3.15 Paints

Wooden facade will be without any paints the Thermwood is designed to resist weather conditions. Indoor paints on the lime cement plaster and on the gypsum boards will be white or color paints Primalex.

D.1.1.a.4 FIRE PROTECTION MEASURES

see the apex no. 5 - D.1.3 Fire protection measures

D.1.1.a.5 BUILDING PHYSICS

see the apex no. 6 - Building physics

D.1.1.a.6 SAFETY AT WORK

All the works will be carried out according to valid regulations about safety and protection of health during construction works. Workers have to abide prescriptions and use suitable working protective equipment.

D.1.1.a.7 GENERAL INFORMATION

- during the construction process there has to be, before beginning of new stage of construction, checked all the finished works according to design documentation. The irregularities have to be told to the main designer and written into the building diary
- executing of all construction works have to be done according to the technological prescriptions of manufacturers
- this documentation is created as a documentation for executing the building, there will follow documentation for real execution of building.

Conclusion

The design has focused on creation of comfortable dwelling for family with four to five people, providing them spaces for relaxation and work. The energy effective design with largest window area to the south enables nice heat gains in winter while protected against overheating by long overhang of roof in the summer. This fact, together with natural friendly facade from traditional material - wood, creates functional and modern unit. Other natural based materials as the cellulose or clay bricks help to keep the level of the Eco Friendship in the deeper meaning.

Závěr

Projektové řešení domu bylo zaměřeno na vytvoření pohodlného bydlení pro čtyř až pěti člennou rodinu s dostatečnými prostory pro relaxaci i pracovní vyžití. Energeticky úsporný tvar domu s největší plochou oken k jihu umožňuje v zimě využívat pasivních teplotních zisků ze slunečního záření, zatímco v létě je chráněn proti přehřívání pomocí přesahu pultové střechy. Tento fakt, spolu s využitím přírodního materiálu- dřeva na fasádě, vytváří funkční a moderní bydlení. Využití i dalších přírodních materiálů jako například celulózy a hliněných cihel posouvá dojem ekologicky přátelského domu do hlubší roviny.

Seznam použitých materiálů a zdrojů / List of used sources

Normy(used czech and european standards):
ČSN 73 4301 – Obytné budovy
ČSN 73 4108 – Šatny, umývárny a záchody
ČSN 73 0833 – PBS – Budovy pro bydlení a ubytování
ČSN 73 0802 – PBS – Nevýrobní objekty
ČSN 73 0540-2 – Tepelná ochrana budov
ČSN 01 3420 – Výkresy pozemních staveb
ČSN 73 0810:06/2005 – Požární bezpečnost staveb – Společná ustanovení
ČSN 73 0802:05/2009 – Požární bezpečnost staveb – Nevýrobní objekty
ČSN 73 0833:10/2010 – Požární bezpečnost staveb – Budovy pro bydlení a ubytování
ČSN 73 0873:06/2003 – Požární bezpečnost staveb – Zásobování požární vodou

Právní předpisy (used legislation)
Zákon č. 183/2006 Sb. O územním plánování a stavebním řádů /Stavební zákon/
Vyhláška č. 268/2009 Sb. O technických požadavcích na stavby

Studijní opory (study materials)
Nauka o pozemních stavbách – Modul M01, Ing. Jarmila Klimešová

Webové stránky: (web pages of producers and suppliers)
www. isover.cz
www.heluz.cz
www.nahlizenidokn.czuzk.cz
www.tzb-info.cz
www.kauf.cz
www.mitec.cz
www.fce.vutbr.cz
www.sakret.cz
www.ekostavivo.cz
www.icopal.cz
www.tahokov.cz
www.oknasirer.cz
www.strisky-polymer.cz
www.ejot.cz
www.rako.cz
www.lindab.cz
www.geofond.cz

List of used abbreviations and symbols:

IGL	Initial groundlevel
FGL	Formational groundlevel
FF	First floor
XPS	extruded polystyrene
EPS	expanded polystyrene
U	Overall heat transfer coefficient
k.ú.	Cadastral
DHW	Domestic hot water
BPV	Baltic Sea basic level
ČSN	Czech national standards
Coll.	Collection

Attachments

Folder No.1 - STUDY

3D visualization	S 1:100
Views East,West	S 1:100
Views North, South	S 1:100
Architectural floorplans	S 1:100
Sections	S 1:100
Cadastral information	
Statements about public networks	

Folder No.2 - SITE PLANS

C.1 Coordination site plan	S 1:200
C.2 Site plan of wider relations	S 1:500

Folder No.3 - D.1.1- CONSTRUCTIONAL SOLUTION 1

D.1.1.01- Foundations	S 1:50
D.1.1.02- Floorplan of groundfloor	S 1:50
D.1.1.03- Floorplan of first floor	S 1:50
D.1.1.04- Section A-A'	S 1:50
D.1.1.05- Section B-B'	S 1:50
D.1.1.06- Roof floorplan	S 1:50
D.1.1.07- Ceiling structure	S 1:50
D.1.1.08- View South	S 1:50
D.1.1.09- View West	S 1:50
D.1.1.10- View East	S 1:50
D.1.1.11- View North	S 1:50

Folder No.4 - D.1.1- CONSTRUCTIONAL SOLUTION 2

D.1.1.12- Detail A	S 1:10
D.1.1.13- Detail B	S 1:10
D.1.1.14- Detail C	S 1:15
D.1.1.15- Detail D	S 1:15
D.1.1.16- Detail E	S 1:10
D.1.1.17- List of compositions	
D.1.1.18- List of elements	
D.1.1.19- Technical report	

Folder No.5 - D.1.3- FIRE SAFETY

D.1.3.01- Fire safety site plan	S 1:200
D.1.3.02- Fire safety report	

Folder No.6 - Building physics

EVALUATION FROM THERMAL AND ACOUSTIC RESISTANCE POINT OF VIEW

Apex 1,calculation part
Apex 2, EVALUATION OF GEOMETRICAL THERMAL BRIDGES IN AREA SOFTWARE
Apex 3, List of compositions
Apex 4, Protocol for the energy performance certificate

Folder No.7- Other calculations

Calculation of staircases
Calculation of foundations