



VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
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FAKULTA STAVEBNÍ
FACULTY OF CIVIL ENGINEERING

ÚSTAV POZEMNÍHO STAVITELSTVÍ
INSTITUTE OF BUILDING STRUCTURES

MUSTANG - STÁJE A PENZION
MUSTANG - STABLES AND GUESTHOUSE

DIPLOMOVÁ PRÁCE
DIPLOMA THESIS

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VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ FAKULTA STAVEBNÍ

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PODKLADY A LITERATURA

(1) Směrnice děkana č. 19/2011 s dodatkem a přílohami; (2) Katalogy a odborná literatura; (3) Stavební zákon č. 183/2006 Sb. ve znění zákona č. 350/2012 Sb.; (4) Vyhláška č. 499/2006 Sb. ve znění vyhlášky č. 62/2013 Sb.; (5) Vyhláška č. 268/2009 Sb.; (6) Vyhláška č. 398/2009 Sb.; (7) Platné normy ČSN, EN; (8) Vlastní dispoziční a architektonický návrh.

ZÁSADY PRO VYPRACOVÁNÍ

Zadání: Zpracování určené části projektové dokumentace pro provádění stavby objektu stájí s penzionem. Název řešeného projektu je "MUSTANG - Stables and Guesthouse". **Cíle:** Vyřešení dispozice zadaného objektu s návrhem vhodné konstrukční soustavy a nosného systému na základě zvolených materiálů a konstrukčních prvků, včetně vyřešení osazení objektu do terénu s respektováním okolní zástavby. Dokumentace bude v souladu s vyhláškou č. 62/2013 Sb. obsahovat část A, část B, část C a část D v rozsahu části D.1.1, D.1.3 a D.1.4. Dále bude obsahovat studie obsahující předběžné návrhy objektu a jeho dispozičního řešení a přílohovou část obsahující předběžné návrhy základů a rozměrů nosných prvků řešeného objektu, prostorovou vizualizaci objektu a technické listy použitých materiálů a konstrukcí. Část D.1.4 bude vypracována ve formě schématických výkresů a příslušných technických zpráv. Výkresová část bude obsahovat výkresy situace, základů, půdorysů všech podlaží, konstrukce zastřešení, svislých řezů, technických pohledů, min. 5 detailů, výkresy sestavy dílců, popř. výkresy tvaru stropní konstrukce. Součástí dokumentace budou i dokumenty podrobnosti dle D.1.1 bod c), stavebně fyzikální posouzení objektu a vybraných detailů popř. další specializované části, budou-li zadány vedoucím práce. **Výstupy:** VŠKP bude členěna v souladu se směrnicí děkana č. 19/2011 a jejím dodatkem a přílohami. Jednotlivé části dokumentace budou vloženy do složek s klopami formátu A4 opatřených popisovým polem a uvedením obsahu na vnitřní straně každé složky. Všechny části dokumentace budou zpracovány s využitím PC v textovém a grafickém CAD editoru. Výkresy budou opatřeny popisovým polem. Textová část bude obsahovat i položky h) "Úvod", i) "Vlastní text práce" jejímž obsahem budou průvodní a souhrnná technická zpráva a technická zpráva pro provádění stavby podle vyhlášky č. 499/2006 Sb. ve znění vyhlášky č. 62/2013 Sb. a j) "Závěr". VŠKP bude mít strukturu dle manuálu umístěného na www.fce.vutbr.cz/PST/Studium.

STRUKTURA 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).
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Ing. František Vajkay, Ph.D.

Vedoucí diplomové práce

Abstrakt

Předmětem diplomové práce je projekt samostatně stojícího objektu sloužícího jako stáje s penzionem v Bušovicích. Objekt je částečně dvoupodlažní bez podsklepení, jednopodlažní část slouží jako stáje. Navrženým materiálem pro nosné i nenosné konstrukce je konstrukční izolovaný panel na bázi dřeva Europanel. Obytná část budovy je zastřešena sedlovou střechou a stáje jsou zastřešeny plochou střechou.

Klíčová slova

Diplomová práce, penzion, stáje, samostatně stojící, konstrukční izolovaný panel, Europanel, sedlová střecha, plochá střecha

Abstract

The subject of diploma thesis is project of detached object that serves as stables and guesthouse located in Bošovice. The building is partly two-storey without basement and one-storey part serves as stables. The designed material for loadbearing and non-loadbearing constructions is structural insulated panels. The residential part of the building is covered by gable roof and the stables are covered by flat roof

Keywords

Diploma thesis, guesthouse, stables, detached, structural insulated panel, Europanel, gable roof, flat roof

Bibliografická citace VŠKP

KOLEGAR, Benjamin. *Mustang - Stables and Guesthouse*. Brno, 2017. 42 s., 155 s. příl. diplomové 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 diploma thesis by myself and that I stated all used information sources.

Prohlášení:

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

V Brně dne

.....
podpis autora

Thanks:

I thank Mr. Ing. František Vajkay, Ph.D. for the willing and helpful guidance in developing this thesis and Ms. Ing. Marie Rusinová, Ph.D. for most willing support during elaboration of Fire safety part of thesis.

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V Brně dne

.....
podpis autora

PROHLÁŠENÍ O SHODĚ LISTINNÉ A ELEKTRONICKÉ FORMY VŠKP

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

V Brně dne 13. 1. 2017

titul jméno a příjmení studenta

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Introduction

The objective of this diploma thesis is to elaborate project documentation of a guesthouse with stables. First floor of guesthouse should serve as a comfortable living of owner's family. The house is designed in a smaller city in South Moravia to provide suitable environment for horse riding. Building has two floors, stables, spacious front yard and no basement. Entire house is built of modern materials, mainly structural insulated panels with addition of insulating layer that provide sufficient thermal insulation.

The thesis includes accompanying and summary technical report, all drawings prescribed by a decree on construction documentation for project execution stage, fire safety and thermotechnical evaluations.

A.1 Identification data

A.1.1 Details about the construction

Name: Guesthouse and Stables
Construction site: Bošovice, Chmelenec, parcel n.823/2

A.1.2 Details about the builder

Name: Jonatan Kolegar
Adress: Podlesí 22, Brno 624 00

A.1.3 Details about the processor of the project documentation

Name: Bc. Benjamin Kolegar
Adress: Kozí 12, Brno 602 00

A.2 List of input documents

- cadastral map of the area
- aerial picture

A.3 Data about the area

a) The size of the area

Area of the land is 1930m²

b) Details about the protection of the territory (acc. to law regulations)

There are no law regulations related to this area

c) Details about runoff ratio

All water will be properly drained. Rainwater will be drained into local rainwater drain and sewage water into local sewage drain.

d) Details about the agreement with land planning documentation

The building is designed on parcel no. 823/2 that is in a possession of the builder and this parcel is ready and approved by land planning office to be built on.

e) Details about the agreement with zoning decision or public agreement about zoning decision

The building is designed in accordance with zoning decision and also in accordance with public zoning decision. There will be no documentation for special requests.

f) Details about compliance of the general use of the area

The documentation comly requirements given by regulation no. 269/2009 coll. of building law.

g) Details on compliance with the requirements of concerned authorities

Eventual requirements on proprocessing of comments by concerned authorities will be take into consideration and dealt with in requested time given by intended concerned authority.

h) List of exeptions and concessional solutions

There are no proposed exeptions or concessions.

i) List of related and conditional investments

There are no related and/or conditional investments caused by designed building.

**j) List of plots and constructions affected by realization of building
(acc. to real estate cadastre)**

Neighboring parcels: 824/2

823/1

820

822/3

A.4 Data about the construction

a) New building or change in finished construction

The design is for new building

b) Purpose of the construction

The building is designed for recreational purposes and also as a home for owner's family.

c) Permanent or temporary construction

Construction is considered to be permanent

d) Details about protection of building acc. to other legal regulations

The building is not part of any protection zone that would increase protective requirements.

e) Details about compliance with the technical requirements for the construction and general technical requirements securing barrier-free usage of building

Movement of disabled people was not considered during design thus this building is not considered as barrier-free.

f) Details about compliance with the requirements of the concerned authorities and the requirements form other legislation

Eventual requirements on processing of comments by concerned authorities will be take into consideration and dealt with in requested time given by intended concerned authority.

g) List of exeptions and concessional solutions

There are no proposed exeptions or concessions.

h) Proposed building capacities

Built-up area:	334,61 m ²
Enclosed space:	1245,4 m ³
Usabe area:	442,91 m ²
Number of functional units:	1 (+ 6 double-bedrooms)
Number of users:	4 (+ 12 vacationers)

i) Basic balance of the building

Requirements and consumption of fuels and energies will be determined by calculation done by realization office.

Electric power

It will be provided by newly laid connection cable of low voltage.

Potable water

Will be provided from local public water main.

Rain water

All rain water that will fall on building will be drained into retention tank and then into local rainwater drain and other rain water that will fall on non-paved area will be naturally soaked. All paved area around building are designed to be in the slope.

Sewerage

All wastewater is drained to public sewerage system.

Waste

Waste supposed to be sorted and stored into containers according to type of waste (paper, plastic, glass). All unsorted waste will be disposed of according to waste-management contract.

j) Basic assumptions of construction

The start of construction works is scheduled to 5/2017

5/2017 - preparation of construction

6/2017 - earthworks

7/2017 - structural works

8/2017 - finishing works

k) Approximate cost of construction

Rough estimation of price is 7,2 mil. CZK

B. Summary technical report

B.1 Description of the parcel

a) Characteristics of parcel

It is rather sloped land. Maximal difference in elevations is approximately fifteen meters. Direction of slope is to west. The parcel is located on southern side of village in not very densely built-up area and close to the very end of village where nature and forests start.

b) Conclusions of executed surveys (geological and hydrogeological)

It was confirmed by geological survey that the soil on given land fulfills values for minimal load-bearing capacity and thus there is no need for special type of foundations (reinforced concrete piles). It was decided to use ground screws that fit this type of construction (to avoid wet processes and speed up construction.).

And from hydrogeological survey we can conclude that the level of underground water will not endanger our construction.

c) Existing protection and safety zones

Construction does not require any protection and is not located in any safety zone.

d) Location relative to flood area, undermined area etc.

Land intended for this project is not located in flood area, the subsoil below this parcel does not indicate any danger of landslides, there are no documented mines below and also seismic activity is not take into account.

e) Influence of construction on surrounding buildings and plots, protection of nearby vicinity and influence of construction on runoff conditions

There are no negative effects caused by construction. All construction site equipment will be stored on given parcel and will not damage surrounding land. Also the runoff conditions will not be negatively influenced.

f) Requirements for sanitation, demolitions, tree felling

Due to the fact that the construction is going to be realized on undeveloped area there is no need for demolition works but there are some trees that need to be felled. There are also some small shrubberies and grass but all of that will be removed during early earthworks.

g) Requirements for the maximum occupation of the agricultural land or land intended to fulfill the function of forests (temporary/permanent)

The land is not used for agricultural purposes and also is not part of a forest thus there are no requirements for maximum occupation.

h) Technical conditions for connection to existing infrastructure

Parcel is located right next to the local road infrastructure.

i) Accrual links to building, conditional, induced, associated investments

Because the whole building process is planned to be done without water there is no need for a branch from water main but electricity meter will be mounted to ensure supply of electric energy during construction works. Requirements for other related and conditional works are not established.

B.2 Description of the building

B.2.1 Purpose of building, basic capacities

Building will serve as a family house for owner's family but also as a guesthouse. In addition there are stables for up to six horses to be used for recreational purposes.

Capacities:	Built-up area:	334,61 m ²
	Enclosed space:	1245,4 m ³
	Usable area:	442,91 m ²
	Parcel area:	1930,0 m ²
	Number of functional units:	1 (+ 6 double-bedrooms)

B.2.2 Urban and architectural solution

a) urbanism - territorial regulations, composition of spatial solution

The building is detached house constructed in non-developed area of the village. There are no territorial regulations issued for this land. In agreement with building authority, spatial planning department and after preliminary consultation about projected plan the building was allowed.

b) architectural solution - shape composition, material and colour solutions

The building is L-shaped. The southern part is two-storey with saddle roof and dormers that serve for inhabitation and the northern part is just one-storey with flat roof that serves as stables. There is no basement.

Foudations will be done in a form of glued laminated grid on top of metal ground screws, all vertical load-bearing constructions are made of structural insulated panels, horizontal load-bearing construction are also made of structural insulated panels (this applies to first floor) and timber structural beams with oriented strand board (for second floor) and truss is made of wood.

Designed external plaster is white with addition of wooden lining where the roof triangle is and roof tiles are colour of burnt or dark orange.

B.2.3 Overall dispositional and operating solution, production technology

Building is a two storey house without basement. There is a main entrance from western side and also entrance to the hayloft and stables that are located in the northern part of the building. There is a vestibule right behind main entrance where you can store your coats and shoes and there is also connection in a form of staircase to the guesthouse so guests do not have to interfere into private part of house to get to room. From vestibule you can get to stables through the hayloft, to boiler room and to the hall of owner's part where kitchen, bathroom and bedrooms are situated. There are six double-bedrooms and two bathrooms with toilet rooms in the second floor.

Foudations will be made of glued laminated beams mounted on ground screws, all vertical load-bearing constructions are made of structural insulated panels, horizontal load-bearing construction are also made of structural insulated panels and timber beams with oriented strand board and truss is made of wood.

B.2.4 Barrier-free usage of building

This building is not designed as barrier-free thus it is not suitable for disabled people

B.2.5 Safety during usage of building

Building is designed in a way to fulfill all requirements in safety during usage, mechanical resistance and stability, fire safety, health protection of persons and animals in accordance with decree number 268/2009.

Individual parts of building must be used in way that they are ment to in accordance with the requirements of its producer. Floors are designed according to statical and mechanical requirements for given operation.

The builder will ensure that before usage of building prescribed tests will be done and evaluated. The test include:

- fire safety during using of chimney, vents and fuel appliances
- check of water main and sewage

All metal parts must be electrically earthed.

B.2.6 Basic characteristics of the building

a) Structural solution

Building is a newly constructed guesthouse with stables. It is designed as two storey house with one storey attachment. Both parts are without basement. Two storey part is covered with saddle roof with 30° slope and the attachment by flat roof.

b) Constructional and material solution

Entire building is based on slab made of structural insulated panels that is mounted on top of grid made of glued laminated beams that is mounted on ground screws. Vertical load-bearing and also non-load-bearing structures are made of structural insulated panels Europanel. Almost all used lintels are also made of structural insulated panels. There are lintels made of plain timber elements due to larger spans. Ceiling are also designed according to Europanel solution - timber structural beams and glued timber I-beams with oriented strand board on top of it. Staircase is made of Europanel produced steps supported by wooden poles. Partitions in bathrooms are made of gypsum boards. Roof truss above guesthouse is made of two purlins supported by columns

and rafters and on top of these rafters are structural insulated panels Europanel 270 so the rafters are visible. The flat roof on top of stables part is in a form of one-layered flat

Polystyrene is used as thermal insulation of vertical structure (in ETICS composition). Flat roof is also insulated with polystyrene. Pitched roof on top of guesthouse is insulated by structural insulated panels.

c) Mechanical resistance and stability

All designed load-bearing constructions fulfills stability requirements and mechanical resistance according to statical calculations.

B.2.7 Basic technical characteristics and technological equipment

a) Technical solutions

The building is designed to be heated by radiators that is powered by electric water-heater located in room 103 - BOILER ROOM. At the same time this water-heater will also serve for heating up the water in acumuation tank KXT1 1500 l. Desing of heating system is not a subject of this documentation.

It is also considered to design air conditioning unit also in room 103 - BOILER ROOM. This unit would serve to ventilate stables. Design of ari conditioning system is not a subject of this documentation.

Sewage waste water will be pumped into local public sewage system by pumping station located on owner's land.

b) List of technological equipment

- electric water heater, power output - 10,5 - 70 kW
- acumulation tank KXT1 1500 l
- sewage connection and pumping staition, \varnothing 1200 mm, outer \varnothing 1400 mm, entrance width/height 750/500 mm, volume 2,4 m³.
- retention tank, dimensions 4800 x 3600 mm, height 1,6 m, retention volume 21,4 m³.

water-meter shaft, type AS-VODO A2, dimensions 1200 x 900 mm,
height 1600 mm, entrance 600 x 600 mm.

lightning rods and grounding

water main with branching

rainwater gutters

kitchen equipment - stainless steel sink, refrigerator, stove with
oven

B.2.8 Fire safety solution

See annex *Fire safety report*.

B.2.9 Principles of energy management

a) Criteria for thermotechnical evaluation

Thermotechnical evaluation of proposed building is based on
requirements stated by technical standard ČSN 730540.

Evaluated parameters are:

lowest internal surface temperature

heat transfer coefficient U [$\text{W}/\text{m}^2\text{K}$]

Building is designed in village called Bošovice in Southern
Moravia where average height above sea level is 280,00 m. Outside
designed temperature is -15°C . Designed interior temperatures are $+20^\circ\text{C}$
for spaces for living and halls, $+24^\circ\text{C}$ for bathrooms and $+10^\circ\text{C}$ in
stables.

- Flat roof: U_n [$\text{W}/\text{m}^2\text{K}$], required 0,24, recommended 0,16

- Outside walls: U_n [$\text{W}/\text{m}^2\text{K}$], required 0,30, recommended 0,20

- Windows: U_n [$\text{W}/\text{m}^2\text{K}$], required 1,70, recommended 1,20.

- Floor in first floor: because it is not in contact with ground it will
be calculated as outside wall.

b) Usage of alternative sources of energy

There are no alternative sources of energy designed for this
building.

B.2.10 Hygienic requirements for buildings, workplaces and communal environment

Ventilation

Fumes generated by cooking process are ventilated by range hood and for general ventilation the only way the building may be ventilated is by natural ventilation through opened windows and doors.

Heating

Heating is provided by system of radiators.

Lighting

The house will be lit in two ways. Natural daylight through windows and artificial light sources (lamps)

Water supply

Water will be provided by connection to local water main. Pipes of potable water will be laid in ceiling and behind gypsum boards.

Waste

Waste supposed to be sorted and stored into containers according to type of waste (paper, plastic, glass). All unsorted waste will be disposed of according to the garbage contract.

Vibrations

There are no major vibrations caused by using of this building. There might be some small vibrations caused by movement of inhabitants and horses around the building.

Noise

Noise is restricted by peripheral construction so there are not supposed to be noises that would exceed limiting values caused by using of the building.

B.2.11 Protection of building against negative external effects

a) Protection against radon from subsoil

The building is protected against radon rising from the subsoil by ventilated gap between first floor and ground level. Higher values of radon concentration was not detected in the area so there are no requirements for special anti-radon solutions.

b) Protection against stray voltage

Influence of stray voltage is not expected

c) Protection against seismicity

The building is located in seismically stable area

d) Protection against noise

Protection against noise is ensured by peripheral construction of building.

e) Flood control

Building is not located in area endangered by flood actions.

B.3 Connection to the technical infrastructure

The building is connected to water main and sewerage from the western side of parcel and to power line also from the western part of parcel. Building is not connected to gas supply.

Water main:

Water main will be brought to owner's property. Water meter shaft will be installed onto the branch of the water main. It is water-meter shaft, type AS-VODO A2, dimensions 1200 x 900 mm, height 1600 mm, entrance 600 x 600 mm. The connection is designed to be made of HDPE PN 32 32x2,9 mm. Tubes in ground are going to be on sand bed of height 100 mm and covered by sand up to 300 mm above the top of tube. Minimal covering in terrain is 900 mm

- length of connection: 19,7 m
- designed for: 16 persons and 6 horses
(80l/person/day, 90l/horse/day)
- average daily consumption $16 \times 80 + 6 \times 90 = 1820$ l/day
- max daily consumption $1820 \times 1,25 = 2275$ l/day
- max hourly consumption $1/12 \times 1820 \times 1,25 \times 1,8 = 341,25$ l/h

Sewage system

To dispose sewage water new sewage water connection will be built DN 160PVC KG. There is going to be pumping station, \varnothing 1200 mm, outer \varnothing 1400 mm, entrance width/height 750/500 mm, volume 2,4 m³.

- length of connection: 23,5 m

Rainwater

The disposal of rainwater will be done by connecting the gutters to retention tank and then into local rainwater drain system

- length of connection: 19,0 m

B.4 Traffic solution**a) Description of traffic solution**

Traffic solution is designed so the maximal safety is ensured. House is connected to local road. There is a local road on the western side of the parcel that is 3,7 m wide in the narrowest spot.

b) Connection to existing traffic infrastructure

Parcel, on which the building is designed is directly next to the local road. From this road there will be a short access road to enter the stables and house. There is a bus station located about 900 m away from designed building.

c) Parking

There might be several parking spots on the southern part of the parcel or on the street line.

d) Pedestrian and cycling trails

There are no pavements or cycling trails around the parcel.

B.5 Vegetation and landscape solutions**a) Terrain adjustments**

The terrain before any adjustments is in a steep slope to west. Terrain where the building is designed will be leveled and removed soil is going to be stored on southern part of parcel and then used for final landscaping.

b) Vegetation

There are some trees that need to be felled. There are also some small shrubberies and grass but all of that will be removed during early earthworks.

c) Biotechnical measures

No biotechnical measures has been proposed

B.6 Effects of building on environment and its protection

a) Effect on the environment

There might occur slightly higher level of noises during construction works but only during work hours of construction company. Quality of air should remain unaffected. The type of work and used technologies has no negative effect on environment. All used constructions and materials must fulfill hygienic requirements. Waste produced during construction will be sorted and disposed off according to decree 185/2001 and 383/2001

After the building is finished there are no negative effects on environment caused by the building itself.

b) Effect on nature and landscape

There are no endangered species or plants in the area of construction. Natural functions will not be affected because the area is not significantly important for local nature.

c) Effect of building on system of protected areas Natura 2000

The building is not located in this system of protected areas.

d) Proposal taking into account conditions of the conclusion of the proceeding or the EIA

There is no need to conduct any conclusion from EIA. There are no significant negative influences on the environment.

e) Proposed protection and safety zones, range of restrictions and conditions for protection according to other legal regulations

There are no proposed protection or safety zones.

B.7 Protection of inhabitants

Basic requirements for protection of inhabitants are fulfilled by chosen construction. Common safety devices will be installed and tested during construction.

B.8 Principles of construction organization

a) Needs and consumptions of supplies and their providing

Needs and consumptions of materials will be stated by construction budget elaborated by realization company. Needs of water and energies will be stated on base of project documentation for building work.

b) Drainage of construction site

Water that will not soak to the ground will be drained to newly constructed drainage system. Intake will be protected against clogging by silted soil.

c) Connection of site to existing traffic infrastructure

Construction site will be connected to existing road system via newly constructed gravel road that will be replaced by paved access road after the construction is finished.

d) Influence on surrounding buildings and parcels

Noise, dust and vibrations might occur during construction due to construction process. The aim is to minimize these negative effects on surrounding buildings.

e) Protection of environment and requirements for sanitation, demolitions, tree felling

Due to the fact that the construction is going to be realized on undeveloped area there is no need for demolition works but there are some trees that need to be felled and also some small shrubberies and grass that will be removed during early earthworks.

f) Maximal annexation for construction (temporary, permanent)

Permanent annexation is defined by borders of parcel. If it is going to be necessary temporary annexations might be done after agreement with concerned owners.

g) Waste management during construction

Waste is going to be treated according to law 185/2001. Waste disposal during construction will be ensured by the contractor.

h) Earthworks balance, requirement for supply or deposition

Excavated soil will be used for terrain adjustments, there are no requirements for supply or depositions.

i) Environment protection during construction works

Construction will be conducted according to laws 17/1992 (environment in general), 86/2002 (air protection) and 9/2002 (requirement on noise level of building machines). There are no special requirements for given area.

j) Safety and health principles on construction site

Construction will be surrounded by fence to prevent movement of civilians on the site. Minimal height of fence is 2 m and there will be signs which prohibits entry of unauthorized people and vehicles. Contractor will provide such facilities to provide shelter against adverse weather conditions. There will be person assigned by contractor to ensure safe operation and clean workplace.

k) Adjustments for barrier-free usage

No adjustments are designed.

l) Traffic measures principles

Public traffic will be respected during supply of the construction site. There is not going to be any special traffic restrictions.

m) Special requirements for building construction

There are no special requirements.

n) Construction procedure

The start of construction works is scheduled to 5/2017

5/2017 - preparation of construction

6/2017 - earthworks

7/2017 - structural works

8/2017 - finishing works

D. Documentation of objects and technical and technological equipment

D.1 Documentation of the building

D.1.1 Architectural and building solutions

Purpose of building and capacities

Building will serve as a family house for owner's family but also as a guesthouse. In addition there are stables for up to six horses to be used for recreational purposes.

Capacities:	Built-up area:	334,61 m ²
	Enclosed space:	1245,4 m ³
	Usable area:	442,91 m ²
	Parcel area:	1930,0 m ²
	Number of functional units:	1 (+ 6 double-bedrooms)

Architectural solution, disposition, material and colour solutions

Object is a L-shaped building where one part of the L is two storeys high and the second part is one storey high. The one storey part will serve as stables and the first floor of the two storeys part is residential unit for owner's family and the second floor is designed as guesthouse with six double-bedrooms. The main part of building intended for living is covered by saddle roof and the stables are under flat roof. There is no basement. Foundations will be made of ground screws with glued laminated beams and structural insulated panels, all vertical load-bearing constructions are made of structural insulated

panels and horizontal load-bearing construction are made of structural insulated panels and timber structural beams with oriented strand board.

Designed external painting is white and roof tiles are colour of burnt or dark orange. There are designed wooden linings on the gable wall and stone lining in the bottom part of building.

Barrier-free usage of building

This building is not designed as barrier-free thus it is not suitable for disabled people.

Overall dispositional and operating solution, production technology

Building is a two storey house without basement. There is a main entrance from western side and also entrance to the hayloft and stables that are located in the northern part of the building. There is a vestibule right behind main entrance where you can store your coats and shoes and there is also connection in a form of staircase to the guesthouse so guests do not have to interfere into private part of house to get to room. From vestibule you can get to stables through the hayloft, to boiler room and to the hall of owner's part where kitchen, bathroom and bedrooms are situated. There are six double-bedrooms and two bathrooms with toilet rooms in the second floor.

Foudations will be made of glued laminated beams mounted on ground screws, all vertical load-bearing constructions are made of structural insulated panels, horizontal load-bearing construction are also made of structural insulated panels and timber beams with oriented strand board and truss is made of wood.

Building physics

Ventilation

Fumes generated by cooking process are ventilated by range hood, stables are ventilated by air conditioning unit located in boiler room and for general ventilation the only way the building may be ventilated is by natural ventilation through opened windows and doors.

Heating

Heating is provided by system of radiators. Hot water is provided by water heater located in boiler room.

Lighting

The house will be lit in two ways. Natural daylight through windows and artificial light sources (lamps).

Vibrations

There are no major vibrations caused by using of this building. There might be some small vibrations caused by movement of inhabitants and horses around the house and or by using of home appliances.

Noise

Noise is restricted by peripheral construction so there not supposed to be noises caused by using of the building that would exceed limiting values.

Principles of energy management

Thermotechnical evaluation of proposed building is based on requirements stated by technical standard ČSN 730540.

There are no alternative sources of energy designed for this building.

Protection of building against negative external effects

see *B.2.11*

Fire protection of building

see *Fire safety report*

Details about required quality of proposed materials and quality of performed work

All used materials must fulfill the parameters stated by project documentation for construction works.

Description of unusual technological procedures

Ground screws are used as foundation. There are two types of screws used for this building - 2,1 m long and 1,6 m long. Installation is done by experts using special drilling machines KR 50 and KR 55.

Determination of required controls of covered constructions

There are no required controls of covered construction nor control measurements for this type of building.

D.1.2 Building and construction solutions**Main building production****Earthworks**

Before levelling part of the parcel the top soil will be removed and stored on the edge of parcel to use it for final terrain adjustments. Because of usage of ground screws there is no need for excavations with exception of small pit that needs to be excavated for concrete installation shaft (approx. 1,5 m³) and narrow strips for utility networks.

Foundations

The only contact between building and ground is through ground screws that are drilled into the soil. There are 2,1 m long screws on the circumference of the two storey part and 1,6 m long screws below the rest of building. Each ground screw has a M16 nut on the top which enables us to put a threaded rod on top of it to connect glued laminated beams to these screws. These beams are 160 mm wide (same as the size of the ground screw pad on the top) and 240 mm high and are connected together to create a grid. Then there are going to be structural insulated panels of thickness 210 mm laid on top of the grid to create an even baseplate to be built on. And additionally there is a geotextile and layer of gravel below the entire floorplan.

Vertical constructions

All peripheral vertical constructions are made of structural insulated panels Europanel 170 which are connected to the baseplate using thicker planks and connected together by special connecting panel that is similar to basic panel but sized just to fill in the gap and rigidly connect two panels together. Thickness of peripheral walls is 170 mm (without thermal insulation). Internal load-bearing wall between residential area and stables is also made of Europanel 170 (to support external wall of residential area in second floor) but all other internal load-bearing wall are made of Europanel 120. The thickness of this wall (without lining with gypsum fiber boards) is 120 mm.

Most of the partitions are made of Europanel 120. Partitions in bathrooms are made of gypsum board suitable for wet conditions.

The columns that supports the lintels for larger openings are mounted onto anchoring foots in such way to be at least 100 mm above rough floor.

Horizontal constructions

Base layer

There is a 210 mm thick structural insulated panel - Europanel 210 that is protected from the bottom with a layer of cement-fiber board.

Waterproofing

There is no need for waterproofing from the ground because there is a ventilated gap between the building and the ground. There is an additional waterproofing layer below the roof tiles and another waterproofing layer in form of PVC-P foil in the flat roof composition as a top layer.

Lintels

Most of the lintels are made of modified Europanels to fit the gap between the opening and ceiling. There are few openings that are too big to use Europanel as a load-bearing lintel. In these cases timber beams are used.

Ceilings

Ceiling above first floor is made of timber structural beams KVH 60/240 and glued timber I-beams KN-I 80/240 (for larger spans) mounted to the wall using special mounting profile (steel U-shaped sheet with holes to drive screws through) and then there is a 22 mm thick oriented strand board screwed onto the beams with screws that are fully threaded to prevent squeaking.

Ceiling above second floor is made of Europanels 270 supported by wooden truss.

Thermal insulation

All vertical peripheral constructions are insulated with 100 mm thick layer of polystyrene EPS 70 F.

There is 120 mm thick layer of mineral wool used as a thermal but mainly as a impact sound insulation in ceiling composition and then there is a rather thin layer of EPS 100 in floor composition of first floor.

Floor structures

Layers of floor structure in first floor are as follows: 30 mm of EPS 100, two 10 mm thick silica sand boards, flooring adhesive and final floor finish layer (laminated, rubber or tiles depending on the type of room). There is a small difference between thicknesses of EPS in residential area and stables because there is a 50 mm layer.

In second floor the floor composition is similar. The only difference is that there is no polystyrene. Sound insulation is ensured by silica sand boards and by mineral wool in ceiling.

Roof structure

Residential part of building is covered with saddle roof and the stables are covered with flat roofs. Rafters of the saddle roof are mounted into the grooves in Europanels and onto the purlins that are supported by columns hidden in partitions and by gable walls. There are Europanels 270 mounted on top of these rafters. This creates even roof surface for roof laths and roof tiles. The flat roof is in a form of cold roof. The slope is ensured by EPS wedges.

Staircase

The steps are made Europanels 170 with additional board to create desired height of the step. Steps are connected together by screws and placed on top of a supporting columns on both sides. The steps are then lined with desired material (laminated for example) and the bottom surface might be covered by gypsum boards. This construction of staircase creates a small storage area for example for cleaning tools.

Openings

All interior door will be constructed as casign type frame with exception of doors between hayloft and stables which are in sliding frame. Also the entrance door to stables are in sliding frame. Entrance hayloft door are in steel frame.

All windows are wooden euro-windows with double sealing, periphery fittings and with aluminium drip cap. The smaller windows (750x600, 900x600 and 1000x1500) are ditherm glazed, the rest (1250x1500, 1500x1500 and roof window 1000x1500) is tritherm glazed.

Conclusion

The outcome of this diploma thesis is a project of a stables with guesthouse. The house is designed as two storey building where the second floor serves as the guesthouse where twelve people may be accommodated at once. The first floor is designed as residential area for the owner's family.

The documentation is elaborated according to the requirements. The documentation includes: study drawings, situations, constructional solutions, details and fire safety solution for the house.

List of used sources

Czech and european standards

- ČSN 73 0540 - Tepelná ochrana budov
- ČSN 01 3420 - Výkresy pozemních staveb - kreslení výkresů
- ČSN 73 4301 - Obytné budovy
- ČSN 730802 - Požární bezpečnost staveb – Nevýrobní objekty
- ČSN 730810 - Požární bezpečnost staveb – Společná ustanovení
- ČSN 730833 - Požární bezpečnost staveb – Budovy pro bydlení a ubytování
- ČSN 730873 - Požární bezpečnost staveb – Zásobování požární vodou

Legislations:

- 499/2006 - about project documentation
- 183/2006 - about spatial planning and building regulations
- 268/2009 - about technical requirement for buildings

Web pages

- www.europanel.cz
- www.isover.cz
- ciko-kominy.cz
- <http://nahlizeniidokn.cuzk.cz/>
- <http://www.tzb-info.cz/>
- www.mapy.cz
- <http://www.komercninemovitosti.com/>
- <http://www.oknamacek.cz/>
- <http://www.lindab.com/cz>
- www.zemnivruty.cz
- www.bezbetonu.cz
- www.fermacell.cz
- www.akustickaizolace.cz
- www.tondach.cz
- www.dek.cz
- www.topwet.cz

List of used abbreviations and symbols

n./no.	number
mm	milimeter
m	meter
m ²	square meter
m ³	cubic meter
acc.	according
coll.	collection
mil.	million
CZK	Czech crowns
ČSN	Česká státní norma (Czech state standard)
U	heat transfer coefficient
EIA	enviromental impact assessment

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MUSTANG - STÁJE A PENZION

MUSTANG - STABLES AND GUESTHOUSE

ATTACHMENTS

SEE INDIVIDUAL FOLDERS OF THE DIPLOMA THESIS FOLDER B,
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DIPLOMOVÁ PRÁCE

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