



# VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

BRNO UNIVERSITY OF TECHNOLOGY

## FAKULTA STAVEBNÍ

FACULTY OF CIVIL ENGINEERING

## ÚSTAV POZEMNÍHO STAVITELSTVÍ

INSTITUTE OF BUILDING STRUCTURES

## MATEŘSKÁ ŠKOLA

KINDERGARTEN

## DIPLOMOVÁ PRÁCE

DIPLOMA THESIS

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### VEDOUČÍ PRÁCE

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BRNO 2018



## VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ FAKULTA STAVEBNÍ

|                                |  |
|--------------------------------|--|
| <b>Studijní program</b>        | N3607 Civil Engineering  |
| <b>Typ studijního programu</b> | Navazující magisterský studijní program v anglickém jazyce a prezenční formou studia |
| <b>Studijní obor</b>           | 3608T001 Pozemní stavby  |
| <b>Pracoviště</b>              | Ústav pozemního stavitelství   |

### ZADÁNÍ DIPLOMOVÉ PRÁCE

|                        |                            |
|------------------------|----------------------------|
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| <b>Název</b>           | Mateřská škola             |
| <b>Vedoucí práce</b>   | Ing. Karel Struhala        |
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V Brně dne 31. 3. 2017

  
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Vedoucí ústavu

  
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Děkan Fakulty stavební VUT

## PODKLADY A LITERATURA

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

## ZÁSADY PRO VYPRACOVÁNÍ

**Zadání:** Zpracování určené části projektové dokumentace pro provedení stavby mateřské školy.


**Cíle:** Vyřešení dispozice budovy 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. Práce bude zpracována v souladu s vyhláškou č. 62/2013 Sb. Obsaženy budou tyto části definované ve vyhlášce: A, B, C a D v rozsahu částí D.1.1 a D.1.3. Dále bude práce obsahovat: studie - předběžný návrh budovy a jejího dispozičního řešení - a přílohou část, ve které budou doloženy předběžné návrhy základů, případně rozměrů dalších nosných prvků řešené budovy a také prostorové vizualizace budovy. Výkresová část bude obsahovat výkresy: situace, základů, půdorysů všech podlaží, konstrukce zastřešení, svislých řezů, technických pohledů, min. 5 detailů, výkres(y) sestavy dílců, popř. výkres(y) tvaru stropní konstrukce. Součástí dokumentace budou i dokumenty podrobnosti dle D.1.1 bod c), stavebně-fyzikální posouzení objektu a vybraných detailů a případně další specializované části, zadané 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".

## 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).
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. Karel Struhala  
Vedoucí diplomové práce

## **Abstrakt**

Diplomová práce se zabývá vypracováním projektové dokumentace pro novostavbu mateřské školy. Budova je rozdělena na dvě části. V první části jsou navrženy 2 samostatné třídy, každá s kapacitou 24 dětí, zázemí pro učitele a v druhé části budovy učebny pro výuku menších kroužků. V první části budovy je pro potřeby školky navržena kuchyně. Objekt má dvě nadzemní podlaží a suterén. Obvodové nosné zdivo taktéž i vnitřní je navrženo ze systému SENDWIX, vápenopísčité cihly. Zateplení izolační vrstvou z minerální vlny a suterén je zateplen extrudovaným polystyrenem XPS. Stropy jsou z předpjatých stropních panelů SPIROLL. Zastřešení budovy plochou zelenou a na některých částí střechy je pouze kacířek. Výkresová dokumentace potřebná pro realizaci mateřské školy je zpracována včetně pěti konstrukčních detailů. Výkresová část byla zpracována v počítačovém programu AutoCAD. Součástí práce je také požární, akustické, tepelně-technické řešení a osvětlení.

## **Klíčová slova**

mateřská škola, plochá zelená střecha, dřevohliníkové okna, předpjatý stropní panel, suterén, vápeno-písčité cihly SENDWIX

## **Abstract**

The diploma thesis deals with elaboration of design documentation for the new building of the kindergarten. The building is divided into two parts. In the first part, two separate classes are designed, each with a capacity of 24 children, there are also teacher's facilities, a logopedic counseling, and office. In the second part of the building there are classrooms for external activities. In the first part of the building, the kitchen is designed for the needs of the kindergarten.

The building has two aboveground floors and a basement. Load-bearing walls are designed from SENDWIX, lime-cement bricks. Thermal insulation on walls above ground floor are a mineral wool and underground floor walls, as well as the plinth are insulated by extruded polystyrene XPS. The floors are made of pre-stressed concrete floor panels SPIROLL. The building has two types of roof: flat green roof and flat roof with stone aggregates.

The drawing documentation necessary for the realization of the kindergarten is

processed including five structural details. The drawing part was processed in the AutoCAD computer program. Part of the work is fire, acoustic, thermal-technical solution and daylighting.

### **Keywords**

Kindergarten, flat green roof, wood-aluminum windows, pre-stressed ceiling panel, basements, lime-sand bricks SENDWIX

## **BIBLIOGRAFICKÁ CITACE VŠKP**

Bc. Janet Klaudie de Ceita *Mateřská škola*. Brno, 2017. 69 s., 488 s. příl.  
Diplomová práce. Vysoké učení technické v Brně, Fakulta stavební, Ústav  
pozemního stavitelství. Vedoucí práce Ing. Karel Struhala

**Declaration:**

I declare, that I worked out the Diploma Thesis independently and that I stated all the used information sources.

**Prohlášení:**

Prohlašuji, že jsem diplomovou práci zpracovala samostatně a že jsem uvedla všechny použité informační zdroje.

V Brně dne 12.1.2017

.....  
podpis autora  
Bc. Janet Klaudie de Ceita

## **Thanks**

I would like to thank my supervisor of Diploma Thesis Ing. Karel Struhala, for professional guidance, help and all the useful and precious advices during process of my work and to all my teachers for the help during my studies in the university. I would also like to thank to all my family, my mum, dad, my sisters and brother, my boyfriend, friends and my classmates, for moral support and for believing in me and to make me believe that everything is possible for which I am extremely grateful.

## **Poděkování**

Ráda bych poděkovala vedoucímu mé diplomové práce Ing. Karel Struhalovi, za odborné vedení, pomoc a všechny užitečné a vzácné rady při zpracování této práce a všem mým učitelům za pomoc během studia na univerzitě. Ráda bych také poděkovala celé své rodině, mojí mamince, mému tátovi, sestrám a bratrovi, mému příteli, mým kamarádům a spolužákům, za morální podporu a že mi pomohli dokázat že vše je možné, za to jsem extrémně vděčná.

V Brně dne 12.1.2017

.....

podpis autora  
Bc. Janet Klaudie de Ceita



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# 1. INTRODUCTION

The aim of the diploma thesis is to design the structure and elaborate project documentation for realization of the construction of the kindergarten. The building is designed as a two-story building with an underground floor, covered by a flat green roof, stands on foundation strips from plain concrete. Both vertical load-bearing and non-load bearing structures are from lime-sand bricks SENDWIX walling system. Peripheral and internal walls are from SENDWIX 5DF-LP lime-sand bricks, partitions are from SENDWIX 4DF-LD lime-sand bricks, and pre-walls in the bathrooms, lavatories and WC are from plasterboard KNAUF red green. Horizontal load-bearing structure above first and second floor is from pre-stressed concrete panels SPIROLL. Above the second floor and as well as above some parts of the first floor there is a green roof with an attic around, there is also a flat roof with stone aggregate in some small parts of the roof above the first floor. The building is divided into two parts. In the first part, space for the kindergarten and the space for external leisure activities each with a separate entrance.

Kindergarten part is designed as two-class, each class for 24 children. Each department is located on a separate floor. A logopedic counseling, a teacher background and office are also designed. The last part of the kindergarten is the kitchen operation and the necessary warehouses. The kitchen is designed to spoil the spaces intended for children's operation, but at the same time the separation between the two operations has been ensured. Disposition of the house is done in accordance with valid regulations and standards. The design intention was to create a building which exterior appearance corresponds with surrounding buildings.

The CAD systems that are commonly used in building practice will be used to develop the diploma thesis. The individual parts of the work are classified in accordance with Decree No. 62/2013 Coll. contain the drawings, calculations and reports in this decree. All standards, laws and regulations are fulfilled in the work.

## **2. TEXT PART OF THE DIPLOMA'S THESIS**



VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

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MATEŘSKÁ ŠKOLA

KINDERGARTEN

A ACCOMPANYING REPORT

DIPLOMOVÁ PRÁCE

DIPLOMA THESIS

AUTOR PRÁCE

AUTHOR

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VEDOUCÍ PRÁCE

SUPERVISOR

Ing. KAREL STRUHALA

BRNO 2018

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## **A ACCOMPANYING REPORT**

### **A.1 Identification data**

#### **A.1.1 Data about the construction**

|                           |                                 |
|---------------------------|---------------------------------|
| Name of construction:     | Kindergarten                    |
| Place of construction:    | cadastral area Žebětín [795674] |
| Plot number               | 1906,1919,1920/4,1920/38,1920/5 |
| Township:                 | Brno [582786]                   |
| Region:                   | Jihomoravský                    |
| Subject of documentation: | Detailed documentation          |

#### **A.1.2 Data about the builder**

|          |                          |
|----------|--------------------------|
| Name:    | Ing. Silvie Vymětalíková |
| Address: | Svážná 11, Brno 634 00   |
| E-mail:  | jasini@seznam.cz         |

#### **A.1.3 Data about the designer**

|          |                          |
|----------|--------------------------|
| Name:    | Janet Klaudie de Ceita   |
| Address: | Říčanská 25, 635 00 Brno |
| E-mail:  | 159339@vutbr.cz          |

### **A.2 List of input data**

Extract from the cadastral map, pictures from the zoning plan of Brno- Žebětín, the position of existing engineering networks, study of the kindergarten

## A.3 Data about the area

### a) Range of the solve territory

The area with plot numbers 1906,1919,1920/4,1920/38,1920/5 is located in Brno-Žebětín. The plot is slightly sloped and has an irregular shape. There are no obstacles on the plot which would be needed to be taken away at the expense of the investor. The investor is also the owner of the parcel.

#### Data about building plot

|                           |                                 |
|---------------------------|---------------------------------|
| Parcel number:            | 1906,1919,1920/4,1920/38,1920/5 |
| Township:                 | Brno [582786]                   |
| Cadastral area:           | Žebětín [795674]                |
| LV number:                | 10001,10001,1124,10001,10001    |
| Acreage:                  | 2175 m <sup>2</sup>             |
| Parcel type:              | Parcel of cadastral estate      |
| Map sheet:                | DKM                             |
| Determination of acreage: | from S-JTSK coordinates         |
| Parcel type:              | other area                      |

### b) Data on the protection of the territory according to other legal regulations

The plot is not located in the monument zone or in the flood plain.

### c) Data of outflow ratios

The building will be connected to the existing infrastructure, rainwater will be taken to retention tanks, then to the inspection shaft, from here to the single sewer system located on Listnatá Street. The final terrain is slightly sloped and contains plenty of grassy areas which permit the infiltration of rainwater.

### d) Data on compliance with land-use planning documentation, if it was not issued territorial decision or territorial measure or, where appropriate, no territorial consent

The proposed design documentation is prepared in accordance with the

valid local zoning plan of Brno. Meets all planning criteria.

**e) Data on compliance with general land use requirements**

All in accordance with the local zoning plan and regulations.

**f) Information about compliance of general requirements for construction**

All requirements for construction are fulfilled in the documentation. These are requirements stated by Building Law 186/2006 Coll. and Ordinance 499/2006 Coll., as amended in Ordinance 62/2012 Coll. and Ordinance 398/2009 Coll.

**g) Information about fulfillment of requirements of concerned authorities**

Requirements of the authorities concerned were incorporated into the project. The construction is designed in accordance with all the requirements of the authorities concerned.

**h) List of exceptions and relief solutions**

The project does not require any exceptions or relief solutions.

**i) List of related and conditional investments**

Related and conditional investments are not expected.

**j) List of affected lands according to cadastral estate:**

Parcel number: 1903, township: Brno, cadastral area: Žebětín, parcel type: Parcel of cadaster estate, map sheet: DKM, acreage: 837 m<sup>2</sup>, parcel type: other area, owner: Statutory city of Brno, Dominikánské náměstí 196/1, Brno-město, 60200 Brno

Parcel number: 1904, township: Brno, cadastral area: Žebětín, parcel type: Parcel of cadaster estate, map sheet: DKM, acreage: 323 m<sup>2</sup>, parcel type: other area, owner: Statutory city of Brno, Dominikánské náměstí 196/1, Brno-město, 60200 Brno



Parcel number: 1907, township: Brno, cadastral area: Žebětín, parcel type: Parcel of cadaster estate, map sheet: DKM, acreage: 261 m<sup>2</sup>, parcel type: other area, owner: Statutory city of Brno, Dominikánské náměstí 196/1, Brno-město, 60200 Brno

Parcel number: 1923/1, township: Brno, cadastral area: Žebětín, parcel type: Parcel of cadaster estate, map sheet: DKM, acreage: 969 m<sup>2</sup>, parcel type: other area, owner: Statutory city of Brno, Dominikánské náměstí 196/1, Brno-město, 60200 Brno

Parcel number: 1909, township: Brno, cadastral area: Žebětín, parcel type: Parcel of cadaster estate, map sheet: DKM, acreage: 3463 m<sup>2</sup>, parcel type: built-up area and courtyard, owner:

|   |            |
|---|------------|
| Bajgar Oldřich, Novodvorská 1003/2, Žebětín, 64100 Brno   | 61/24989   |
| Borovičková Lenka, Říčanská 980/25, Žebětín, 64100 Brno   | 621/24989  |
| manželé v SJM Bosák Matěj Mgr. a Bosáková Hedvika Mgr., Říčanská 980/25, Žebětín, 64100 Brno  | 830/24989  |
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| D-Oil, s.r.o., Říčanská 980/25, Žebětín, 64100 Brno   | 550/24989  |
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| Goliáš Richard, Říčanská 980/25, Žebětín, 64100 Brno  | 216/24989  |
| Goliášová Lenka, Říčanská 980/25, Žebětín, 64100 Brno   | 216/24989  |
| Hamerská Jitka, Říčanská 980/25, Žebětín, 64100 Brno  | 382/24989  |

|   |           |
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| Hanáková Jiřina, Ke Statku 579/2, Medlánky, 62100 Brno  | 596/24989 |
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| Jakubovich Peter, U Leskavy 728/28, Starý Lískovec, 62500 Brno  | 803/24989 |
| Klapuš Petr, Říčanská 980/25, Žebětín, 64100 Brno   | 616/24989 |
| Klíma Tomáš, Zahradníková 927/26, Veverí, 60200 Brno  | 552/24989 |
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| Kratinová Monika MUDr., Chudčická 1348/21, Bystrc, 63500 Brno   | 917/24989 |
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| Kyršová Alena, Jasanová 650/8, Jundrov, 63700 Brno  | 535/24989 |
| Lengál Patrik, Říčanská 980/25, Žebětín, 64100 Brno   | 366/24989 |
| manželé v SJM Lexa Ivo Ing. a Lexová Marie, Modřínová 316/2, Nové Město, 67401 Třebíč   | 550/24989 |
| Lízal Martin Ing., Švermova 255/8, Bohunice, 62500 Brno   | 511/24989 |
| Lukáčová Karolína Bc., Říčanská 980/25, Žebětín, 64100 Brno   | 805/49978 |
| Makovcová Michaela Ing., č. p. 156, 79804 Seloutky  | 551/24989 |

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|--|-----------|
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| Morávek Lukáš, Říčanská 980/25, Žebětín, 64100 Brno  | 945/49978 |
| Morávková Vladislava, Říčanská 980/25, Žebětín, 64100 Brno   | 945/49978 |
| NOME a.s., třída Kpt. Jaroše 1845/26, Černá Pole, 60200 Brno   | 469/24989 |
| PAVRO s.r.o., Říčanská 1291/13, Bystrc, 63500 Brno   | 545/24989 |
| manželé v SJM Pazderka Jan a Pazderková Martina Mgr., Říčanská 980/25, Žebětín, 64100 Brno                           | 766/24989 |
| manželé v SJM Sedláček Antonín a Sedláčková Ivana MUDr., Topolky 1969/30, Žabovřesky, 61600 Brno                     | 606/24989 |
| Sládková Barbora, Okružní 1389/1, 66491 Ivančice   | 568/24989 |
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| Sýkorová Veronika, Křížová 56/6, Staré Brno, 60300 Brno  | 509/24989 |
| Šárník Stanislav MUDr., Ph.D., Hrázka 601/20, Medlánky, 62100 Brno   | 503/24989 |
| Ševčíková Pavla, Bartolomějská 845/31, Žebětín, 64100 Brno   | 361/24989 |
| Škrdla Michal, Říčanská 980/25, Žebětín, 64100 Brno  | 813/24989 |
| Večeřa Radim, Říčanská 980/25, Žebětín, 64100 Brno   | 581/24989 |
| Žáková Jana, č. p. 143, 67177 Branišovice  | 851/24989 |

## A.4 Data about the construction

**a) New construction or change of completed building**

New construction

**b) Purpose of use of the building**

The building is intended to be used as a kindergarten with maximal capacity of 48 children in total, 4 teachers, 1 director, 3 cooks and 1 cleaned, part of the building is going to be used for leisure external activities.

**c) Permanent or temporary construction**

Permanent building. Expected service life is 50 years.

**d) Data on building protection under other legislation**

The building is not in any way protected, it is not in any protection zone.

**e) Information on compliance with technical requirements for buildings and general technical requirements ensuring the barrier-free use of buildings**

All technical requirements that are required according to valid norms. Accordance to the relevant ČSN standards concerning the proposed building, Building Act No. 138/2006 Coll. as amended later regulations, with Decree no.268/2009 Coll. on technical requirements for constructions in the wording of later regulations. The barrier-free requirements were designed according to the Decree 398/2009 Sb. about general technical requirements ensuring the accessible use of buildings.

**f) Data on compliance with the requirements of the authorities concerned and the requirements of the subsequent legislation**

The construction is designed in accordance with the requirements of all the authorities concerned. Requirements have been incorporated into project documentation

**g) List of exceptions and relief solutions**

The project does not require any exceptions or relief solutions.

**h) Design building capacity**

Build-up area: 1383,95 m<sup>2</sup>

Enclosed building space: 4024,2 m<sup>3</sup>

Usable area of the building: 1631,4 m<sup>2</sup>

Number of parking places: 9 + 1 for disabled people

Number of departments: 2

Number of children in one department: 24

Number of workers: 4 teachers, 1 director, 3 cooks, 1 cleaner

**i) Basic balance of construction (needs and consumption of media and mass, management of rainfall water, total quantity produced and types of waste and energy class emissions difficulty, etc.)**

Total water consumption: - 60 m<sup>3</sup>/day/person, 21900 m<sup>3</sup>/year/person

The balance of sewage corresponds to the approximate balance of water consumption.

The rainwater will be taken to a retention tank.

Energy class - the building is rated B - Economical.

Waste - collection of waste will be provided once a week, it will be sorted into containers; waste generated from the construction activities will be sorted and weighed into a landfill for recycling, according to Act no.185/2001 about waste.

**j) Basic prevision of construction (time data on construction realization, division into stages)**

Expected start of construction work - April 2018

Construction Completion - February 2020

Construction will be a divided into stages, not a subject of the diploma thesis.

**k) Indicative construction costs**

The price was determined according to the THU indicator of the average budget price per unit of measure and purpose set for 2015, the price is set by the JSCO

801.3 Buildings for teaching and education.

Design Material Characteristics 1

Price per 1 m<sup>3</sup> of built-up area: 4580 CZK / m<sup>3</sup>

Expected construction costs: 18 430 900 CZK

## **A.5 Division of the object into parts**

The building is divided into 3 objects according to coordination situation.

OBJECT BO 01 - Kindergarten

OBJECT BO 02 – Children's playground

OBJECT BO 03 – Solid surfaces

OBJECT BO 04 – Access road communication

OBJECT BO 05 – Parking load

OBJECT BO 06 – Larch wooden double trash

OBJECT BO 07 – Rain waste pipeline

OBJECT BO 08 – Rain water pipeline

OBJECT BO 09 – Low voltage power connections

OBJECT BO 10 – Water pipes for drinking water

OBJECT BO 11 – Hot water underground pipes



**VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ**

BRNO UNIVERSITY OF TECHNOLOGY

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**ÚSTAV POZEMNÍHO STAVITELSTVÍ**

INSTITUTE OF BUILDING STRUCTURES

**MATEŘSKÁ ŠKOLA**

KINDERGARTEN

## **B SUMMARY TECHNICAL REPORT**

**DIPLOMOVÁ PRÁCE**

DIPLOMA THESIS

**AUTOR PRÁCE**

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**BRNO 2018**

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## B SUMMARY TECHNICAL REPORT

### B.1. Description of the plot

#### a) Characteristics of the building plot

The building plot is located in the cadastral area Brno-Žebětín, on the plots number 1906,1919,1920/4,1920/38,1920/5. On the opposite side of the road and on the northwestern side, there is a neighboring building – newly built block of flats with a parking lot. On the West there is a large parking lot located. On the East side across the road there is a supermarket. It is possible to assume the use of kindergarten by citizens from nearby surroundings. The land is slightly sloped towards the west.

#### Data about building plot

|                           |                                 |
|---------------------------|---------------------------------|
| Parcel number:            | 1906,1919,1920/4,1920/38,1920/5 |
| Township:                 | Brno [582786]                   |
| Cadastral area:           | Žebětín [795674]                |
| LV number:                | 10001,10001,1124,10001,10001    |
| Acreage:                  | 2175 m <sup>2</sup>             |
| Parcel type:              | Parcel of cadaster estate       |
| Map sheet:                | DKM                             |
| Determination of acreage: | from S-JTSK coordinates         |
| Parcel type:              | other area                      |

#### b) List and conclusions of surveys and analyzes

Based on the available geological and radon maps and drills made in the given area, were determined the soil type of class 4 – marble solid clay, straw solid, and Rdt is 150KPa.

In the pre-marble foundation there are rocks from Brno's outbreak (granodiorite).

The drill which was examined was J 813.

Dimension of the terrain: 340,3 m a.s.l

Drilled: 24.4.1989

0,0 - 0,2 m – sandy clay brown soil with vegetation – topsoil

0,2 - 7,8 m – yellow-brown clay, whiter bridle, calcium, solid

7,8 – 10 m – red-brown clay, black bridle, calcium, solid

Drill ends in the depth of 10 m.

Drill without water.

Radon risk is medium. These conclusions need to be verified when digging the base passes. If the actual soil and radon risk data are different from the assumption, it is only necessary to contact the designer and agree on the next work progress.

A copy of the data from the geological survey are included in calculation of foundations (other calculations file) – annex D.1.2.6

**c) Existing protection and safety zones**

The building site does not interfere with any protection and safety zones.

**d) Position relative to the flooded territory, undermined territory, etc.**

The building plot is not located near any undermined area.

The flooded area of Brno does not interfere with the building site.

**e) Effect of the construction on surrounding buildings and lands, protection of the environment, influence of the construction on the outflow conditions in the territory**

The construction is designed to not endanger the environment by releasing hazardous substances and to avoid excessive air pollution, surface and groundwater and soil contamination.

The rainwater will be taken from the roofs (through the internal ducts) and from the surface adjacent car park (supplemented with a light liquor separator) to the building site into the retention tank (from the terrace and the paved areas to the soil). The sewage will be placed into separate sewerage systems. Communal waste will be disposed of based on contracts with the Municipal Authority.

When carrying out the construction, the surrounding buildings must be protected by normal means night quietness, avoid excessive noise and dust,

etc. Construction site will be for certain period of time fenced with a height of 2 meters and will be prevented from entering unauthorized persons.

**f) Demolition, demolition and felling requirements for trees**

There are existing objects on the land, such as trees. There is necessary to do tree felling of trees which are interfering in the construction, other existing trees on the plot are going to be use as a shading for the playground and as aesthetic reasons for more information see annex C.1 situation plans.

**g) Requirements for maximum utilization of the agricultural land fund or land intended for the performance of the forest function**

Requirements not set.

**h) Territorial technical conditions (especially the possibility of connection to the existing transport and technical infrastructure)**

The building can be connected to the local road on Listnatá street. Near the roads there are also all utilities, namely water mains, low-pressure gas pipelines, underground electricity lines and uniform sewerage systems. All new utilities are allowed to connect new networks to the object.

**i) Material and temporal links, conditional, induced and related investment**

The construction is not fixed in time-bound or factually bound. They are not conditional, induced and related investments.

## **B.2. General Description of the building**

### **B.2.1 Purpose of the object, basic capacity of function unit**

The building is designed as a new kindergarten building, an object used for the education and education of preschool children. Kindergarten has two floors in each floor there are two separate classes are designed, each with a capacity of 24 children. There will be a total of 4 teachers and 1 director. For the needs of kindergarten there is a kitchen in the building. In the building there is also a

separate entrance for leisure external activities.

## **B.2.2 Urban and architectural solution**

### **a) Urbanism - territorial regulation, composition, and spatial solution**

The building is located in the Brno-Žebětín. The building is designed to fit as closely as possible to the surroundings. The building of the kindergarten is designed as a free-standing two-story building.

The building is located in the north-eastern part of the land, it is designed with 2 separate front entrances, one for the kindergarten part and the other for leisure external activities. There is also an entrance for staff members on the east side.

The kindergarten fulfills the prescribed territorial decision regulations for the building.

### **b) Architectural design – composition of the shape solution, material and color solutions**

Kindergarten is designed as two-story building. The ground plan of the building has an irregular linear shape.

The building is covered with a warm flat roof - green roof, the height of the attics above the 2<sup>nd</sup> floor is in the level + 8.100 m above the floor of the first floor. Part of the building which is oriented to the western part is designed as one-story. This part is also roofed by warm flat roof - green roof.

The kindergarten is designed as a building made of lime-sand SENDWIX blocks worn on thin layer of mortar. Ceiling structures are formed by pre-stressed reinforced concrete SPIROLL floor panels of 250 mm height. Door and window are designed from wood-aluminum profiles.

Colorfully the building is divided into 4 different shades to be ensuring a large color of the building, making it more pleasant children's environment. At the same time, the color classification is chosen to make it obvious different functional division of the object,

there is an orange color for the external leisure activities part of building, blue is for the working part, yellow for the first floor of the daily class and white for the second floor. Those colors were also chosen to fit perfectly into the neighborhood where are block of flats, with similar colors around.

All windows and doors are from blue color 3-28 VEKRA. Paving around the house is designed of concrete blocks BEST-ARCHIA.

The utility network of the house is going to be connected to public utility network underneath the road. The floor level of the first floor is defined as  $\pm 0,000$  and refers to 340,3 m a.s.l.

### **B.2.3 Layout and operational solutions, production technology**

In this project, I have a structured design of a kindergarten building. The building is dividing into two main parts, the part of kindergarten for children from 3 to 6 years old and part for external activities.

Kindergarten part has two above ground floors and one underground floor. Is a place for 24 children per class, in this case there are two classes so the whole kindergarten area is dedicated for 48 children. Kindergarten part is divided into different sections in each floor. I will go into further detail to describe each floor and classify each room according to its section.

1<sup>st</sup> underground floor:

All the 1<sup>st</sup> underground floor is one section – technical section. The first area is an entrance hall (S11), which is accessible by the staircase from the 1<sup>st</sup> above ground floor. From there we can enter to the first room which has a chimney and is used as a storage room (S12). From this room we have a direct access to the technical room (S13) where is located the boiler 1<sup>st</sup> above ground floor:

1<sup>st</sup> aboveground floor:

The first floor is dedicated for children of 3 and 4 years old. This kindergarten part is divided into different sections. The very first space we notice in this floor is the entrance area (101), where is located the staircase which link the second floor and

the underground floor to the first floor. The entrance area (101) is followed by a changing room (102) for children which is classified as public and communication section.

On the left side of the changing room (102) there is a working area. This area is composed by the main corridor which give as an access to the cleaning room (103), laundry room (104) and to the changing room for workers (107). The changing room for workers (107) has a link to shower (105), WC for woman (109) and man (108), and to the side entrance (111) to the building. The side entrance (111) is dedicated for the staff workers and food or technical distribution, from this space we can go directly to the storage room (110) and to the kitchen (112), both of those areas are connected by a door. Left from the entrance for staff workers there are two doors, the first one is a storage for outside toys (113) and the second door is a bathroom (114). On the right side of the changing room for children (102) there is a changing room for teachers (122) with two WC (120,121). The second door on the right side gives us access to the lavatory (119), there is also an interior window, to make those two areas totally connected, it is necessary for teachers to constantly watch out for children. The third door in the middle is for the main room of the kindergarten, daily room for children (118) with large French windows all over the area. In this room there is also a storage for toys (117) and beds (116). There is also a window for food distribution and a door for the kitchen (112). In the kitchen (112) there is a lift for meal for the 2<sup>nd</sup> floor.

2<sup>nd</sup> underground floor:

The second floor is dedicated for children from 5-6 years old, is a pre-school class. The staircase (201) from the first floor gives us access to the second floor in front of the staircase (201) there is a director office (202) from here we can go directly to the meeting room for teachers (203), despite of this entrance there is also another one from the entrance hall where is the staircase (201) located. The other door on the right side from the staircase is to the children changing room (215). On the right side in the changing room (215) there is teachers changing room (214) equipped with WC for women (211) and men (212). The other door followed also on the right side is to the cleaning room (213), then there is a door for the lavatory (210), which also has an interior window with a view to the children changing room

(215) and to the main daily room (209). The door in the middle in the in changing room (215) gives us an access to the daily room for children (209) with large French windows all over the area. In this room there is also a storage for toys (206) and beds (207). There is also a window for food distribution and a door for the kitchen (205). In the kitchen (205) there is a lift for meal for the 2<sup>nd</sup> floor. In this room there is also a door for the second staircase (208) which gives us an access to the first floor and then to the garden it is used mainly as an escape way. On the right side in the changing room for children (215) there is a logopedic clinic (204).

The second part of the building is for the external activities, which has only the first floor. The first area which we can noticed is the entrance hall (123). From there we can go directly to the changing room (124). In this room there are three doors. Two of doors are for the classes (125,126) with large French windows. The third door is for the bathroom (129) where are two WC, one for women (127) and the other for men (128).

#### **B.2.4 Access-free use of the building**

The building is designed to allow space in 1<sup>st</sup> underground floor to be used by people with reduced mobility and orientation. The main entrance to the building is designed as barrier-free. The doors to the children's daily room are designed in such a way that they allow the wheelchair to pass through. Access to 2 floor is not accessible without barriers.

#### **B.2.5 Safety during usage**

The building is designed from health-conscious, certified materials so that the use of the building is safe. When using the building, it is necessary to keep all the constructions of the house in good condition in order to avoid damage to the building.

## **B.2.6 Basic technical description of the buildings**

### **a) Building solution**

It is a kindergarten object designed in traditional construction technology.

The structure is the wall system, which lays on the foundation strips, has a ceiling (roof) supporting structure made of pre-stressed concrete hollow panels.

The custom layout solution is in line with the design for the type of construction

### **b) Structural and material solution**

#### **b.1) Foundations**

The foundation strips under 1<sup>st</sup> aboveground floor are made of plain concrete of class C20/25, and formwork of concrete blocks filled with concrete C20/25 reinforced by longitudinal and transversal reinforced according to static calculations. All the foundation strips are 800 mm thick and 1200 mm below the flooring level 0.000 (refers to 340.3 m.a.s.l.) and below internal wall the thickness is 2400 mm and 2600 mm and 1900mm and 2000 mm below the flooring level 0.000 (refers to 340.3 m.a.s.l.). The diameters of reinforcement are according to structural design. This thickness of foundation strips is due to soil type which is made from sandy clays and partially also because of the load transferring by the house itself. For more information see annex D.1.2.6 Other calculations.

#### **b.2) Waterproofing**

Waterproofing is done on concrete base under the floors or on the concrete walls of the basement, with the help of bitumen sheets GALSTEK 40 Special mineral and ELASTEK 40 Special mineral. Waterproofing in form of asphalt sheets is also placed in the composition of the roof above 1<sup>st</sup> as well as 2<sup>nd</sup> floor and in the wall composition of the underground floor.



### **b.3) Vertical load-bearing structures**

Envelope walls are made of lime-sand SENDWIX 5DF-LP lime-sand bricks blocks th. 290 mm on mortar (SENDWIX) supplemented with a certified contact insulation system th. 150 mm (thermal insulation made of mineral wool-insulating material), internal load-bearing walls are made from the same material as peripheral walls lime-sand SENDWIX 5DF-LP lime-sand bricks blocks th. 290 mm. The partitions are from SENDWIX 4DF-LD lime-sand bricks th. 115 mm, and pre-walls in the bathrooms, lavatories and WC are from plasterboard KNAUF red green.

### **b.4) Horizontal load-bearing structures**

Ceiling above underground, first, as well as second floor is made of pre-stressed concrete ceiling hollow panels SPIROLL. The thickness of the panel is 250 mm. Above envelope walls there is a ring of thickness 250 mm from reinforced concrete. Concrete class and diameter of reinforcement is done according to static calculation.

The ceiling structure will be made of suspended plasterboard on steel frame hanging from the floor structure (SPIROLL panels) possibly a suitable acoustic suspended ceiling in the desired rooms such as daily rooms and classrooms.

### **b.5) Roof**

The roof system used in the kindergarten is a system of green roof. The roof above the 1<sup>st</sup> floor on the east side has an inclination of a 3% to just one side and has two inlets. The roof above 1<sup>st</sup> floor on the west side has two inlets and two safety outlets. The roof above the main part of the kindergarten has two inlets and safety outlets in the area of the roof. The main distributor is TOWET.

### **b.6) Insulation**

Thermal insulation on the envelope wall is from mineral wool boards (ISOVER PROFI). Thermal insulation on the plinth is extruded polystyrene ISOVER SYNTHOS XPS PRIME 30L. This thermal insulation is going to be used on the peripheral wall of underground floor with a thickness of 120mm.

Green roof above 1<sup>st</sup> and 2<sup>nd</sup> aboveground floor is insulated by two layers of thermal insulation ISOLVER EPS th.100 mm and 160 mm.

Thermal insulation on the floor, above the first floor th.140 mm of graphite foam and 40 mm OF EPS 200 for heating pipes, and above underground floor th.80mm of STYRODUR 4000CS. For more information, see list of floors and walls composition in Annex D.1.1.20 of this project.

#### **b.7) Windows and doors**

Aluminum wooden triple-glazing windows VEKRA Alu design Classic were designed. The entrance doors are from the same material as windows, VEKRA Alu design Classic. The entrance doors are from the same material as windows, VEKRA Alu design Classic and for the back doors opening I design the doors from the same distributor as for entrance door, the only thing which differs is from the esthetical design. All above-mentioned windows and doors are in the same blue 3-28 color. Internal doors are wood laminated supplied by SAPELI. For more information, see List of Openings in Annex D.

#### **b.8) Floor**

There are three different types of floor finishes – ceramic tiles, lamellae flooring and polished concrete screed. In the underground floor there is a polished concrete screed all over the area. Then in the first and second floor there are ceramic tiles in the entrance halls (101,111,123), changing rooms (107,122, 124, 214,215), kitchen (112, 205), and bathrooms / WC / lavatories (105, 108, 109,114,119,120,121,127,128,129,210,211,212), cleaning room (103,213), storages (110,113,116,117,206,207), laundry room (104), corridor (106) and staircase(115,201,208). Lamellae of marmoleum flooring is placed in daily rooms (118,209), classrooms (125, 126), logopedic clinic (204), meeting room (203) and office (202). There is also a thermal insulation on the floor, above the first floor th.140 mm of graphite foam and 40 mm of EPS 200 for heating pipes, and above underground floor th.80mm of STYRODUR 4000CS. For more information, see Compositions is Annex D.1.1.20

### **c) mechanical resistance and stability**

The building is constructed on foundation strips, envelope walls including lintels above the openings is made of the lime-sand SENDWIX system. The supporting structure of the roof is going to be made of pre-stressed concrete hollow panels SENDWIX ceiling structures. The proposal design was based from the design values of each used material. For the realization of the construction there will be used materials and products with valid certificates, construction works will be carried out by a professional company. For certain structures (as defined in the building's design documentation) will be performed static calculations to demonstrate the verification of the dimension design.

## **B.2.7 Technical and technological equipment**

### **a) Technical solution**

Kindergarten will be heated by a classic heating system with radiators and floor convectors. As a heating system we use condensation boiler located in the technical room in the underground floor. Hot water heating is provided by a local distribution of the hot water.

### **b) List of technical and technological equipment**

Not part of the project.

## **B.2.8 Fire safety solution**

For more information about fire safety solution see the annex of fire safety in annex D.1.3.1 of this project.

## **B.2.9 Principals in energy saving**

Energy saving solution is made in accordance to ČSN 73 0540 - 2.

### **a) Thermo-technical evaluation criteria**

The building is designed according to energy saving and thermal protection regulations and standards. Meets the requirements of the valid version of the ČSN 730540-2 Thermal Protection of Buildings Act,

Act 406/2000 Coll. Act on Energy Management and Decree No. 78/2006 Coll. on the energy performance of buildings. A detailed technical design for the building is part of a separate annex, which is contained in Annex 6 - Building Physics.

**b) Energy performance of a building**

The average U-value the building was assessed as B – very economical. For more information, see Annex Building Physics.

**c) Assessment of the use of alternative energy sources**

Assessing the usability of alternative resources is not part of the project

**B.2.10 Hygienic, working and communal environment requirements**

The construction is designed in accordance with applicable hygiene regulations and related regulations standards. The requirements for ventilation and required air exchange are met. Daily lighting is the sunlight of the window. The building will be heated by condensing boilers. Drinking water supply is a water supply from the city of Brno. Common municipal waste is disposed of by the usual way (collection vessels, transport contract by the company)

**B.2.11 Protection of the building against adverse effects of the external environment**

**a) Protection against penetration of radon from the subsoil**

The building site is characterized by a medium radon index. As a precaution against this risk, it is sufficient to provide all structures with direct contact with the soil by layers of waterproofing, which simultaneously provides protection against moisture and radon protection.

**b) Protection against stray currents**

The load is not assumed to be fraudulent, so no measures are

proposed.

**c) Protection against technical seismicity**

There is no technical seismicity around the building. No measures are proposed.

**d) Protection against noise**

The requirements of the noise protection from standard ČSN 73 0532: 2010 are complied. The assessment of building structures in terms of acoustics is included in Annex 6 - Building Physics.

**e) Flood protection measure**

The facility is not located in floodplains and therefore flood protection measures are not necessary.

### **B.3 Connection to infrastructure**

**a) Technical infrastructure connection points**

For power supply on the builder land will be built a wardrobe where is going to be placed the main power switchboard. Location on the east side of the building behind the parking lot.

Connection to the water supply by a water meter assembly located in a water meter shaft on the building site. The water meter shaft is located near the parking lot.

Connection to the gas pipeline through a T-piece located on the existing pipeline. The gas supply port will result in an overhead connection box in which the main gas shut-off will be located along with the gas meter.

Connection to sewerage connections connected to the existing single sewer network. The connection will be led from the inspection shaft located on the land of the builder, into which all the sewage water of the building will be brought. For more information see annex C.3 Situation drawing.

#### **b) Connection dimensions, power capacities and lengths.**

Sewer connection - The building will be drained to the existing separate sewer DN 400 and DN 300 in Listnatá street. For drainage and sewage new sewer connections from PVC KG will be built, for drainage rainwater DN 200 and sewage drains DN 150.

Before the rainwater drainage line connects the water from the adjacent area parking lot on the retention tank, a light liquids separator will be installed on the pipeline.

Water supply - New water pipe will be built to supply drinking water connection made of HDPE 100 SDR 11 Ø32 × 3,0, connected to tap water series for public use in Listnatá street.

Connection of the wiring - 230 V and 380 V are installed in the building. Connection dimensions, power capacities and lengths are not the subject of a master's thesis. For more information see annex C.1.3 Total situation drawing.

### **B.4 Traffic solution**

#### **a) Description of the transport solution**

The building will be connected to the existing transport road, which is located along the northern boundary of the land.

#### **b) Connection to the existing transport infrastructure**

The kindergarten building will be connected to the Říčanská Street, in the place of the existing intersection.

#### **c) Transport at rest**

1 parking place per 5 children

48 children – 10 parking places

90% of parking places for short term stay (10-15min) – 9 parking places

10% of parking places for long term stay – 1 parking place

Note:

There is designed one parking place for handicap people, which is in total 11 parking places.

There is also a possibility for parents to park across the street on the parking places, also on the left side there is a large parking load.

**d) Pedestrian and bicycle paths**

Hiking or cycling trails are not designed

## **B.5 Vegetation and terrain solution**

**a) Landscaping**

The plot is almost flat with a small inclination so here is no going to be any changes on the inclination. A gutter walkway will be done around the building. Further landscaping will be done based on a separate project. For more information see annex C.3 Situation drawing.

**b) Used vegetation elements**

New grass, ornamental bushes and small trees will be planted on the site.

**c) Biotechnical measures**

No biotechnical measures are solved.

## **B.6 Description of the effects of construction on the environment and its protection**

**a) The effect of the construction on the environment - air, noise, water, waste and soil**

The construction does not have a negative impact on the surrounding environment. Types of work and used technology also has no impact on the deterioration of the quality of the environment. All used construction and materials must meet hygienic requirements for pollutant emissions and foreign substances. The building will not be disturbing your surroundings with noise, dust and will not endanger the safety of the population, etc.

Dust and noise in the area are temporarily increased during construction. The contractor in cooperation with the supplier, shall take steps to ensure that these negative effects on the surrounding buildings are

minimized. Sewage and rainwater will be diverted to a separate one sewerage. Waste from the construction and subsequent operation will be categorized and removed according to Annex No. 1 of Decree of the Ministry of the Environment 381/2001 Coll., as amended by Decree No. 503/2004 Coll.

**b) The impact of the construction on nature and landscape (tree conservation, protection of memorable trees, protection of plants and animals, etc.), preservation of ecological functions and link in the countryside**

The construction does not have a negative impact on the surrounding nature or landscape, and there is no land, monuments or trees protected.

**c) The effect of the construction on the Natura 2000 system of protected areas**

There are no European locations or bird areas within reach of the site under the protection of Natura 2000, the construction will not have a Natura protected area 2000 influence.

**d) The proposal to take into account the conditions of the conclusion of the inquiry procedure or the EIA opinion**

Not required in this type of construction.

**e) The proposed protection and safety bands, the scope of restrictions and conditions protection under other legislation**

Not present

## **B.7 Protection of population**

The construction of the kindergarten is designed in accordance with the terms of



the municipality's territorial plan. The basic requirements for the location and construction of the building from the point of view of population protection are fulfilled.

## **B.8 Organizational principles during the construction**

### **a) Necessary and critical consumption of media and materials, their security**

Before the beginning of the construction there will be build temporary water connections and electricity.

### **b) Drainage on construction side**

The drainage of the site will be solved if necessary by means of a pump with a float. The soil around the building is sandy clay – class 4, permeable soil.

### **c) Connecting the construction site of the existing transport and technical infrastructure**

Construction site will be connected to the existing road. There will be build utility mains water and electricity, which will be connected to the existing technical infrastructure.

### **d) The effects of construction on surrounding buildings and land**

All traffic will take place exclusively on the property builder. Not prejudice surrounding buildings or land. Will ensuring clean of the adjacent road, which will be contaminated due to travel building.

### **e) Protection around construction sites and related requirements for decontamination, demolition, tree felling**

Surroundings demolition work of trees and vegetation are needed.

### **f) The maximum occupation of the construction site (in temporary / permanent)**

The permanent occupation of the site is defined by the outer boundaries of the building.

If necessary, temporary site equipment will be placed on adjacent plots especially when connecting the connectors. However, these temporary gains will be as small as possible extent and for a period of time strictly necessary and agreed in advance with the respective owner land and network administrator

**g) Maximum quantities produced and types of waste and emissions during construction, its disposed.**

Types and quantities of waste are listed in the Technology Code for the given building. All waste will be disposed exclusively in authorized facilities for the disposal of waste. Documents on the transfer of waste to these establishments must be kept (eg builder) for possible inspection.

**h) Balance earthworks requirements for feed or soil dumping ground**

Part of depositions in the western part of the land will be used for landscaping. The rest of the soil will be dumped. Feed up the soil at the construction site is not needed.

**i) Environmental protection during construction**

During the construction will be used machinery and equipment in proper condition to avoid environmental damage. During construction, there will not be any air pollution caused by burning for example. All waste will be stored in a landfill.

**j) Occupational health and safety in work in construction side, assessment of coordinator needs of health and safety at work under other legal regulations**

The construction work will be subject to the OSH safety regulations, in particular

Government Order No. 591/2006 Coll., on Closer Minimum Safety Requirements and protection of health at work on construction sites, Government Order no. 362/2005 Coll., on Neighbors occupational safety and health requirements in workplaces with a fall hazard from height or depth and Act No. 309/2006 Coll., on securing further conditions safety and health at work. The construction contractor will secure the building site to be unauthorized persons are prohibited.

**k) Arrangements for barrier-free use of the construction of the buildings concerned**

It does not exist.

**l) Principles for transport engineering measures**

All principles will be followed, the cars used in the construction will be fitted with cleaning chassis with substance separator. The building will be accessible from local roads, it is not necessary to change the traffic signs around the building, as the site is large enough for all mechanization.

**m) Setting special conditions for the implementation of construction (implementation structures in operation, measures against the effects of external environment during construction, etc.).**

Determining special conditions for the implementation of construction is not required. Possible work at heights in unprotected areas weather conditions must be interrupted in the storm, heavy rain, snow, formation of icing, under visibility less than 30 m, at ambient temperatures below -10 ° C, in the wind speeds above 8 m / s, etc.

**n) Construction process, decisive partial deadlines**

Expected start of construction work - April 2018

Construction Completion - February 2020



**VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ**

BRNO UNIVERSITY OF TECHNOLOGY

**FAKULTA STAVEBNÍ**

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**ÚSTAV POZEMNÍHO STAVITELSTVÍ**

INSTITUTE OF BUILDING STRUCTURES

**MATEŘSKÁ ŠKOLA**

KINDERGARTEN

**D DOCUMENTATION OF THE OBJECT AND  
TECHNICAL AND TECHNOLOGICAL EQUIPMENT**

**DIPLOMOVÁ PRÁCE**

DIPLOMA THESIS

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**BRNO 2018**

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## **D.1 DOCUMENTATION OF THE CONSTRUCTION**

### **D.1.1 Architectonic solution**

#### **D.1.1.1 Purpose of object, function filling, capacity data**

The resolved building is a new kindergarten school for education of pre-school age children, including also external leisure activity space.

Capacity of the kindergarten space is designed for two departments, maximum for 48 children. The proposed building has one above ground floor and a basement (underground floor).

Build-up area: 1383,95 m<sup>2</sup>

Enclosed building space: 4024,2 m<sup>3</sup>

Usable area of the building: 1631,429 m<sup>2</sup>

Number of parking spaces: 10 + 1 for disabled people

Number of children's departments: 2

Number of children in one unit: 24

Number of employees: 4 teachers, 1 director, 3 cooks, 1 cleaner

#### **D.1.1.2 Architectural, art, material and layout solutions, barrier-free building use**

The architectural solution is based on the investor's requirements and is designed to fit into the surrounding area. The building is divided into two big areas, the main one is the part of the kindergarten which has two floors and the second one is the part for external leisure activities with only one floor, each space has its own main entrance. Technical and operational background is located in the underground floor which has an access from the kindergarten part of the building. Roof above second and as well as on the first floor are made of single-layer flat green roof, drainage of roofs inside the building, the roof above the 1st floor on the right side is from stone aggregates.

The surface layer on the facade is made of silicate plaster. Colorfully the building is divided into 4 different shades to be ensuring a large color of

the building, making it more pleasant children's environment. At the same time, the color classification is chosen to make it obvious different functional division of the object, there is an orange color for the external leisure activities part of building, blue is for the working part, yellow for the first floor of the daily class and white for the second floor. Those colors were also chosen to fit perfectly into the neighborhood where are block of flats with similar colors around.

All windows and doors are from blue color 3-28 VEKRA. Paving around the house is designed of concrete blocks BEST-ARCHIA.

The building is based on the strip foundation of the plain concrete, which it follows base concrete slab tl. 150 mm reinforced with reinforced mesh. As waterproofing against ground humidity, asphalt sheets made of SBS modified asphalt are designed. Vertical structures designed from lime-sand SENDWIX bricks. Thermal insulation facades with contact insulation system made of mineral wool-insulating material with thickness of 150 mm. Ceiling structures from the pre-stressed concrete ceiling Spiroll panels.

The construction is designed to allow the use of the 1<sup>st</sup> floor by persons with limited mobility and orientation skills.

#### **D.1.1.3 Total operational solution, production technology**

In this project, I have a structured design of a kindergarten building. The building is dividing into two main parts, the part of kindergarten for children from 3 to 6 years old and part for external activities.

Kindergarten part has two above ground floors and one underground floor. Is a place for 24 children per class, in this case there are two classes so the whole kindergarten area is dedicated for 48 children. Kindergarten part is divided into different sections in each floor. I will go into further detail to describe each floor and classify each room according to its section.

1<sup>st</sup> underground floor: All the 1<sup>st</sup> underground floor is one section – technical section. The first area is an entrance hall (S11), which is accessible by the staircase from the 1<sup>st</sup> above ground floor. From there we can enter to the first room which has a chimney and is used as a storage room (S12). From this room we have a direct access to the technical room (S13) where is located the boiler 1<sup>st</sup> above ground floor:

1<sup>st</sup> aboveground floor:

The first floor is dedicated for children of 3 and 4 years old. This kindergarten part is divided into different sections. The very first space we notice in this floor is the entrance area (101), where is located the staircase which link the second floor and the underground floor to the first floor. The entrance area (101) is followed by a changing room (102) for children which is classified as public and communication section.

On the left side of the changing room (102) there is a working area. This area is composed by the main corridor which give as an access to the cleaning room (103), laundry room (104) and to the changing room for workers (107). The changing room for workers (107) has a link to shower (105), WC for woman (109) and man (108), and to the side entrance (111) to the building. The side entrance (111) is dedicated for the staff workers and food or technical distribution, from this space we can go directly to the storage room (110) and to the kitchen (112), both of those areas are connected by a door. Left from the entrance for staff workers there are two doors, the first one is a storage for outside toys (113) and the second door is a bathroom (114). On the right side of the changing room for children (102) there is a changing room for teachers (122) with two WC (120,121). The second door on the right side gives us access to the lavatory (119), there is also an interior window, to make those two areas totally connected, it is necessary for teachers to constantly watch out for children. The third door in the middle is for the main room of the kindergarten, daily room for children (118) with large French windows all over the area. In this room there is also a storage for toys (117) and beds (116). There is also a window



for food distribution and a door for the kitchen (112). In the kitchen (112) there is a lift for meal for the 2<sup>nd</sup> floor.

2<sup>nd</sup> underground floor:

The second floor is dedicated for children from 5-6 years old, is a pre-school class. The staircase (201) from the first floor gives us access to the second floor in front of the staircase (201) there is a director office (202) from here we can go directly to the meeting room for teachers (203), despite of this entrance there is also another one from the entrance hall where is the staircase (201) located. The other door on the right side from the staircase is to the children changing room (215). On the right side in the changing room (215) there is teachers changing room (214) equipped with WC for women (211) and men (212). The other door followed also on the right side is to the cleaning room (213), then there is a door for the lavatory (210), which also has an interior window with a view to the children changing room (215) and to the main daily room (209). The door in the middle in the in changing room (215) gives us an access to the daily room for children (209) with large French windows all over the area. In this room there is also a storage for toys (206) and beds (207). There is also a window for food distribution and a door for the kitchen (205). In the kitchen (205) there is a lift for meal for the 2<sup>nd</sup> floor. In this room there is also a door for the second staircase (208) which gives us an access to the first floor and then to the garden it is used mainly as an escape way. On the right side in the changing room for children (215) there is a logopedic clinic (204).

The second part of the building is for the external activities, which has only the first floor. The first area which we can noticed is the entrance hall (123). From there we can go directly to the changing room (124). In this room there are three doors. Two of doors are for the classes (125,126) with large French windows. The third door is for the bathroom (129) where are two WC, one for women (127) and the other for men (128).

#### **D.1.1.4 Structural and construction-technical solution**

##### **a) Demolition work**

There will be necessary to cut few trees and other vegetation located on the site. No other demolition works are required in connection with the construction of the building.

##### **b) Earthworks**

According to the indicative geological appraisal was detected at the level of the foundations soil of class 4- sandy clays. These soils are quite suitable for building foundations. Before starting earthworks, there will be removed the topsoil of the thickness of 100 mm. The top soil will be stored in a landfill located in the western part of the plot so as not to hinder any work throughout construction. Upon completion, the orchard will be used for landscaping.

Excavation work also includes excavation of the pit, trench for foundations and excavations for utility network connections. Excavations for utility network connections must be sloped in the direction of the building. Excess soil from excavations will be stored at a landfill located on the land of the investor.

As soon as the excavation for foundation is completed it is necessary to do a quick concreting of strip foundations in order to avoid the possibility of loosening the foundation joint.

During the excavation work, the foundation joint should always be consistently protected against mechanical damage and adverse climatic impacts.

##### **c) Foundations**

The foundation strips under 1<sup>st</sup> above ground floor are made of plain concrete of class C20/25, and formwork of concrete blocks filled with concrete C20/25 reinforced by longitudinal and transversal reinforced according to static calculations. All the foundation strips are 800 mm thick and 1200 mm below the flooring level  $\pm 0,000$  (refers to 338

m.a.s.l.). and below internal wall the thickness is 2400 mm and 2600 mm and 1900mm and 2000 mm below the flooring level  $\pm 0,000$  (refers to 338 m.a.s.l.). The diameters of reinforcement are according to structural design. These huge thickness of foundation strips is due to soil type which is made from sandy clays and partially also because of the load transferring by the house itself. For more information see annex D.1.2.6 Other calculations, D.1.2.1 Foundations drawing and D.1.15 section B-B'.

#### **d) Waterproofing**

Waterproofing is done underneath the whole structure above foundation slab above the 1st underground floor and 1<sup>st</sup> above ground floor, with the help of bitumen sheets GALSTEK 40 Special mineral and ELASTEK 40 Special mineral. Waterproofing in form of asphalt sheets is also located in the composition of the roof above 1<sup>st</sup> as well as 2<sup>nd</sup> floor and in the wall composition of the underground floor.

#### **e) Vertical load-bearing structures**

The envelope walls are made of lime-sand SENDWIX 5DF-LP lime-sand bricks blocks th. 290 mm on mortar (SENDWIX) supplemented with a certified contact insulation system th. 150 mm (thermal insulation made of mineral wool-insulating material), internal load-bearing walls are made from the same material as peripheral walls lime-sand SENDWIX 5DF-LP lime-sand bricks blocks th. 290 mm.

#### **f) Partitions**

The partitions are from SENDWIX 4DF-LD lime-sand bricks th. 115 mm.

#### **g) Lintels**

For the peripheral wall there will be used lintel SENDWIX 2x2DF (height of 240 mm th.115 mm each) and concrete coating in the middle, there will be mineral wool on the external part of the building. For the internal lintels on load-bearing structure there will also be lintel SENDWIX 2x2DF (height of 240 mm th.115 mm each) and concrete coating in the middle but without the thermal insulation. On the partition there will be only e 1x 2DF

(height of 240 mm th.115 mm). In some cases, for large windows there will be used reinforced concrete lintel of height 250 mm and individual lintels will be stacked into reports wall thickness. The lengths of individual translations are listed in the drawings of each floors. For lintels, it is necessary to keep their manufacturer's minimum storage. For more specification see annex D.1.1 drawing of floor plans.

#### **h) Horizontal load-bearing structures**

Ceiling above underground, first, as well as second floor is going to be made of pre-stressed concrete ceiling hollow panels SPIROLL. The thickness of the panel is 250 mm. Above envelope walls there is a ring of thickness 250 mm from reinforced concrete. Concrete class and diameter of reinforcement is done according to static calculation.

The ceiling structure will be made of suspended plasterboard on steel frame hanging from the floor structure (SPIROLL panels) possibly a suitable acoustic suspended ceiling in the desired rooms such as daily rooms and classrooms.

#### **i) Roof**

The roof system used in this kindergarten is a system of green roof. The roof above the 1<sup>st</sup> floor on the east side has an inclination of 3% to just one side and has two drainage pipes, which is a perforated pipe to divert water into the rain drainage. The roof above 1<sup>st</sup> floor on the west side has two inlets and safety outlets. The roof above the residential has two inlets and safety outlets in the area of the roof. The main distributor is DEK.

#### **j) Insulation**

Thermal insulation on the envelope wall is from mineral wool boards (ISOVER PROFI). Thermal insulation on the plinth is extruded polystyrene ISOVER SYNTHOS XPS PRIME 30L this thermal insulation is going to be used on the peripheral wall of underground floor.

Green roof above the residential pat as well as above the non-residential

one is insulated by two layers of thermal insulation ISOLVER EPS th.100 mm and 160 mm.

Thermal insulation on the floor, above the first floor th.140 mm of graphite foam and 40 mm OF EPS 200 for heating pipes, and above underground floor th.80mm of STYRODUR 4000CS. For more information, see Compositions is Annex D.1.1.20.

#### **k) Windows and doors**

Aluminum wooden triple-glazing windows VEKRA Alu design Classic were designed. The entrance doors are from the same material as windows, VEKRA Alu design Classic.

There are skylights in the 1<sup>st</sup> floor in the lavatory and teachers changing room and in the children changing room in the 2<sup>nd</sup> floor. The entrance doors are from the same material as windows, VEKRA Alu design Classic and for the back doors opening I design the doors from the same distributor as for entrance door, the only thing which differs is from the esthetical design. All above-mentioned windows and doors are in the same blue 3-28 color. Internal doors are wood laminated from SAPELLI. For more information, see List of doors in annex D.1.1.19 and list of windows in annex D.1.1.18.

#### **l) Floor**

There are three different types of floor finishes – ceramic tiles, lamellae flooring and polished concrete screed. In the underground floor there is a polished concrete screed all over the area. Then in the first and second floor there are ceramic tiles in the entrance halls (101,111,123), changing rooms(107,122, 124, 214,215), kitchen (112, 205), and bathrooms / WC / lavatories (105, 108, 109,114,119,120,121,127,128,129,210,211,212), cleaning room (103,213), storages (110,113,116,117,206,207), laundry room (104), corridor (106) and staircase(115,201,208). Lamellae of marmoleum

flooring is placed in daily rooms (118,209), classrooms (125, 126), logopedic clinic (204), meeting room (203) and office (202). There is also a thermal insulation on the floor, above the first floor th.140 mm of graphite foam and 40 mm of EPS 200 for heating pipes, and above underground floor th.80mm of STYRODUR 4000CS. For more information, see Compositions is Annex D.1.1.20

#### **m) Surface finishing**

##### Interior tiles

Tiles are designed in bathrooms, toilets and in the kitchen behind the kitchen.

The height location of the tiles is indicated in the drawing documentation of the individual floors. The tiles will be glued to the underlying core layer of plasters. Selection of color shades and the dimensions of the tiles will be made according to the investor's wishes. In places with wet traffic it is necessary to apply a waterproofing trowel before gluing the tiles.

##### Internal plasters

internal plasters are designed as single-layer, made of core plaster 15mm and interior stucco 5mm. Thinning with a felt trowel. Plasters will be made before the floors are applied and tightened to the floor level.

##### Exterior plaster

The final layer of exterior plasters will be made of thin-layer silicate facade

plaster (grain size 2 mm) in thickness 2 mm. The plaster will be stained according to the location on the facade. It will be applied to the top layer of the thermal insulation system made of cement adhesive with glue applied with reinforcing glass mesh.

##### Suspended ceilings

Plasterboard ceilings will be made in some rooms. There will be used plasterboards tl. 12.5 mm, anchored on steel grid from profiles.

Wet dry rooms will be impregnated with gypsum boards.

In the teachers changing room in the 1<sup>st</sup> floor there will be suspended ceiling from elements. In the dayroom for children and in the classrooms, an acoustic ceiling will be provided of the Ecophon Master A panels.

Suspension height 200 mm below the ceiling structure.

#### Pre-wall structures

The prefabricated structures in the bathrooms, lavatories and WC, will be made of plasterboards anchored on a grid of CW 50 profiles.

Plasterboards will be made of ordinary plasterboard KNAUF red green.

The heights and widths of the front are given in floor plans of individual floors.

#### Painting and coating

The final painting will be painted on the plaster. Colorfully the building is divided into 4 different shades to be ensuring a large color of the building, making it more pleasant children's environment. At the same time, the color classification is chosen to make it obvious different functional division of the object, there is an orange color for the external leisure activities part of building, blue is for the working part, yellow for the first floor of the daily class and white for the second floor. Those colors were also chosen to fit perfectly into the neighborhood where are block of flats with similar colors around.

For gypsum plasterboard construction will be used painting for gypsum boards.

The color shades in each room will be made on request investor.

#### **n) Staircase**

Both of staircases are identical, made of reinforced concrete. Its width is 1200 mm. Calculated height of the step is 150 mm and width is 330 mm. There are 24 steps designed and the slope of the flight is 27,16°. The staircase is designed according to standards. Turned staircase with wing

of dimension 12x150x330 mm. Staircases are designed according to standard CSN73 4130 Stairs and sloped ramps.

**o) Chimney**

The Schiedel Absolut outdoor chimney system, designed with 2 chimneys, vents with an internal diameter of 140 mm. The chimney flue is supplied as a system product made up of individual fittings that are built on each other they jump together. Fittings are composed of an internal ceramic insert and a sandwich cladding. The chimney is terminated by an anti-rain cover.

**p) Ventilation**

Ventilation of the building is ensured naturally via windows and doors. There's forced ventilation in toilet rooms, corridor, changing rooms and kitchen hood is designed.

**q) Terrain work**

Within the landscaping, paved surfaces will be made around the building. Landscaping will be done, and new trees and shrubs will be planted. Around the building will be a slope paving path made of a concrete. Border of the slope paving path with the help of concrete pillars.

**D.1.1.5 Building safety, health and work safety environment**

The building is designed from health-conscious, certified materials, so that the use of the building is safe. When using an object, keep it all construction of the house in good condition to avoid damage to the building.

**D.1.1.6 Building physics**

The detailed assessment of building physics is devoted to a separate technical report, which is part of Annex 6.



#### **D.1.1.7 Protection of the building against adverse effects of the environment**

The surface is protected against the action of earth moisture by the waterproofing asphalt sheets, the flat green roof and its attic are watertight against rainwater penetration by asphalt sheets. The specifications of the waterproofing are described in more detail in the foregoing chapters. Measures against other negative effects of the external environment are not required.

#### **D.1.1.8 Requirements of fire protection of the building**

The construction is designed according to the applicable regulations and standards fire safety of buildings mentioned in annex D.1.3 Fire safety protection. The construction meets the load and stability requirements of construction over a period of time, limitation of the development and spread of fire in the building, limitation of propagation of fire to neighboring buildings, enabling people and animal to evacuate and enabling safe intervention of fire protection units.

A detailed description of the fire safety solution of the building is a separate part technical report, which is contained in Annex 5 - D1.3 Fire Safety Solution.

### **3. CONCLUSION**

The project documentation for realization was discussed in the diploma thesis kindergarten. The work is done according to all legal regulations valid at the time of work.

The greatest benefit of this work is the deepening of knowledge in the field of children's buildings, here kindergarten schools, which are in many cases different and stricter than requirements for other constructions. During the elaboration of the thesis, the horizon was expanded in the field of construction, as well as the fact that my experience so far was mainly with residential buildings.

During the work, changes were made to the original proposal. As a rule, it was about minor modifications in the materials or their replacement for another, better or more competitive product.

Major changes were then made to modify the disposition inside the building so that they are met all requirements for construction, especially in the field of daylight lighting and teachers needs in the building.

The thesis is prepared in accordance with the requirements of diploma thesis supervisor.

The work also respects the uniform form of processing required by the Land Institute of buildings at BUT.

## 4. LIST OF USED SOURCES

### Standards:

ČSN 01 3420. Výkresy pozemních staveb - Kreslení výkresů stavební části. Praha: Český normalizační institut, 2004. Třídící znak 01 3420

ČSN 73 0601. Ochrana staveb proti radonu z podloží. Praha: Český normalizační institut, 2006. Třídící znak 73 0601

ČSN 73 0540-1. Tepelná ochrana budov: Terminologie. Praha: ČNI, 2005. ČSN 73 0540-2. Tepelná ochrana budov: Požadavky. Praha: ČNI, 2011.

ČSN 73 0540-2. Tepelná ochrana budov: Požadavky. Změna 1. Praha: ČNI, 2012.

ČSN 73 0540-3. Tepelná ochrana budov: Návrhové hodnoty veličin. Praha: ČNI, 2005.

ČSN 73 0540-4. Tepelná ochrana budov: Výpočtové metody. Praha: ČNI, 2005.

ČSN EN ISO 13788 (730544). Tepelně vlhkostní chování stavebních dílců stavebních prvků: Vnitřní povrchová teplota pro vyloučení kritické povrchové vlhkosti a kondenzace uvnitř konstrukce: Výpočtové metody. Praha: ČNI, 2002.

ČSN 73 1901. Navrhování střech: Základní ustanovení. Praha: ČNI, 1999.

ČSN 73 0580-1. Denní osvětlení budov - Část 1. Praha: ČNI, 2007.

ČSN 73 0580-1. Denní osvětlení budov - Část 1: Změna 1. Praha: ČNI, 2011.

ČSN 73 0580-2. Denní osvětlení budov - Část 2: Denní osvětlení obytných budov. Praha: ČNI, 2007.

ČSN 73 0580-3. Denní osvětlení budov - Část 3: Denní osvětlení škol

cích zabezpečujících bezbariérové užívání staveb

Vyhláška č. 410/ 2005 Sb. o hygienických požadavcích na prostory a provoz zařízení a provozoven pro výchovu a vzdělávání dětí a mladistvých

Nařízení vlády 272/2011 Sb., o ochraně zdraví před nepříznivými účinky hluku a vibrací

## **Software used**

Microsoft Office 2010

AutoCAD 2018

ArchiCAD 18

Related standards and laws

Day lighting – VELUX

TEPLO

AREA

## **www-sources**

VEKRA available at: [www.vekra.cz](http://www.vekra.cz)

GUTTABIT available at: [www.guttashop.cz](http://www.guttashop.cz)

STAVBA HROU available at: [www.stavbahrou.cz](http://www.stavbahrou.cz)

TZB INFO available at: [www.tzb-info.cz](http://www.tzb-info.cz)

RAKO available at: [www.rako.cz](http://www.rako.cz)

BEST available at: [www.best.info](http://www.best.info)

CATASTRAL MAP available at: [www.cuzk.cz](http://www.cuzk.cz)

DEK available at: [www.dek.cz](http://www.dek.cz)

MAPEI available at: [www.mapei.com](http://www.mapei.com)

CEMIX available at: [www.cemix.cz](http://www.cemix.cz)

MIRELON available at: [www.mirelon.com](http://www.mirelon.com)

ISOVER available at: [www.isover.cz](http://www.isover.cz)

SHIEDEL available at: [www.schiedel.cz](http://www.schiedel.cz)

STROPSYSTEM available at: [www.stropsystem.cz](http://www.stropsystem.cz)

FATRAFOL available at: [www.fatrafol.cz](http://www.fatrafol.cz)

TOWET available at: [www.topwet.cz](http://www.topwet.cz)

WEER-TERRANOVA available at: [www.weber-terranova.cz](http://www.weber-terranova.cz)

PREFA available at: <http://www.prefa.cz/>

SEMOVYTAHY available at: [www.semovytahy.cz](http://www.semovytahy.cz)

ECOPHON available at: [www.ecophon.com](http://www.ecophon.com)

HRISTE available at: [www.hriste.cz/](http://www.hriste.cz/)

SAPELI available at: [www.sapeli.cz/](http://www.sapeli.cz/)

FOBRO available at: [www.kpp.cz/](http://www.kpp.cz/)

## 5. LIST OF USED ABBREVIATIONS AND SYMBOLS

|               |   |
|---------------|---|
| Coll.         | collocation   |
| ČSN           | česká státní norma=Czech national                           |
| stand. FC     | fire compartment  |
| LV            | list of ownership   |
| S-JTSK        | jednotné trigonometrická síť katastrální = uniform          |
| trigonometric | cadastral network   |
| VŠKP          | vysokoškolská kvalifikační práce = university qualification |
| work min      | minimal   |
| max           | maximal   |
| no.           | number  |
| par           | paragraph   |
| RC            | reinforced concrete   |
| mm            | millimeter  |
| m             | meter   |
| th.           | thickness   |
| S             | scale   |

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- Annex B – Heat transfer of windows and doors

- Annex C – Assessment of the object of the point of view of acoustics
- Annex D – Day lighting of the critical room
- Annex E – Thermal bridges
- Annex F – Protocol of the building envelope



# PROHLÁŠENÍ O SHODĚ LISTINNÉ A ELEKTRONICKÉ FORMY VŠKP

## PROHLÁŠENÍ

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

V Brně dne 1. 10. 2017

---

Bc. Janet Klaudie de Ceita  
autor práce

## POPISNÝ SOUBOR ZÁVĚREČNÉ PRÁCE

**Vedoucí práce** Ing. Karel Struhala

**Autor práce** Bc. Janet Klaudie de Ceita

**Škola** Vysoké učení technické v Brně

**Fakulta** Stavební

**Ústav** Ústav pozemního stavitelství

**Studijní obor** 3608T001 Pozemní stavby

**Studijní program** N3607 Civil Engineering

**Název práce** Mateřská škola

**Název práce  
v anglickém jazyce** Kindergarten

**Typ práce** Diplomová práce

**Přidělovaný titul** Ing.

**Jazyk práce** Čeština

**Datový formát  
elektronické verze** PDF

**Abstrakt práce** Diplomová práce se zabývá vypracováním projektové dokumentace pro novostavbu mateřské školy. Budova je rozdělena na dvě části. V první části jsou navrženy 2 samostatné třídy, každá s kapacitou 24 dětí, zázemí pro učitele a v druhé části budovy učebny pro výuku menších kroužků. V první části budovy je pro potřeby školky

navržena kuchyně. Objekt má dvě nadzemní podlaží a suterén. Obvodové nosné zdivo taktéž i vnitřní je navrženo ze systému SENDWIX, vápenopísčité cihly. Zateplení izolační vrstvou z minerální vlny a suterén je zateplen extrudovaným polystyrenem XPS. Stropy jsou z předpjatých stropních panelů SPIROLL. Zastřešení budovy plochou zelenou a na některých části střechy je pouze kacířek. Výkresová dokumentace potřebná pro realizaci mateřské školy je zpracována včetně pěti konstrukčních detailů. Výkresová část byla zpracována v počítačovém programu AutoCAD. Součástí práce je také požární, akustické, tepelně-technické řešení a osvětlení.

**Abstrakt práce  
v anglickém jazyce**

The diploma thesis deals with elaboration of design documentation for the new building of the kindergarten. The building is divided into two parts. In the first part, two separate classes are designed, each with a capacity of 24 children, there are also teacher's facilities, a logopedic counseling, and office. In the second part of the building there are classrooms for external activities. In the first part of the building, the kitchen is designed for the needs of the kindergarten. The building has two aboveground floors and a basement. Load-bearing walls are designed from SENDWIX, lime-cement bricks. Thermal insulation on walls above ground floor are a mineral wool and underground floor walls, as well as the plinth are insulated by extruded polystyrene XPS. The floors are made of pre-stressed concrete floor panels SPIROLL. The building has two types of roof: flat green roof and flat roof with stone aggregates. The drawing documentation necessary for the realization of the kindergarten is processed including five structural details. The drawing part was processed in the AutoCAD computer program. Part of the work is fire, acoustic, thermal-technical solution and daylighting.

**Klíčová slova** mateřská škola, plochá zelena střecha, dřevohliníkové okna, předpjatý stropní panel, suterén, vapo-písčité cihly SENDWIX

**Klíčová slova** Kindergarten, flat green roof, wood-aluminum windows, pre-stressed  
**v anglickém jazyce** ceiling panel, basements, lime-sand bricks SENDWIX



# VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

BRNO UNIVERSITY OF TECHNOLOGY

## FAKULTA STAVEBNÍ

FACULTY OF CIVIL ENGINEERING

## ÚSTAV POZEMNÍHO STAVITELSTVÍ

INSTITUTE OF BUILDING STRUCTURES

## MATEŘSKÁ ŠKOLA

KINDERGARTEN

## ANNEX

SEE SINGLE FOLDS OF DIPLOMA THESIS :

1-PREPARATORY AND STUDY WORKS, 2-SITUATION DRAWINGS, 3-ARCHITECTURAL BUILDING SOLUTION, 4-CONSTRUCTION SOLUTION, 5-FIRE SAFETY SOLUTION, 6-BUILDING PHYSICS

## DIPLOMOVÁ PRÁCE

DIPLOMA THESIS

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