CZECH TECHNICAL UNIVERSITY IN PRAGUE
FACULTY OF CIVIL ENGINEERING

D.1.4 BUILDING ENVIRONMENT TECHNOLOGY

01/2023

Table of Content

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering 	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	A4
LOCATION	Czech Republic – Vodňany	DATE	01/2023
BUILDING'S NAME	Community centre – Vodňany	LVL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	Technical report	-	-

Table of Content

1. Identification data

1.1. Building data

Name of the building:

Community centre – Vodňany

Place of the building:

Zeyerovy sady 963, 389 01 Vodňany, Czech Republic

plots st.1678, 132, st.358, st.1021, 3132, 1762, 689, 3123, 1855/9, st.784/1, 130/3, 130/4, 130/1, 1929

cadastral community Vodňany [784281]

Subject of project documentation:

The subject of the project documentation is the new building of the community centre including the connection to the technical infrastructure.

1.1.1. Data about the developer

ARCHCON atelier, s. r. o.

Národní obrany 826/31

160 00 Praha 6 – Bubeneč

IČ: 28586204

1.1.2. Data about the designer

Bc. Tadeáš Petřík

Dlouhá 971, 330 23 Nýřany

2. General description of the building

The subject of the project documentation is a design of a community centre in a Czech town called Vodňany. It is a building with two floors above ground and one underground floor. The building is square in shape, with

The building is located on plots with parcel number st.1678, 132, st.358, st.1021, 3132, 1762, 689, 3123, 1855/9, st.784/1, 130/3, 130/4, 130/1, 1929. Cadastral community Vodňany [784281].

The building will be connected to the utilities, which are led under the adjacent roads in Zeyerovy Sady and Elektrárenská streets. The construction will not affect any surrounding existing buildings.

3. Urban, architectural and layout design of the building

The subject of the project documentation is a design of a community centre in a Czech town called Vodňany. The building is square in shape, with area of 46,1 x 45,9 m. It has two floors above ground and one underground floor. The height of the building is 9,5 m above ±0,000 or 9,8 m above ground (modified terrain). Structural floor height is 3,9 m for the underground floor, 4,4 m for the first floor and 4,3 m for the second floor.

The main part of the building is a large black box theatre right in the middle of the layout. Around it, on the first floor, there are public areas such as a foyer, cloakroom, café, playroom, clubrooms, staff facilities and sanitary facilities. On the second floor there is another foyer, an adult‘s library and children's library, an exhibition space, a cinema room, storage space, technical facilities for the black room theatre, and again staff and sanitary facilities. On the underground floor we can find a rehearsal room, an air-conditioner mechanical room, a boiler room and storerooms. Near the building there is a playground, few parking spaces, and a park that extends on the rest of the property.

4. Technical design of the building

The load-bearing system varies in different parts of the building. In the underground floor, the load-bearing system is designed as monolithic reinforced concrete walls supplemented by reinforced concrete beams and one-way floor slabs. On the above-ground floors, another load-bearing system is used for the black box theatre, where again monolithic reinforced concrete walls are used, now in combination with wooden truss beams. In the rest of the building, the load-bearing system is designed as a combination of wooden wall panels and wooden columns, supplemented by wooden beams and wooden one-way floor slabs.

The foundation structures are designed as a combination of strips and footings made of plain concrete, between which a base plain concrete slab will be made.

The staircases on the underground floor are designed as prefabricated reinforced concrete, half landing or two-quarter landing. The staircases on the above-ground floors are designed as wooden staircases, placed on wooden staircase beams, again half landing or two-quarter landing.

The building has sufficient spatial rigidity due to the large number of load-bearing walls perpendicular to each other in combination with woodem beams and rigid floor slabs.

4.1. Material solution of the building

Load-bearing structures in the underground floor are made as reinforced concrete monolithic, in the black box theatre as reinforced concrete monolithic in combination with wooden elements, and in the rest of the building the load-bearing structures are made of wood. The foundations are made of plain concrete.

<u>Reinforced concrete structures</u>

- concrete C30/37 XC1 (CZ) – Cl 0,2 – D_{max} 16 – S3
- concrete C30/37 XC2 (CZ) – Cl 0,2 – D_{max} 16 – S3
- steel B 500 B

<u>Foundations</u>

- concrete C25/30 XC2 (CZ) – Cl 0,2 – D_{max} 16 – S3

<u>Truss beams</u>

- wood KVH/DUO C24 (S4S)

Wooden structures

- wood KVH C24
- wood CLT C24
- wood SWP + BSH GL32h
- wood BSH GL30

Partitions

- Knauf W111, thickness 100 mm
- Knauf W112, thickness 100 mm
- YTONG Klasik 100, thickness 100 mm

4.2. Work safety and health protection

All measures and legal regulations to ensure occupational safety and health protection on the construction site must be strictly observed by all construction workers throughout the construction activity and in the phase of its preparatory work (Act No. 183/2006 Coll., Government Regulation No. 591/2006 Coll., on more detailed minimum requirements for occupational safety and health protection on construction sites, Government Regulation No. 494/2001 Coll. and No. 495/2001 Coll.).

5. Technical building equipment

In terms of technical building equipment, only concepts and schematic drawings of the individual HVAC, water and sewerage distribution systems are addressed.

5.1. Sewerage

5.1.1. Connection to the public sewerage system

The building is connected to the public unified sewerage system, the line of which runs in the local road of the adjacent Zeyerova street, at a distance of approximately 50,0 m from the building.

5.1.2. Sewer connection

The sewer connection is used to connect the internal sewerage network and the public sewerage system. The connection starts at the point of connection to the internal sewerage system of the building in a 600 mm diameter external inspection shaft, which is located in front of the north side of the building in front of the secondary northern exit from the building, and continues in a gravity gradient of 2% to the public sewer to which it is connected. The connection is made of DN 315 PVC KG pipes and is 50,75 m long.

Wastewater quantity:

Sewage:

FLOOR	SANITARYWARE	DU [l/s]	units	∑DU [l/s]
UG FL No.1	floor drain	2,0	1	2,0
FL No.1	floor drain	2,0	2	4,0
	washbasin	0,5	15	7,5
	toilet	1,8	16	28,8
	urinal	1,5	4	6,0
	shower	0,8	2	1,6
	sink	0,8	1	0,8
FL No.2	washbasin	0,5	5	2,5
	toilet	1,8	4	7,2
	urinal	1,5	5	7,5
	sink	0,8	1	0,8
TOTAL				68,7

$Q_W = k * \sqrt{\sum DU} = 0{,}5 * \sqrt{68{,}7} = 4{,}14$ l/s

Rainwater:

$Q_R = i * c * A = 0{,}03 * 1 * 1992{,}91$ = 59,79 l/s

Total amount of wastewater:

$Q_{RW} = 0{,}33 Q_W + Q_R = 0{,}33 * 4{,}14 + 59{,}79$ = 61,16 l/s (0,78 m/s)

61,16 l/s < 77,9 l/s (1 m/s) => FULFILLED

The designed sewer connection DN 315 of the PVC KG system with a gradient of 2% is suitable.

5.1.3. Inspection shafts

In the building there are 6 inspection shafts with square ground plan dimensions 900x900 mm equipped with a movable cast iron cover. These inspection shafts will be fitted with a cleaning fitting mounted on the sewer pipe. In front of the building there is another inspection shaft, located in front of the northern secondary entrance, with a circular plan shape, with a diameter of 600 mm. This inspection shaft will also be fitted with a movable cast iron cover.

5.1.4. Internal sewerage

The internal sewage sewer serves to drain wastewater from all sanitaryware and is terminated at the outdoor inspection shaft where it flows into the proposed sewer connection.

Horizontal pipes:

The horizontal piping is made of PVC KG pipes and is laid at a slope of at least 2% under the base concrete of the underground floor. The pipeline is provided with a plastic protector at all the penetration points.

Riser pipes:

The riser pipes are made of HT PP pipes, which are designed for wastewater disposal inside buildings. In most cases, the riser pipes are routed in installation shafts. All riser pipes are fitted with cleaning fittings which are located at the lowest floor where the riser pipes are located, i.e. at the first floor and the first underground floor, at a height of 1000 mm above the floor level of the respective floor. All risers shall be ventilated by ventilation heads with their outlets located 500 mm above roof level.

Connection pipes:

The connecting pipes are made of HT PP pipes. All connection pipes are made with a minimum slope of 3%. Connection pipes are routed in installation partitions made of Knauf PBD partitions W111 system, or behind the kitchen counter. All sanitaryware is connected to the sewerage network via odour stoppers.

5.1.5. Storm drain

The building has 2 proposed flat roof tracks, both as green, accessible for maintenance only. The total roof area of the building is 1992.91 m2. Rainwater from both types of roofs is drained into the public sewer through the interior of the building using the building's internal sewer system. Rainwater from the flat roof above the black box theatre is channelled through linear shallow gutters leading to downpipes fixed on the facade of the building. At a depth that is not frozen, the rainwater from the internal sewerage network is then led with a minimum slope of 2% to a retention tank with a regulated outflow (vortex valve), from where it is further led again with a minimum slope of 2% to an external inspection shaft where the storm water pipe of the building is connected to the designed sewerage connection.

5.1.6. Sanitaryware

Floor drains, washbasins, toilets, showers and sinks are designed in the building. All of sanitaryware are connected to the sewerage network via odour stoppers.

5.1.7. Pipe material solution

Pipes of the HT PP system are used for the riser and connection pipes, which are designed for wastewater disposal inside the building. PVC KG pipes are used for the horizontal pipes.

5.2. Water supply

5.2.1. Connection to the public water supply system

The building is connected to the public water supply system, whose public water supply line runs in the local road of the adjacent Zeyerova street, at a distance of approximately 62,0 m from the building.

5.2.2. Water supply connection

The water connection serves to connect the internal water supply and the public water supply. The connection starts at the point of connection to the internal water supply, or at the main water meter, which is located as part of the water meter assembly in an outdoor water meter shaft with a diameter of 600 mm, which is located in front of the north side of the building next to the main entrance, and ends at the point of connection to the public water supply line. The water supply connection is made of HDPE pipes DN 50 and its length is 61,98 m, it is laid at a non-freezing depth and is made at a slope of 0,3% towards the public water supply line.

Calculation of water supply connection dimensions:

FLOOR	SANITARYWARE	q_i [l/s]	units	$\sum q_i$ [l/s]
FL No.1	washbasin	0,2	15	3,0
	toilet	0,1	16	1,6
	urinal	0,1	4	0,4
	shower	0,2	2	0,4
	sink	0,2	1	0,2
FL No.2	washbasin	0,2	5	1,0
	toilet	0,1	4	0,4
	urinal	0,1	5	0,5
	sink	0,2	1	0,2
TOTAL				7,7

Calculation flow rate:

$Q_d = \sqrt{\sum(q_i^2 * n)} = \sqrt{7,7}$ = 2,77 l/s

Návrh dimenze vodovodní přípojky:

$d = \sqrt{\frac{4*Q_d}{\pi*v}} = \sqrt{\frac{4*2,77*10^{-3}}{\pi*2}}$ = 0,042 m

The designed water supply connection DN 50 made of HDPE pipes is suitable.

5.2.3. Water meter assembly

The water meter assembly is located in a 600 mm diameter water meter shaft located in front of the north side of the building next to the main entrance.

The water meter assembly consists of the following elements (in order from the public water supply line to the internal water supply line): main cap, reduction, plastic sleeve, water meter, reduction, plastic sleeve, non-return valve, closure with drainage (drain valve).

5.2.4. Sanitaryware

Floor drains, washbasins, toilets, showers and sinks are designed in the building. All of sanitaryware are connected to the water supply network.

5.2.5. Pipe material solutions, pipe insulation

The water connection is made of HDPE pipes DN 50. The internal water supply network is made of PPR pipes. The pipes are insulated with polyethylene foam insulation sleeves of appropriate diameters.

5.2.6. Internal water supply

All internal water supply piping will be made of PPR pipes, which will be routed in installation shafts, installation partitions and behind kitchen counters. All riser pipes are fitted with a stop valve and a drain valve.

5.2.7. Water consumption measurement

The main water meter is located in front of the building as part of the water meter assembly in the water meter shaft DN 600. In each installation shaft there are secondary water meters for cold and hot water.

5.3. Heating

5.3.1. Heat source

An air-to-water heat pump will be used as a heat source in the building. The outdoor part of the heat pump will be located above the roof, the indoor part of the heat pump will be located in the utility room together with the accumulator. From the accumulator, the pipes are further routed through a distributor/collector to the heating elements. In addition to the internal part of the heat pump, the accumulator and the distributor/collector, the air conditioning unit and the hot water tank are also located in the technical room.

5.3.2. Pipe material solutions, pipeline distribution

The piping used to heat the building is made of copper. The piping is located in the installation shafts, to which the piping is led from the technical room in the underground floor, to the individual heating units the piping is then led in the floors of the individual rooms. The hot water pipes are made of PPR pipes and are again led from the technical room to the installation shafts, from which the pipes are further led in the installation partitions.

5.3.3. Calculation of hot water production

Hot water demand per time period:

n = 156 persons

$V_{2P} = 0,02*n = 0,02*156 = 3,12\ m^3/day$

Note: The calculation assumes a hot water consumption of 0,02 m^3/person per day, which is based on the recommended value of the standard ČSN 06 0320.

The heat demand taken from the heater:

$E_{2t} = V_{2P}*\rho*c*(t_2-t_1) = 3,12*1000*1,163*(55-10) = 163,29\ kW/day$

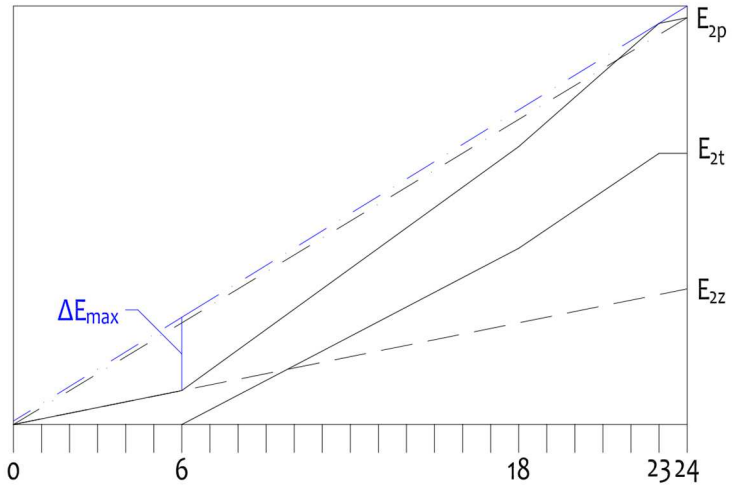
$E_{2z} = E_{2t}*z = 163,29*0,5 = 81,65\ kW/den$

$E_{2p} = E_{2t} + E_{2z} = 163,29 + 81,65 = 244,94\ kW/day$

Water tank size:

TIME SECTION	E_{2t} SHARE	
	[%]	[kW]
0-6	0	0
6-18	65	106,14
18-23	35	57,15
23-24	0	0

Graph of heat consumption and supply:



ΔE_{max} = 44,15 kW

$V_z = \frac{\Delta E_{max}}{\rho * c * (t_2 - t_1)} = \frac{44,15}{1000 * 1,163 * (55 - 10)}$ = 0,84 m^3 = 840 l

Design: 1 hot water tank, capacity 900 l

5.4. Air conditioning

Forced equal pressure ventilation will be designed throughout the building, which will be provided centrally by two air conditioning units, one of which is located on the roof of the building and provides supply and exhaust air for the black box theatre, and the other is located in the utility room on the underground floor and provides supply and exhaust air for the rest of the building.

5.4.1. Pipeline distribution

All ductwork for fresh and exhaust air will be square, galvanized. All ducting will be routed under ceilings, covered with a PBD dropped ceiling. The dimensions of the individual ducts are specified in the calculation below, see paragraph 4.4.3. and drawings D.1.4-9 to D.1.4-12.

5.4.2. Distribution elements

For fresh and exhaust air supply to and from the rooms, disc valves and, if necessary, outlets located in the wall are used. In the black box theatre, the supply and exhaust air is provided by anemostats. In addition, recirculation hoods with carbon filters will be installed above the kitchen units.

5.4.3. Calculation of air conditioning

Standard values of supply and exhaust air:

Recommended values according to the national annex Z1 to standard ČSN EN 15 665.

Ventilation intensity: l = 0,5 1/h

Supply air flow per person: 20 (15) m^3/(h*pers)

Exhaust air flow: kitchens 150 m^3/h (min. 100 m^3/h)

bathrooms 90 m^3/h (min. 50 m^3/h)

toilets 50 m^3/h (min. 25 m^3/h)

Note: Due to the type of building, its operation and the aim to achieve the lowest possible energy consumption of the building, the values for supply and extract air will be adjusted accordingly.

Formulas used:

$V_{pi} = V_m * I$ [m^3/h] V_{po} = 20 (15) * number of persons [m^3/h]

Amount of supply and exhaust air:

AC UNIT No.1 – BLACK BOX THEATRE					
PART OF THE BUILDING	NUMBER OF PERS.	V_m [m^3]	V_{pi} [m^3/h]	V_{po} [m^3/h]	V_o [m^3/h]
BLACK BOX THEATRE	416	608,1	304,1	**6240**	-

AC UNIT No.2 – REST OF THE BUILDING						
PART OF THE BUILD.	ROOM	NUMBER OF PERS.	V_m [m^3]	V_{pi} [m^3/h]	V_{po} [m^3/h]	V_o [m^3/h]
UG FL No.1	STORAGE	-	20,6	**10,3**	-	-
	REHEARSAL ROOM	5	30,7	15,4	**75**	-
	STORAGE	-	19,3	**9,7**	-	-
	WORKSHOP	-	34,3	**17,2**	-	-
	STORAGE	-	31,7	**15,9**	-	-
FL No.1	FYOER	30	256,3	128,2	**450**	-
	CAFÉ	30	143,5	71,8	**450**	-
	CLEANING ROOM	-	7,6	**3,8**	-	**25**
	WC EMPLOYEES	-	2,8	**1,4**	-	**25**
	WC WOMEN	-	3,7	**1,9**	-	**25**
	WC MEN	-	3,7	**1,9**	-	**25**
	WC CHILDREN	-	6,2	**3,1**	-	**25**
	KITCHEN	-	6,8	**3,4**	-	**100**
	PLAYROOM	15	65,1	32,6	**225**	-
	BEDROOM	15	35,7	17,9	**225**	-
	STORAGE	-	108,7	**54,4**	-	-
	DRESSING ROOM MEN	10	29,6	14,8	**150**	-
	WC MEN	-	6,0	**3,0**	-	**50**
	DRESSING ROOM WOMEN	10	29,6	14,8	**150**	-
	WC WOMEN	-	6,0	**3,0**	-	**50**
	CLUBROOM	20	56,0	28,0	**400**	-
	CLUBROOM	20	56,1	28,1	**400**	-
	CLEANING ROOM	-	2,7	**1,4**	-	**25**
	WC MEN	-	20,9	**10,5**	-	**25**
	WC WOMEN	-	21,8	**10,9**	-	**25**
	CLOAKROOM	2	95,6	**47,8**	40	-
FL No.2	FOYER	10	106,2	53,1	**200**	-
	EXHIBITION SPACE	-	35,5	**17,8**	-	-
	LIBRARY	20	273,9	137,0	**300**	-
	DEPOSITORY	-	41,9	**21,0**	-	-
	DEPOSITORY	-	18,7	**9,4**	-	-
	CHILDREN'S LIBRARY	20	247,3	123,7	**300**	-
	OFFICE	3	16,6	8,3	**60**	-
	OFFICE + KITCHEN	3	23,0	11,5	**60**	**100**
	WC WOMEN	-	11,4	**5,7**	-	**25**
	WC EMPLOYEES	-	5,4	**2,7**	-	**25**
	WC MEN	-	10,5	**5,3**	-	**25**
	LECTURE ROOM	60	79,1	39,6	**900**	-

Designed amount of supply and extract air with respect to equal pressure ventilation:

PART OF THE BUILDING	NUMBER OF PERS.	DESIGNED VALUES	
		V_p [m^3/h]	V_o [m^3/h]
BLACK BOX THEATRE	416	6300	6300
TOTAL		**6300**	**6300**

PART OF THE BUILD.	ROOM	NUMBER OF PERS.	DESIGNED VALUES	
			V_p [m^3/h]	V_o [m^3/h]
UG FL No.1	STORAGE	-	15	15
	REHEARSAL ROOM	5	100	100
	STORAGE	-	10	10
	WORKSHOP	-	20	20
	STORAGE	-	20	20
TOTAL			**165**	**165**
FL No.1	FYOER	30	450	450
	CAFÉ	30	450	450
	CLEANING ROOM	-	25	25
	WC EMPLOYEES	-	25	25
	WC WOMEN	-	25	25
	WC MEN	-	25	25
	WC CHILDREN	-	25	25
	KITCHEN	-	100	100
	PLAYROOM	15	225	225
	BEDROOM	15	225	225
	STORAGE	-	55	55
	DRESSING ROOM MEN	10	150	150
	WC MEN	-	50	50
	DRESSING ROOM WOMEN	10	150	150
	WC WOMEN	-	50	50
	CLUBROOM	20	400	400
	CLUBROOM	20	400	400
	CLEANING ROOM	-	25	25
	WC MEN	-	25	25
	WC WOMEN	-	25	25
	CLOAKROOM	2	50	50
TOTAL			**2955**	**2955**
FL No.2	FOYER	10	200	200
	EXHIBITION SPACE	-	20	20
	LIBRARY	20	300	300
	DEPOSITORY	-	25	25
	DEPOSITORY	-	10	10
	CHILDREN'S LIBRARY	20	300	300
	OFFICE	3	60	60
	OFFICE + KITCHEN	3	100	100
	WC WOMEN	-	25	25
	WC EMPLOYEES	-	25	25
	WC MEN	-	25	25
	LECTURE ROOM	60	900	900
TOTAL			**1990**	**1990**

Design of HVAC duct dimensions:

Used formulas and values of used air velocities:

Pipe profile: $DN = \sqrt{\frac{4*V}{\pi*w}}$ [mm]

Cross-sectional area of the pipe: $S = \frac{\pi*d^2}{4} * 10^{-6}$ [m²]

w = 3 m/s supply pipe to the outlet

w = 4-5 m/s main pipe under the ceiling (chosen by the number of connected sections)

w = 6 m/s pipe from the air conditioning unit

part of the b.	intlet outlet	section	V [m3/h]	w [m/s]	CALCULATED			DESIGNED		
					HxW [mm]		S [m2]	HxW [mm]		S [m2]
UG FL No.1	inlet	1A	20	3	80	23	0,002	**80**	**80**	**0,006**
		2A	50	3	80	58	0,005	**80**	**80**	**0,006**
		3A	165	4	100	115	0,011	**100**	**125**	**0,013**
		4A	5110	6	500	473	0,237	**500**	**500**	**0,250**
		5A	20	3	80	23	0,002	**80**	**80**	**0,006**
		6A	10	3	80	12	0,001	**80**	**80**	**0,006**
		7A	15	3	80	17	0,001	**80**	**80**	**0,006**
		8A	115	4	80	100	0,008	**80**	**100**	**0,008**
		9A	100	4	80	87	0,007	**80**	**100**	**0,008**
		10A	4945	6	500	458	0,229	**500**	**500**	**0,250**
UG FL No.1	outlet	1A	20	3	80	23	0,002	**80**	**80**	**0,006**
		2A	50	3	80	58	0,005	**80**	**80**	**0,006**
		3A	165	4	100	115	0,011	**100**	**125**	**0,013**
		4A	5110	6	500	473	0,237	**500**	**500**	**0,250**
		5A	20	3	80	23	0,002	**80**	**80**	**0,006**
		6A	10	3	80	12	0,001	**80**	**80**	**0,006**
		7A	15	3	80	17	0,001	**80**	**80**	**0,006**
		8A	115	4	80	100	0,008	**80**	**100**	**0,008**
		9A	100	4	80	87	0,007	**80**	**100**	**0,008**
		10A	4945	6	500	458	0,229	**500**	**500**	**0,250**

FL No.1	inlet	1B	225	4	125	125	0,016	**125**	**125**	**0,016**
		2B	450	5	160	156	0,025	**160**	**160**	**0,026**
		3B	550	5	160	191	0,031	**160**	**200**	**0,032**
		4B	575	5	160	200	0,032	**160**	**200**	**0,032**
		5B	600	5	160	208	0,033	**160**	**250**	**0,040**
		6B	625	5	160	217	0,035	**160**	**250**	**0,040**
		7B	925	5	160	321	0,051	**160**	**355**	**0,057**
		8B	950	5	160	330	0,053	**160**	**355**	**0,057**
		9B	975	5	160	339	0,054	**160**	**355**	**0,057**
		10B	1125	5	160	391	0,063	**160**	**400**	**0,064**
		11B	1275	5	160	443	0,071	**160**	**450**	**0,072**
		12B	1425	5	160	495	0,079	**160**	**500**	**0,080**
		13B	1575	6	160	456	0,073	**160**	**500**	**0,080**
		14B	2905	6	315	427	0,134	**315**	**450**	**0,142**
		15B	2955	6	315	434	0,137	**315**	**450**	**0,142**
		16B	225	4	125	125	0,016	**125**	**125**	**0,016**
		17B	100	3	100	93	0,009	**100**	**100**	**0,010**
		18B	25	3	80	29	0,002	**80**	**80**	**0,006**
		19B	25	3	80	29	0,002	**80**	**80**	**0,006**
		20B	25	3	80	29	0,002	**80**	**80**	**0,006**
		21B	150	3	125	111	0,014	**125**	**125**	**0,016**
		22B	150	3	125	111	0,014	**125**	**125**	**0,016**
		23B	25	3	80	29	0,002	**80**	**80**	**0,006**
		24B	25	3	80	29	0,002	**80**	**80**	**0,006**
		25B	150	3	125	111	0,014	**125**	**125**	**0,016**
		26B	150	3	125	111	0,014	**125**	**125**	**0,016**
		27B	150	3	125	111	0,014	**125**	**125**	**0,016**
		28B	150	3	125	111	0,014	**125**	**125**	**0,016**
		29B	50	3	80	58	0,005	**80**	**80**	**0,006**
		30B	55	3	80	64	0,005	**80**	**80**	**0,006**
		31B	255	5	125	113	0,014	**125**	**125**	**0,016**
		32B	455	5	160	158	0,025	**160**	**160**	**0,026**
		33B	655	5	200	182	0,036	**200**	**200**	**0,040**
		34B	855	6	200	198	0,040	**200**	**200**	**0,040**
		35B	1255	6	200	291	0,058	**200**	**315**	**0,063**
		36B	1280	6	200	296	0,059	**200**	**315**	**0,063**
		37B	1305	6	200	302	0,060	**200**	**315**	**0,063**
		38B	1330	6	200	308	0,062	**200**	**315**	**0,063**
		39B	150	3	125	111	0,014	**125**	**125**	**0,016**
		40B	200	4	125	111	0,014	**125**	**125**	**0,016**
		41B	50	3	80	58	0,005	**80**	**80**	**0,006**
		42B	150	3	125	111	0,014	**125**	**125**	**0,016**
		43B	200	4	125	111	0,014	**125**	**125**	**0,016**
		44B	50	3	80	58	0,005	**80**	**80**	**0,006**
		45B	200	4	125	111	0,014	**125**	**125**	**0,016**
		46B	200	4	125	111	0,014	**125**	**125**	**0,016**
		47B	200	4	125	111	0,014	**125**	**125**	**0,016**
		48B	400	5	160	139	0,022	**160**	**160**	**0,026**
		49B	200	4	125	111	0,014	**125**	**125**	**0,016**
		50B	25	3	80	29	0,002	**80**	**80**	**0,006**
		51B	25	3	80	29	0,002	**80**	**80**	**0,006**
		52B	25	3	80	29	0,002	**80**	**80**	**0,006**

FL No.1	outlet	1B	225	4	125	125	0,016	**125**	**125**	**0,016**
		2B	450	5	160	156	0,025	**160**	**160**	**0,026**
		3B	550	5	160	191	0,031	**160**	**200**	**0,032**
		4B	575	5	160	200	0,032	**160**	**200**	**0,032**
		5B	600	5	160	208	0,033	**160**	**250**	**0,040**
		6B	625	5	160	217	0,035	**160**	**250**	**0,040**
		7B	925	5	160	321	0,051	**160**	**355**	**0,057**
		8B	950	5	160	330	0,053	**160**	**355**	**0,057**
		9B	975	5	160	339	0,054	**160**	**355**	**0,057**
		10B	1125	5	160	391	0,063	**160**	**400**	**0,064**
		11B	1275	5	160	443	0,071	**160**	**450**	**0,072**
		12B	1425	5	160	495	0,079	**160**	**500**	**0,080**
		13B	1575	6	160	456	0,073	**160**	**500**	**0,080**
		14B	2905	6	315	427	0,134	**315**	**450**	**0,142**
		15B	2955	6	315	434	0,137	**315**	**450**	**0,142**
		16B	225	4	125	125	0,016	**125**	**125**	**0,016**
		17B	100	3	100	93	0,009	**100**	**100**	**0,010**
		18B	25	3	80	29	0,002	**80**	**80**	**0,006**
		19B	25	3	80	29	0,002	**80**	**80**	**0,006**
		20B	25	3	80	29	0,002	**80**	**80**	**0,006**
		21B	150	3	125	111	0,014	**125**	**125**	**0,016**
		22B	150	3	125	111	0,014	**125**	**125**	**0,016**
		23B	25	3	80	29	0,002	**80**	**80**	**0,006**
		24B	25	3	80	29	0,002	**80**	**80**	**0,006**
		25B	150	3	125	111	0,014	**125**	**125**	**0,016**
		26B	150	3	125	111	0,014	**125**	**125**	**0,016**
		27B	150	3	125	111	0,014	**125**	**125**	**0,016**
		28B	150	3	125	111	0,014	**125**	**125**	**0,016**
		29B	50	3	80	58	0,005	**80**	**80**	**0,006**
		30B	55	3	80	64	0,005	**80**	**80**	**0,006**
		31B	255	5	125	113	0,014	**125**	**125**	**0,016**
		32B	455	5	160	158	0,025	**160**	**160**	**0,026**
		33B	655	5	200	182	0,036	**200**	**200**	**0,040**
		34B	855	6	200	198	0,040	**200**	**200**	**0,040**
		35B	1255	6	200	291	0,058	**200**	**315**	**0,063**
		36B	1280	6	200	296	0,059	**200**	**315**	**0,063**
		37B	1305	6	200	302	0,060	**200**	**315**	**0,063**
		38B	1330	6	200	308	0,062	**200**	**315**	**0,063**
		39B	150	3	125	111	0,014	**125**	**125**	**0,016**
		40B	200	4	125	111	0,014	**125**	**125**	**0,016**
		41B	50	3	80	58	0,005	**80**	**80**	**0,006**
		42B	150	3	125	111	0,014	**125**	**125**	**0,016**
		43B	200	4	125	111	0,014	**125**	**125**	**0,016**
		44B	50	3	80	58	0,005	**80**	**80**	**0,006**
		45B	200	4	125	111	0,014	**125**	**125**	**0,016**
		46B	200	4	125	111	0,014	**125**	**125**	**0,016**
		47B	200	4	125	111	0,014	**125**	**125**	**0,016**
		48B	200	4	125	111	0,014	**125**	**125**	**0,016**
		49B	25	3	80	29	0,002	**80**	**80**	**0,006**
		50B	25	3	80	29	0,002	**80**	**80**	**0,006**
		51B	25	3	80	29	0,002	**80**	**80**	**0,006**

FL No.2	inlet	1C	25	3	80	29	0,002	**80**	**80**	**0,006**
		2C	135	4	100	94	0,009	**100**	**100**	**0,010**
		3C	235	5	125	104	0,013	**125**	**125**	**0,016**
		4C	495	5	160	172	0,028	**160**	**180**	**0,029**
		5C	520	5	160	182	0,029	**160**	**200**	**0,032**
		6C	545	5	160	189	0,030	**160**	**200**	**0,032**
		7C	570	5	160	198	0,032	**160**	**200**	**0,032**
		8C	1090	6	200	252	0,050	**200**	**315**	**0,063**
		9C	1990	6	315	292	0,092	**315**	**315**	**0,099**
		10C	100	3	100	93	0,009	**100**	**100**	**0,010**
		11C	10	3	80	12	0,001	**80**	**80**	**0,006**
		12C	100	3	100	93	0,009	**100**	**100**	**0,010**
		13C	100	3	100	93	0,009	**100**	**100**	**0,010**
		14C	160	3	125	119	0,015	**125**	**125**	**0,016**
		15C	60	3	80	69	0,006	**80**	**80**	**0,006**
		16C	100	3	100	93	0,009	**100**	**100**	**0,010**
		17C	25	3	80	29	0,002	**80**	**80**	**0,006**
		18C	25	3	80	29	0,002	**80**	**80**	**0,006**
		19C	25	3	80	29	0,002	**80**	**80**	**0,006**
		20C	300	4	160	130	0,021	**160**	**160**	**0,026**
		21C	600	5	180	185	0,033	**180**	**200**	**0,036**
		22C	300	4	160	130	0,021	**160**	**160**	**0,026**
		23C	300	4	160	130	0,021	**160**	**160**	**0,026**
		24C	100	3	100	93	0,009	**100**	**100**	**0,010**
		25C	200	4	125	111	0,014	**125**	**125**	**0,016**
		26C	300	4	160	130	0,021	**160**	**160**	**0,026**
		27C	320	4	160	139	0,022	**160**	**160**	**0,026**
		28C	420	5	160	146	0,023	**160**	**160**	**0,026**
		29C	520	6	160	150	0,024	**160**	**160**	**0,026**
		30C	100	3	100	93	0,009	**100**	**100**	**0,010**
		31C	100	3	100	93	0,009	**100**	**100**	**0,010**
		32C	20	3	80	23	0,002	**80**	**80**	**0,006**
		33C	100	3	100	93	0,009	**100**	**100**	**0,010**
		34C	100	3	100	93	0,009	**100**	**100**	**0,010**

FL No.2	outlet	1C	25	3	80	29	0,002	**80**	**80**	**0,006**
		2C	135	4	100	94	0,009	**100**	**100**	**0,010**
		3C	235	5	125	104	0,013	**125**	**125**	**0,016**
		4C	495	5	160	172	0,028	**160**	**180**	**0,029**
		5C	520	5	160	182	0,029	**160**	**200**	**0,032**
		6C	545	5	160	189	0,030	**160**	**200**	**0,032**
		7C	570	5	160	198	0,032	**160**	**200**	**0,032**
		8C	1090	6	200	252	0,050	**200**	**315**	**0,063**
		9C	1990	6	315	292	0,092	**315**	**315**	**0,099**
		10C	100	3	100	93	0,009	**100**	**100**	**0,010**
		11C	10	3	80	12	0,001	**80**	**80**	**0,006**
		12C	100	3	100	93	0,009	**100**	**100**	**0,010**
		13C	100	3	100	93	0,009	**100**	**100**	**0,010**
		14C	160	3	125	119	0,015	**125**	**125**	**0,016**
		15C	60	3	80	69	0,006	**80**	**80**	**0,006**
		16C	100	3	100	93	0,009	**100**	**100**	**0,010**
		17C	25	3	80	29	0,002	**80**	**80**	**0,006**
		18C	25	3	80	29	0,002	**80**	**80**	**0,006**
		19C	25	3	80	29	0,002	**80**	**80**	**0,006**
		20C	300	4	160	130	0,021	**160**	**160**	**0,026**
		21C	600	5	180	185	0,033	**180**	**200**	**0,036**
		22C	900	5	180	278	0,050	**180**	**315**	**0,057**
		23C	300	4	160	130	0,021	**160**	**160**	**0,026**
		24C	300	4	160	130	0,021	**160**	**160**	**0,026**
		25C	100	3	100	93	0,009	**100**	**100**	**0,010**
		26C	200	4	125	111	0,014	**125**	**125**	**0,016**
		27C	300	4	160	130	0,021	**160**	**160**	**0,026**
		28C	320	4	160	139	0,022	**160**	**160**	**0,026**
		29C	420	5	160	146	0,023	**160**	**160**	**0,026**
		30C	520	6	160	150	0,024	**160**	**160**	**0,026**
		31C	100	3	100	93	0,009	**100**	**100**	**0,010**
		32C	100	3	100	93	0,009	**100**	**100**	**0,010**
		33C	20	3	80	23	0,002	**80**	**80**	**0,006**
		34C	100	3	100	93	0,009	**100**	**100**	**0,010**
		35C	100	3	100	93	0,009	**100**	**100**	**0,010**

BLACK BOX THEATRE	inlet	1D	525	4	200	182	0,036	**200**	**200**	**0,040**
		2D	1050	4	250	292	0,073	**250**	**315**	**0,079**
		3D	1575	5	315	278	0,088	**315**	**315**	**0,099**
		4D	2100	5	315	370	0,117	**315**	**400**	**0,126**
		5D	4200	6	400	486	0,194	**400**	**500**	**0,200**
		6D	6300	6	560	521	0,292	**560**	**560**	**0,314**
		7D	525	4	250	146	0,036	**250**	**160**	**0,040**
		8D	1050	5	315	185	0,058	**315**	**200**	**0,063**
		9D	1575	5	315	278	0,088	**315**	**315**	**0,099**
		10D	2100	5	315	370	0,117	**315**	**400**	**0,126**
		11D	525	4	200	182	0,036	**200**	**200**	**0,040**
		12D	1050	5	250	233	0,058	**250**	**250**	**0,063**
		13D	1575	5	315	278	0,088	**315**	**315**	**0,099**
		14D	2100	5	315	370	0,117	**315**	**400**	**0,126**
BLACK BOX THEATRE	outlet	1D	525	4	200	182	0,036	**200**	**200**	**0,040**
		2D	1050	4	250	292	0,073	**250**	**315**	**0,079**
		3D	1575	5	315	278	0,088	**315**	**315**	**0,099**
		4D	2100	5	315	370	0,117	**315**	**400**	**0,126**
		5D	2625	5	400	365	0,146	**400**	**400**	**0,160**
		6D	3150	6	400	365	0,146	**400**	**400**	**0,160**
		7D	6300	6	560	521	0,292	**560**	**560**	**0,314**
		8D	525	4	200	182	0,036	**200**	**200**	**0,040**
		9D	1050	4	250	292	0,073	**250**	**315**	**0,079**
		10D	1575	5	315	278	0,088	**315**	**315**	**0,099**
		11D	2100	5	315	370	0,117	**315**	**400**	**0,126**
		12D	2625	5	400	365	0,146	**400**	**400**	**0,160**
		13D	3150	6	400	365	0,146	**400**	**400**	**0,160**

6. Work safety and health protection

All measures and legal regulations to ensure occupational safety and health protection on the construction site must be strictly observed by all construction workers throughout the construction activity and in the phase of its preparatory work (Act No. 183/2006 Coll., Government Regulation No. 591/2006 Coll., on more detailed minimum requirements for occupational safety and health protection on construction sites, Government Regulation No. 494/2001 Coll. and No. 495/2001 Coll.).

7. Software used

- AutoCAD 2018 (student version)
- AutoCAD 2023 (student version)
- Microsoft Office 365 (student version)

8. List of references

- ARCHCON Architectural study KD Vodňany [online]
- ARCHCON atelier s.r.o., [cit. 2023-01-08], [https://www.archcon.cz/projekt/kd-vodnany/]

- NOVATOP [online], AGROP NOVA a.s., [cit. 2023-01-08], [https://novatop-system.cz/]
- KNAUF [online], Knauf Praha spol. s.r.o., [cit. 2023-01-08], [https://www.knauf.cz/]

- TZB-info [online], Topinfo s.r.o., [cit. 2023-01-08], [https://www.tzb-info.cz/]
- Katastr nemovitostí [online], ČÚZK, [cit. 2023-01-08], [https://www.cuzk.cz/]

9. List of used standards, laws and decrees

- ČSN 01 3420 Výkresy pozemních staveb – Kreslení výkresů stavební část
- ČSN 73 5305 Administrativní budovy a prostory
- ČSN 73 5245 Kulturní objekty s hledištěm. Podmínky viditelnosti
- ČSN 73 1901 Navrhování střech – Základní ustanovení
- ČSN 73 4130 Schodiště a šikmé rampy – Základní požadavky

- ČSN EN 1990 Eurokód: Zásady navrhování konstrukcí

- ČSN 75 5411 Vodovodní přípojky
- ČSN 73 6101 Stokové a kanalizační přípojky
- ČSN 73 6005 Prostorové uspořádání sítí technického vybavení
- ČSN 06 0320 Tepelné soustavy v budovách – Příprava teplé vody – Navrhování a projektování
- ČSN EN 15665 Větrání budov – Stanovení výkonových kritérií pro větrací systémy obytných budov

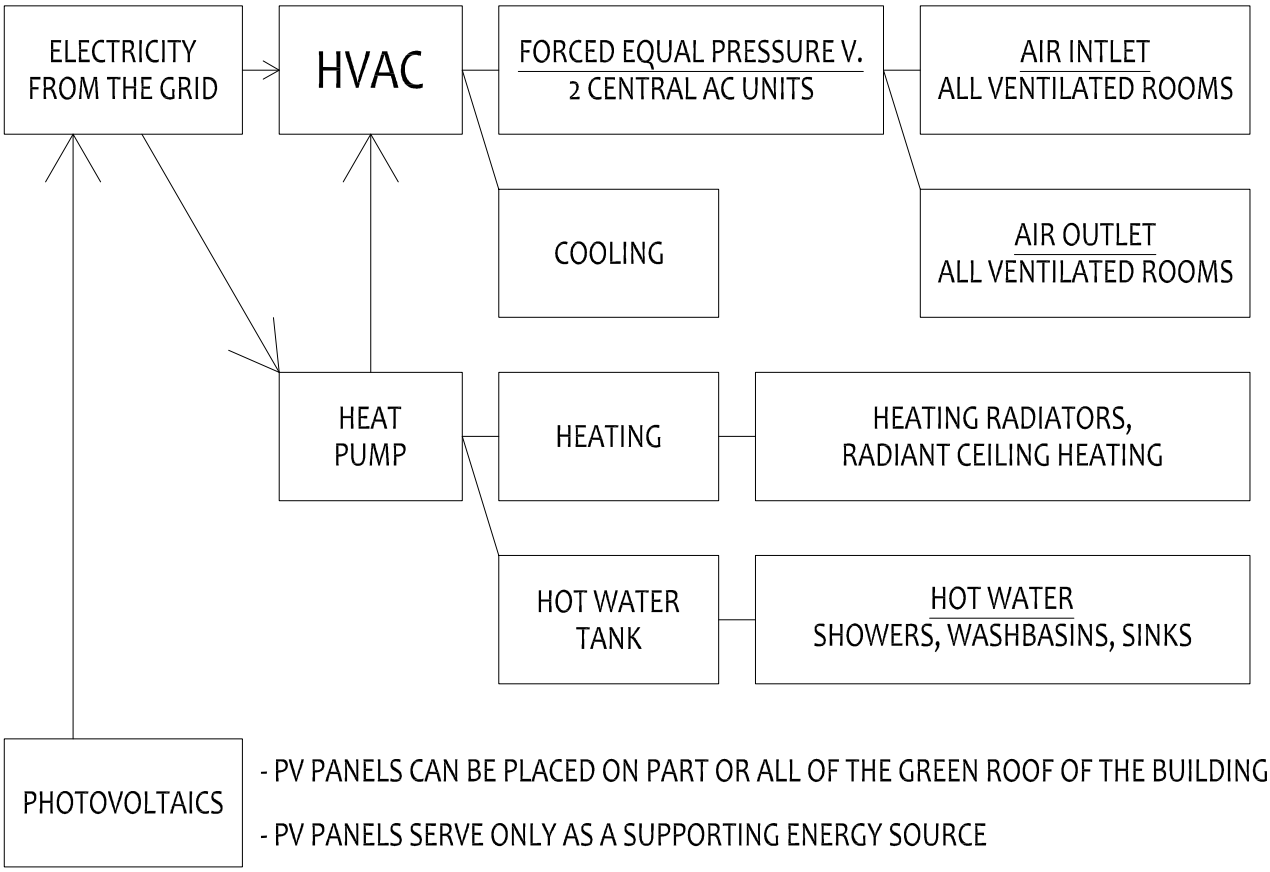
- Zákon č. 183/2006 Sb., o územním plánování a stavebním řádu (stavební zákon)
- Zákon č. 201/2012 Sb., o ochraně ovzduší
- Zákon č. 262/2006 Sb., zákoník práce
- Zákon č. 263/2016 Sb., atomový zákon
- Zákon č. 541/2020 Sb., zákon o odpadech
- Zákon č. 100 / 2001 Sb., o posuzování vlivů na životní prostředí a o změně některých souvisejících zákonů (zákon o posuzování vlivů na životní prostředí)
- Zákon č. 185/2001 Sb., o odpadech a o změně některých dalších zákonů
- Zákon č. 258/2000 Sb., o ochraně veřejného zdraví a o změně některých souvisejících zákonů
- Zákon č. 309/2006 Sb., o zajištění dalších podmínek bezpečnosti a ochrany zdraví při práci

- Nařízení vlády č. 163/2002 Sb., ověření o shodě výrobku
- Nařízení vlády č. 101/2005 Sb., o podrobnějších požadavcích na pracoviště a pracovní prostředí
- Nařízení vlády č. 272/2011 Sb., o ochraně zdraví před nepříznivými účinky hluku a vibrací
- Nařízení vlády č. 361/2007 Sb., kterým se stanoví podmínky ochrany zdraví při práci
- Nařízení vlády č. 591/2006 Sb., o bližších minimálních požadavcích na bezpečnost a ochranu zdraví při práci na staveništích
- Nařízení vlády č. 494/2001 Sb., kterým se stanoví způsob evidence, hlášení a zasílání záznamu o úrazu, vzor záznamu o úrazu a okruh orgánů a institucí, kterým se ohlašuje pracovní úraz a zasílá záznam o úrazu
- Nařízení vlády č. 495/2001 Sb., kterým se stanoví rozsah a bližší podmínky poskytování osobních ochranných pracovních prostředků, mycích, čisticích a dezinfekčních prostředků

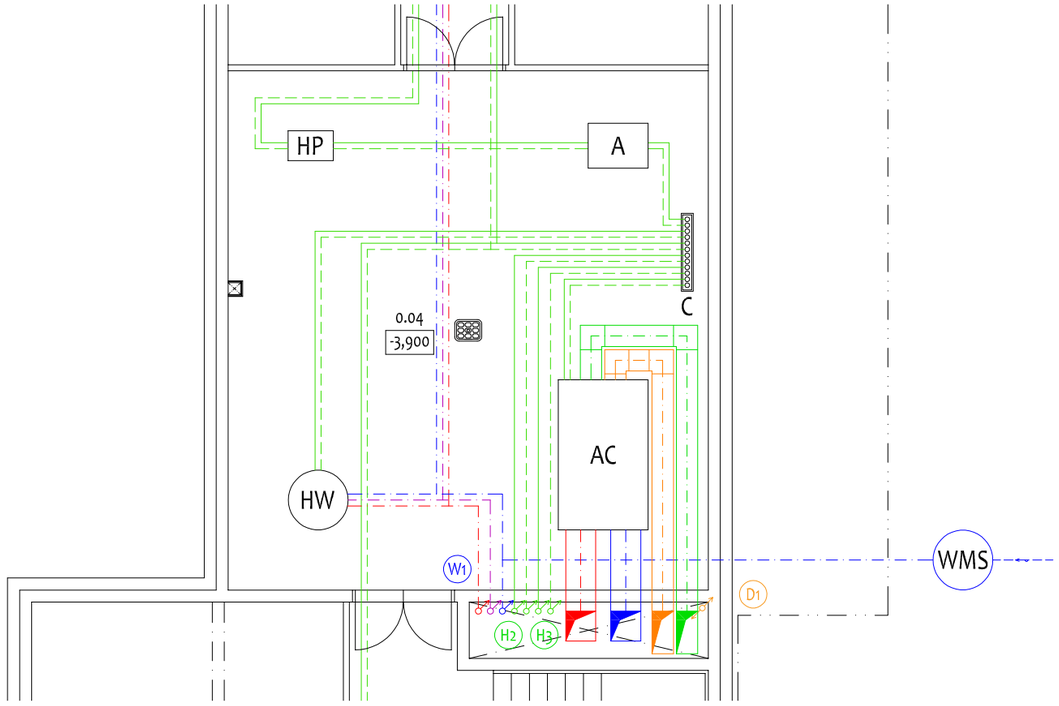
- Vyhláška č. 268/2009 Sb., o technických požadavcích na stavby
- Vyhláška č. 499/2001 Sb., o dokumentaci staveb
- Vyhláška č. 78/2013 Sb., o energetické náročnosti budov
- Vyhláška č. 398/2009 Sb., o obecných technických požadavcích zabezpečujících bezbariérové užívání staveb
- Vyhláška č. 23/2008 Sb., o technických podmínkách požární ochrany staveb
- Vyhláška č. 422/2016 Sb., o radiační ochraně a zabezpečení radionuklidového zdroje
- Vyhláška č. 120/2011 Sb., kterou se mění vyhláška Ministerstva zemědělství č. 428/2001 Sb., kterou se provádí zákon č. 274/2001 Sb., o vodovodech a kanalizacích pro veřejnou potřebu a o změně některých zákonů (zákon o vodovodech a kanalizacích), ve znění pozdějších předpisů

In Barcelona 01/2023

Author: Bc. Tadeáš Petřík


ELECTRICITY FROM THE GRID
HVAC
FORCED EQUAL PRESSURE V.
2 CENTRAL AC UNITS
AIR INTLET
ALL VENTILATED ROOMS
COOLING
AIR OUTLET
ALL VENTILATED ROOMS
HEAT PUMP
HEATING
HEATING RADIATORS,
RADIANT CEILING HEATING
HOT WATER TANK
HOT WATER
SHOWERS, WASHBASINS, SINKS
PHOTOVOLTAICS
- PV PANELS CAN BE PLACED ON PART OR ALL OF THE GREEN ROOF OF THE BUILDING
- PV PANELS SERVE ONLY AS A SUPPORTING ENERGY SOURCE

UNDERGROUND FLOOR No.1



NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

LEGEND OF THE ELEMENTS:

W1	WATER SUPPLY (RISER PIPES)
H1	HEATING (RISER PIPES)
S1	SEWERAGE (RISER PIPES)
D1	STORM DRAIN (RISER PIPES)
HP	HEAT PUMP
A	ACCUMULATOR
C	DISTRIBUTOR/COLLECTOR
HW	HOT WATER TANK
AC	AIR CONDITIONING UNIT
WMS	WATER-METER SHAFT

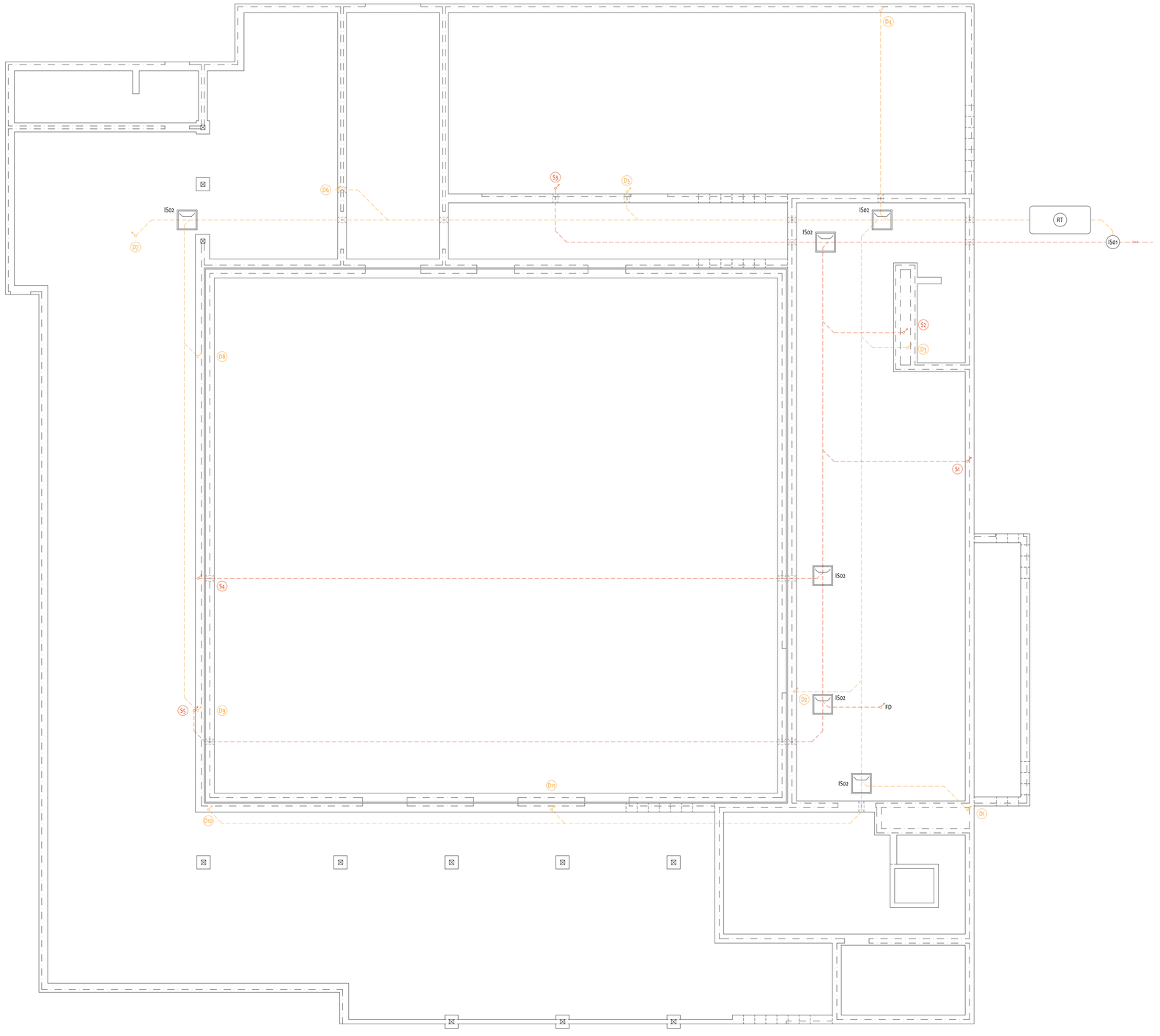
LEGEND OF THE ELEMENTS:

- WATER SUPPLY CONNECTION
- COLD WATER
- CIRCULATING WATER
- HOT WATER
- HEATING (SUPPLY PIPE)
- HEATING (RETURN PIPE)
- SEWERAGE
- STORM DRAIN
- FRESH OUTDOOR AIR SUPPLY DUCT
- EXHAUST AIR DUCT TO THE EXTERIOR
- FRESH AIR SUPPLY DUCT TO THE ROOMS
- EXHAUST AIR DUCT FROM THE ROOMS

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	UTILITY ROOM LAYOUT - UG FL No.1	1:100	D.1.4-1

FOUNDATIONS



LEGEND OF THE ELEMENTS:

- S1 SEWERAGE (RISER PIPES)
- D1 STORM DRAIN (RISER PIPES)
- IS01 INSPECTION SHAFT Ø 600 mm
- IS02 INSPECTION SHAFT 900 x 900 mm
- RT RAINWATER RETENTION TANK WITH REGULATED OUTLET (VORTEX VALVE)
- FD SEWAGE OUTLET OF A FLOOR DRAIN

LEGEND OF THE ELEMENTS:

- SEWERAGE CONNECTION TO THE UNIFIED SEWERAGE SYSTEM
- SEWERAGE
- STORM DRAIN

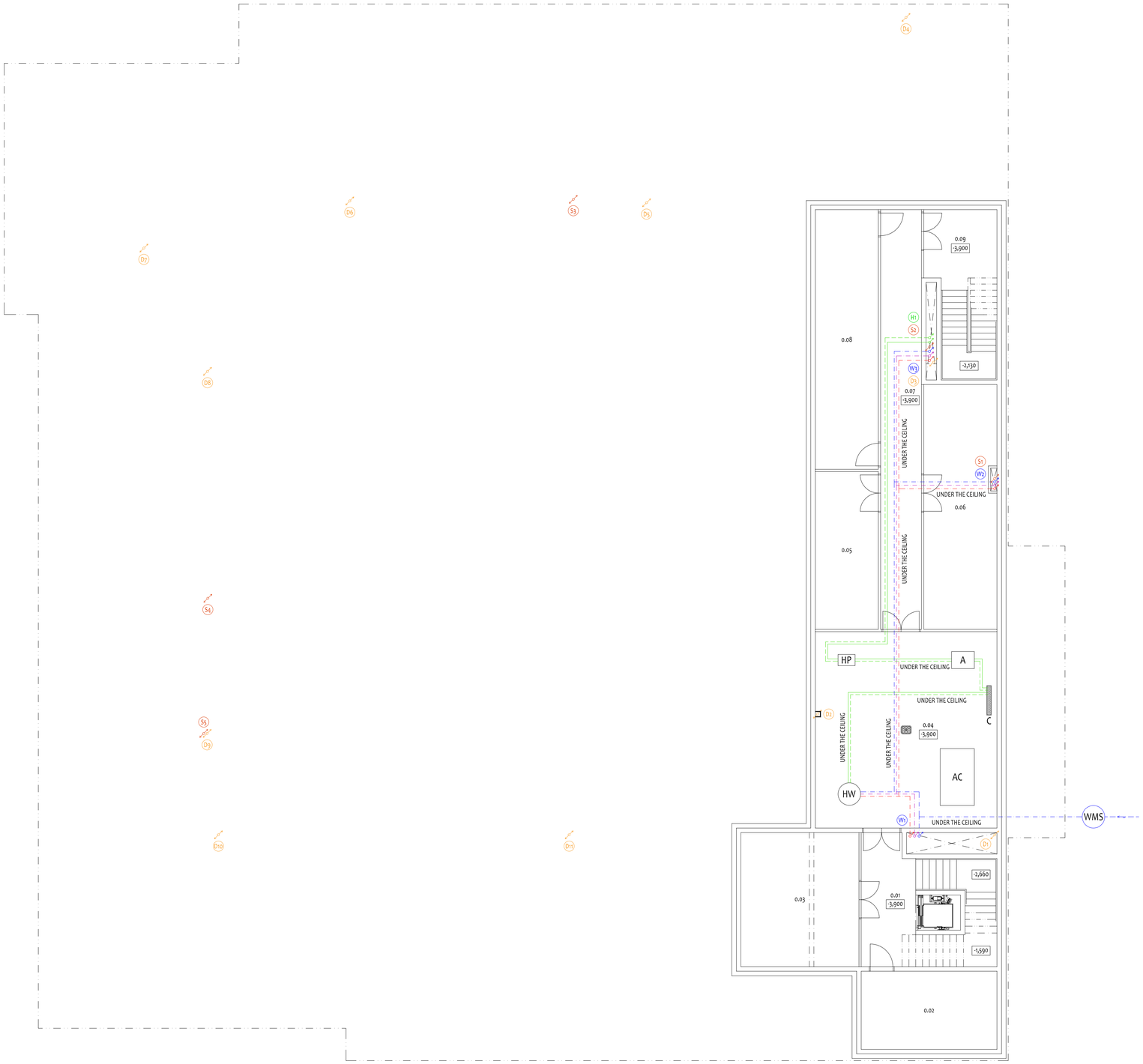
NOTES:

- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer
- all horizontal pipes inside the building are routed at the foundation level, all horizontal pipes outside the building are routed in the soil
- all storm water drains are equipped with a roof debris collector
- the building is connected to the public unified sewerage network, although rainwater is first led through the storm drainage to the retention tank with a regulated outlet (vortex valve), from where the rainwater is further led through the inspection shaft IS01 to the unified sewerage network

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	WATER AND SEWERAGE LAYOUT - FOUNDATIONS	1:100	D.1.4-2

UNDERGROUND FLOOR No.1



Community centre - Vodňany - UG FL No.1		
NO.	ROOM	AREA [m²]
0.01	CORRIDOR	30,5
0.02	STORAGE	20,6
0.03	REHEARSAL ROOM	30,7
0.04	UTILITY ROOM	69,2
0.05	STORAGE	19,3
0.06	WORKSHOP	34,3
0.07	CORRIDOR	33,3
0.08	STORAGE	31,7
0.09	CORRIDOR	20,7
	TOTAL	290,3

LEGEND OF THE ELEMENTS:

- W1 WATER SUPPLY (RISER PIPES)
- H1 HEATING (RISER PIPES)
- S1 SEWERAGE (RISER PIPES)
- D1 STORM DRAIN (RISER PIPES)
- HP HEAT PUMP
- A ACCUMULATOR
- C DISTRIBUTOR/COLLECTOR
- HW HOT WATER TANK
- AC AIR CONDITIONING UNIT
- WMS WATER-METER SHAFT

LEGEND OF THE ELEMENTS:

- WATER SUPPLY CONNECTION
- COLD WATER
- CIRCULATING WATER
- HOT WATER
- HEATING (SUPPLY PIPE)
- HEATING (RETURN PIPE)
- SEWERAGE
- STORM DRAIN

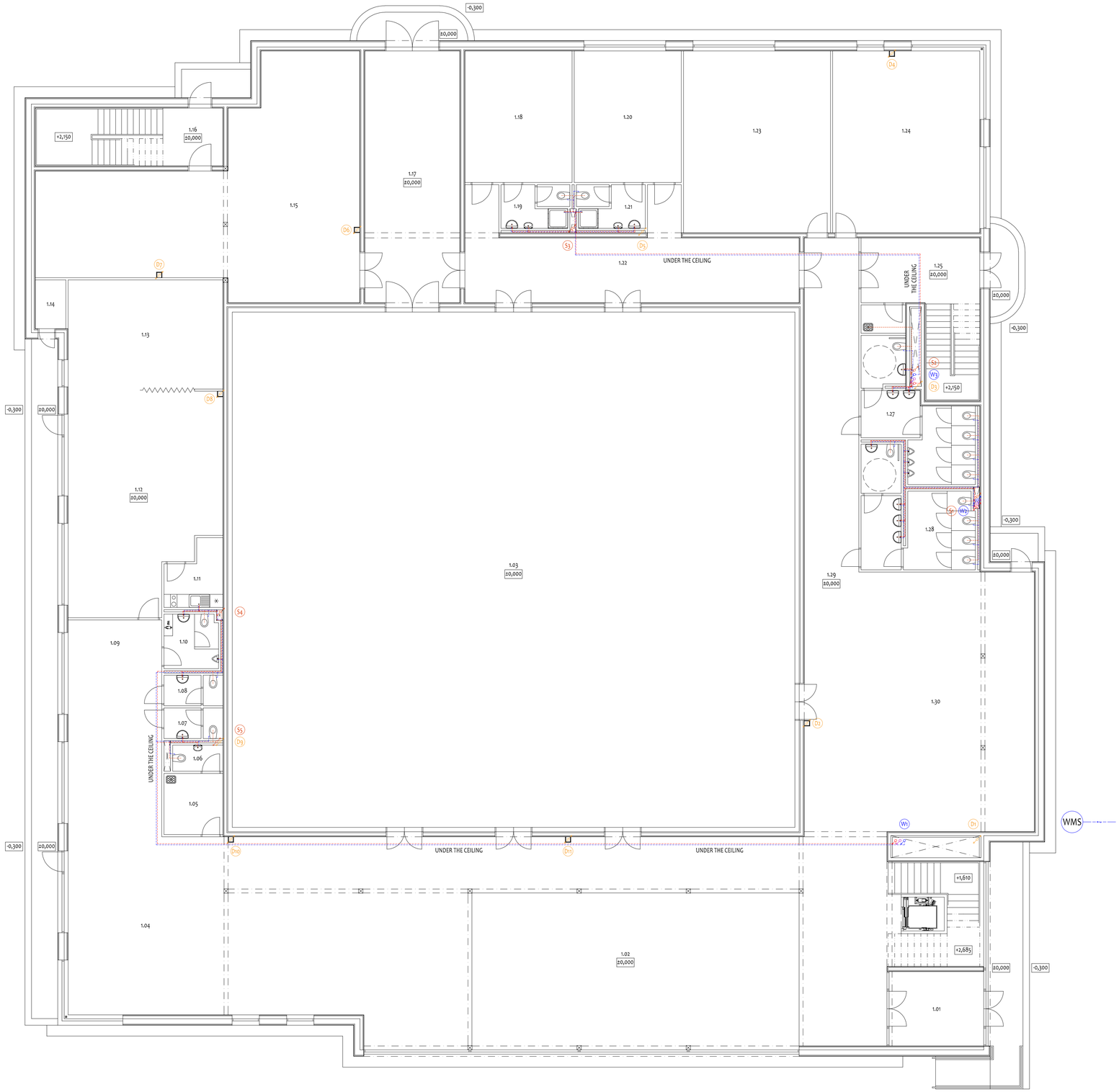
NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	WATER AND SEWERAGE LAYOUT - UG FL No.1	1:100	D.1.4-3

FLOOR No.1



Community centre - Vodňany - FL No.1		
NO.	ROOM	AREA [m²]
1.01	VESTIBULE	14,8
1.02	FOYER + STAIRCASE	256,3
1.03	BLACK BOX THEATRE	608,1
1.04	CAFÉ	143,5
1.05	STORAGE + CLEANING ROOM	7,6
1.06	WC EMPLOYEES	2,8
1.07	WC WOMEN	3,7
1.08	WC MEN	3,7
1.09	CLOAKROOM	9,6
1.10	WC CHILDREN	6,2
1.11	KITCHEN	6,8
1.12	PLAYROOM	65,1
1.13	BEDROOM	35,7
1.14	TOY STORAGE	3,1
1.15	STORAGE	108,7
1.16	CORRIDOR	22,8
1.17	VESTIBULE	50,7
1.18	DRESSING ROOM MEN	29,6
1.19	WC MEN	6,0
1.20	DRESSING ROOM WOMEN	29,6
1.21	WC WOMEN	6,0
1.22	CORRIDOR	53,8
1.23	CLUBROOM	56,0
1.24	CLUBROOM	56,1
1.25	CORRIDOR	27,4
1.26	CLEANING ROOM	2,7
1.27	WC MEN	20,9
1.28	WC WOMEN	21,8
1.29	CORRIDOR	68,4
1.30	CLOAKROOM	95,6
	TOTAL	1823,1

LEGEND OF THE ELEMENTS:

- W1 WATER SUPPLY (RISER PIPES)
- S1 SEWERAGE (RISER PIPES)
- D1 STORM DRAIN (RISER PIPES)
- WMS WATER-METER SHAFT

LEGEND OF THE ELEMENTS:

- WATER SUPPLY CONNECTION
- COLD WATER
- CIRCULATING WATER
- HOT WATER
- SEWERAGE
- STORM DRAIN

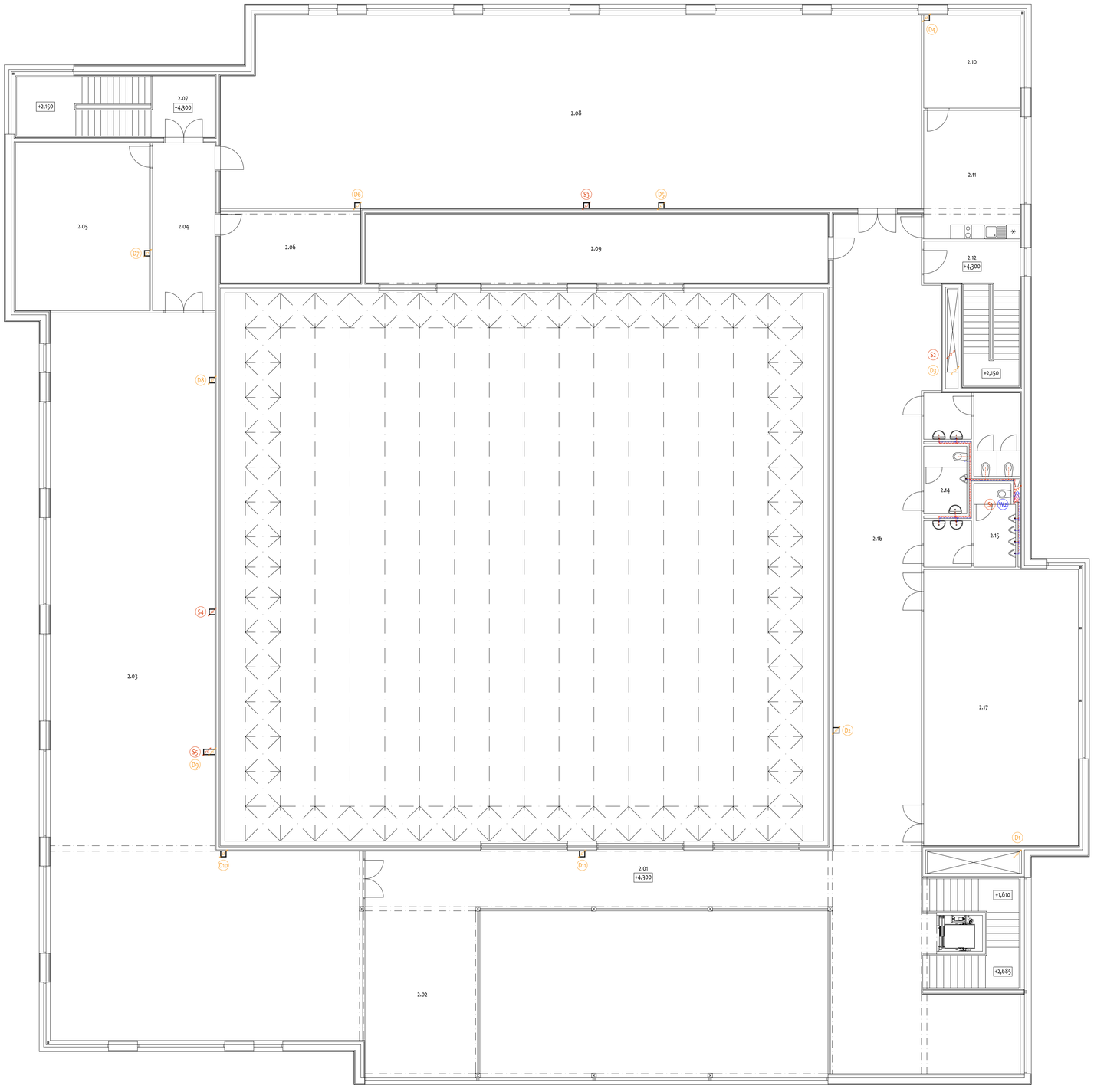
NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	WATER AND SEWERAGE LAYOUT - FL No.1	1:100	D.1.4-4

FLOOR No.2



Community centre - Vodňany - FL No.2		
NO.	ROOM	AREA [m²]
2.01	FOYER	106,2
2.02	EXHIBITION SPACE	35,5
2.03	LIBRARY	273,9
2.04	CORRIDOR	19,4
2.05	DEPOSITORY	41,9
2.06	DEPOSITORY	18,7
2.07	CORRIDOR	7,3
2.08	CHILDREN'S LIBRARY	247,3
2.09	TECHNICAL FACILITIES	59,9
2.10	OFFICE	16,6
2.11	OFFICE + KITCHEN	23,0
2.12	CORRIDOR	7,6
2.13	WC WOMEN	11,4
2.14	WC EMPLOYEES	5,4
2.15	WC MEN	10,5
2.16	CORRIDOR	107,7
2.17	LECTURE ROOM	79,1
	TOTAL	1071,4

1.03	BLACK BOX THEATRE	608,1

LEGEND OF THE ELEMENTS:

- W1 WATER SUPPLY (RISER PIPES)
- S1 SEWERAGE (RISER PIPES)
- D1 STORM DRAIN (RISER PIPES)

LEGEND OF THE ELEMENTS:

- WATER SUPPLY CONNECTION
- COLD WATER
- CIRCULATING WATER
- HOT WATER
- SEWERAGE
- STORM DRAIN

NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	WATER AND SEWERAGE LAYOUT - FL No.2	1:100	D.1.4-5

UNDERGROUND FLOOR No.1

Community centre - Vodňany - UG FL No.1		
NO.	ROOM	AREA [m²]
0.01	CORRIDOR	30,5
0.02	STORAGE	20,6
0.03	REHEARSAL ROOM	30,7
0.04	UTILITY ROOM	69,2
0.05	STORAGE	19,3
0.06	WORKSHOP	34,3
0.07	CORRIDOR	33,3
0.08	STORAGE	31,7
0.09	CORRIDOR	20,7
	TOTAL	290,3

LEGEND OF THE ELEMENTS:

H1	HEATING (RISER PIPES)
HP	HEAT PUMP
A	ACCUMULATOR
C	DISTRIBUTOR/COLLECTOR
HW	HOT WATER TANK
AC	AIR CONDITIONING UNIT
HR	HEATING RADIATORS

LEGEND OF THE ELEMENTS:

———	HEATING (SUPPLY PIPE)
- - -	HEATING (RETURN PIPE)

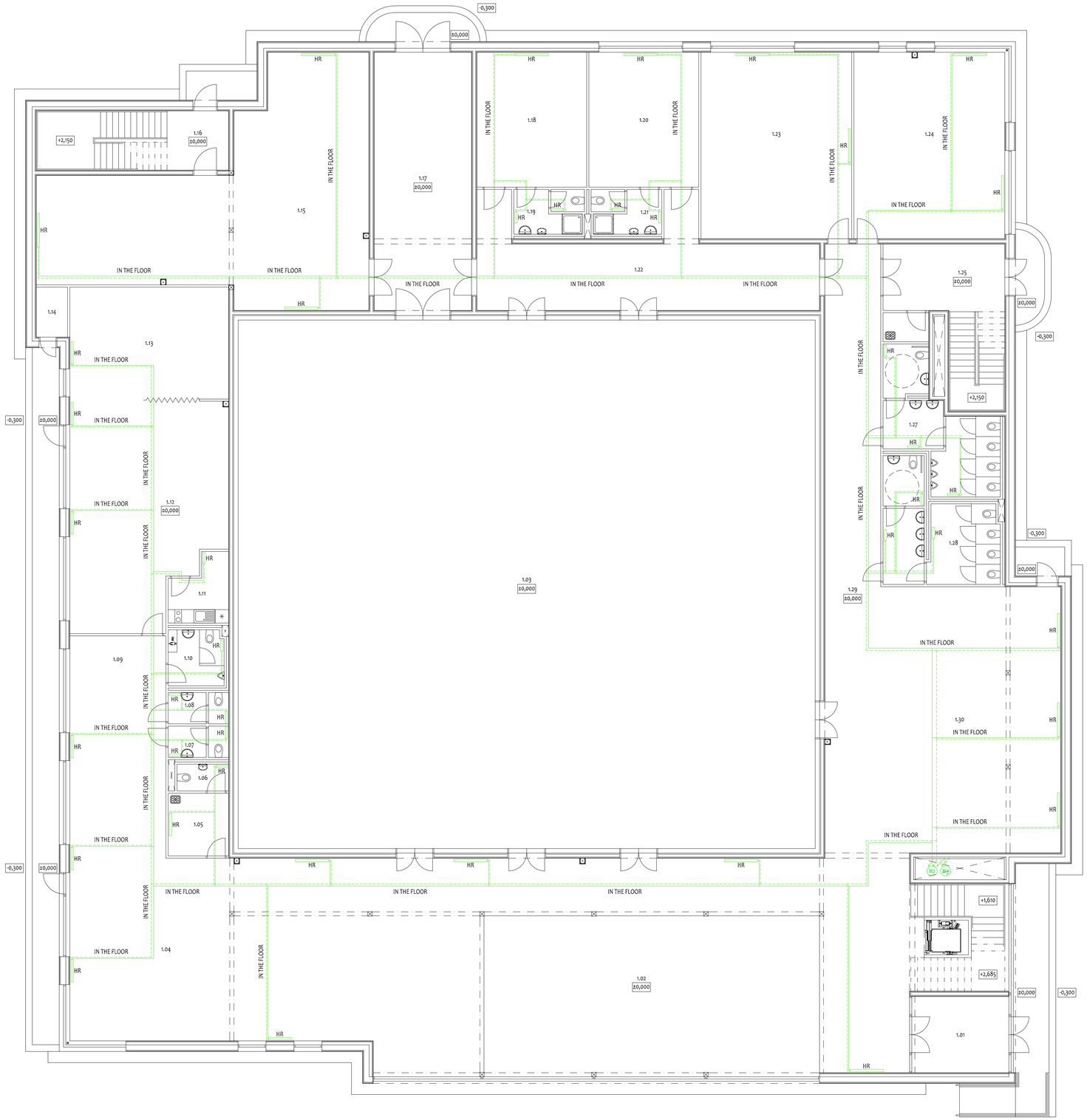
NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (HEATING) LAYOUT - UG FL No.1	1:100	D.1.4-6

FLOOR No.1



Community centre - Vodňany - FL No.1		
NO.	ROOM	AREA [m²]
1.01	VESTIBULE	14,8
1.02	FOYER + STAIRCASE	256,3
1.03	BLACK BOX THEATRE	608,1
1.04	CAFÉ	143,5
1.05	STORAGE + CLEANING ROOM	7,6
1.06	WC EMPLOYEES	2,8
1.07	WC WOMEN	3,7
1.08	WC MEN	3,7
1.09	CLOAKROOM	9,6
1.10	WC CHILDREN	6,2
1.11	KITCHEN	6,8
1.12	PLAYROOM	65,1
1.13	BEDROOM	35,7
1.14	TOY STORAGE	3,1
1.15	STORAGE	108,7
1.16	CORRIDOR	22,8
1.17	VESTIBULE	50,7
1.18	DRESSING ROOM MEN	29,6
1.19	WC MEN	6,0
1.20	DRESSING ROOM WOMEN	29,6
1.21	WC WOMEN	6,0
1.22	CORRIDOR	53,8
1.23	CLUBROOM	56,0
1.24	CLUBROOM	56,1
1.25	CORRIDOR	27,4
1.26	CLEANING ROOM	2,7
1.27	WC MEN	20,9
1.28	WC WOMEN	21,8
1.29	CORRIDOR	68,4
1.30	CLOAKROOM	95,6
	TOTAL	1823,1

LEGEND OF THE ELEMENTS:

H HEATING (RISER PIPES)

HR HEATING RADIATORS

LEGEND OF THE ELEMENTS:

HEATING (SUPPLY PIPE)

HEATING (RETURN PIPE)

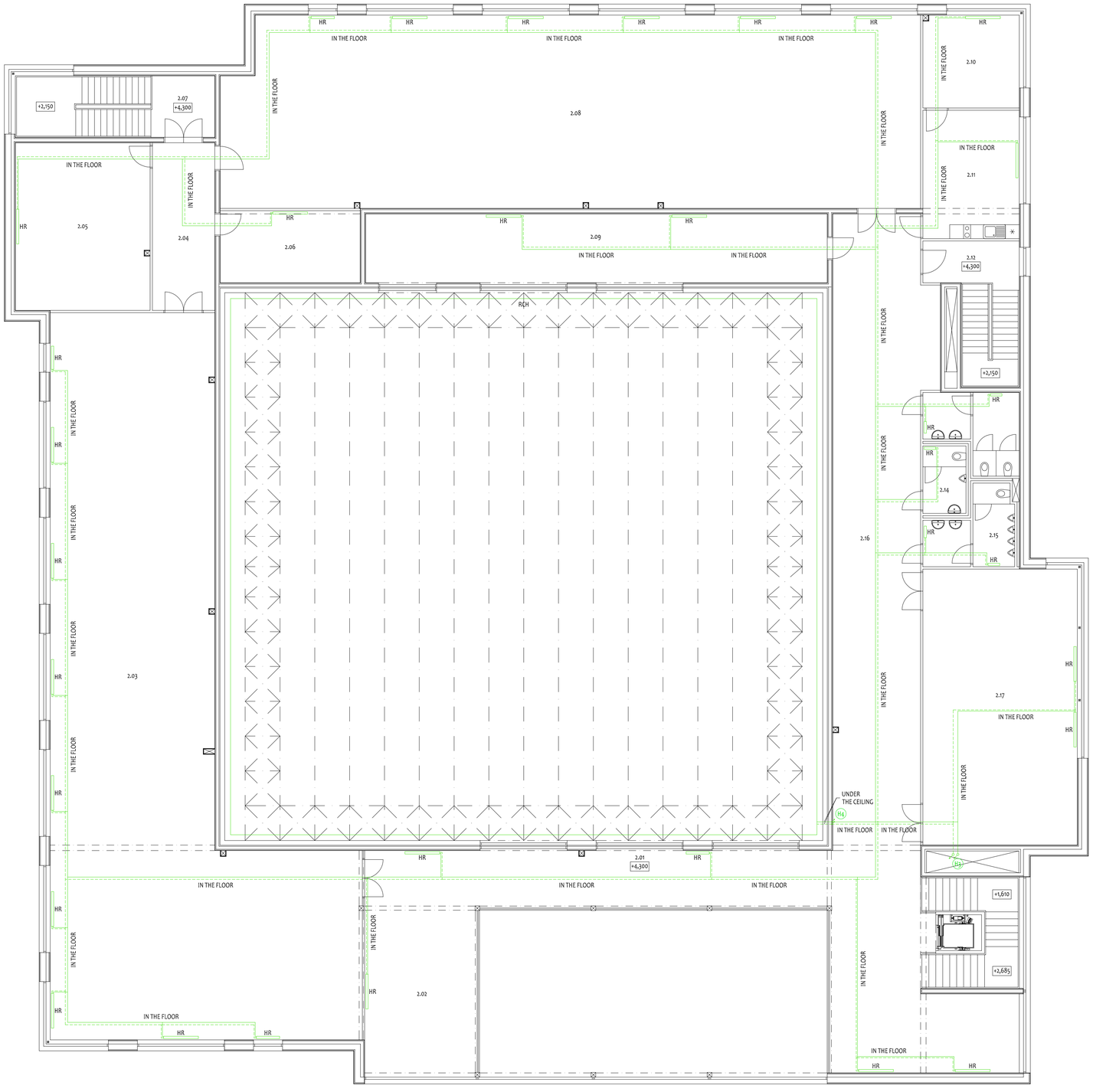
NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (HEATING) LAYOUT - FL No.1	1:100	D.1.4-7

FLOOR No.2



Community centre - Vodňany - FL No.2		
NO.	ROOM	AREA [m²]
2.01	FOYER	106,2
2.02	EXHIBITION SPACE	35,5
2.03	LIBRARY	273,9
2.04	CORRIDOR	19,4
2.05	DEPOSITORY	41,9
2.06	DEPOSITORY	18,7
2.07	CORRIDOR	7,3
2.08	CHILDREN'S LIBRARY	247,3
2.09	TECHNICAL FACILITIES	59,9
2.10	OFFICE	16,6
2.11	OFFICE + KITCHEN	23,0
2.12	CORRIDOR	7,6
2.13	WC WOMEN	11,4
2.14	WC EMPLOYEES	5,4
2.15	WC MEN	10,5
2.16	CORRIDOR	107,7
2.17	LECTURE ROOM	79,1
	TOTAL	1071,4

1.03	BLACK BOX THEATRE	608,1

LEGEND OF THE ELEMENTS:

H1 HEATING (RISER PIPES)

HR HEATING RADIATORS

RCH RADIANT CEILING HEATING

LEGEND OF THE ELEMENTS:

HEATING (SUPPLY PIPE)

HEATING (RETURN PIPE)

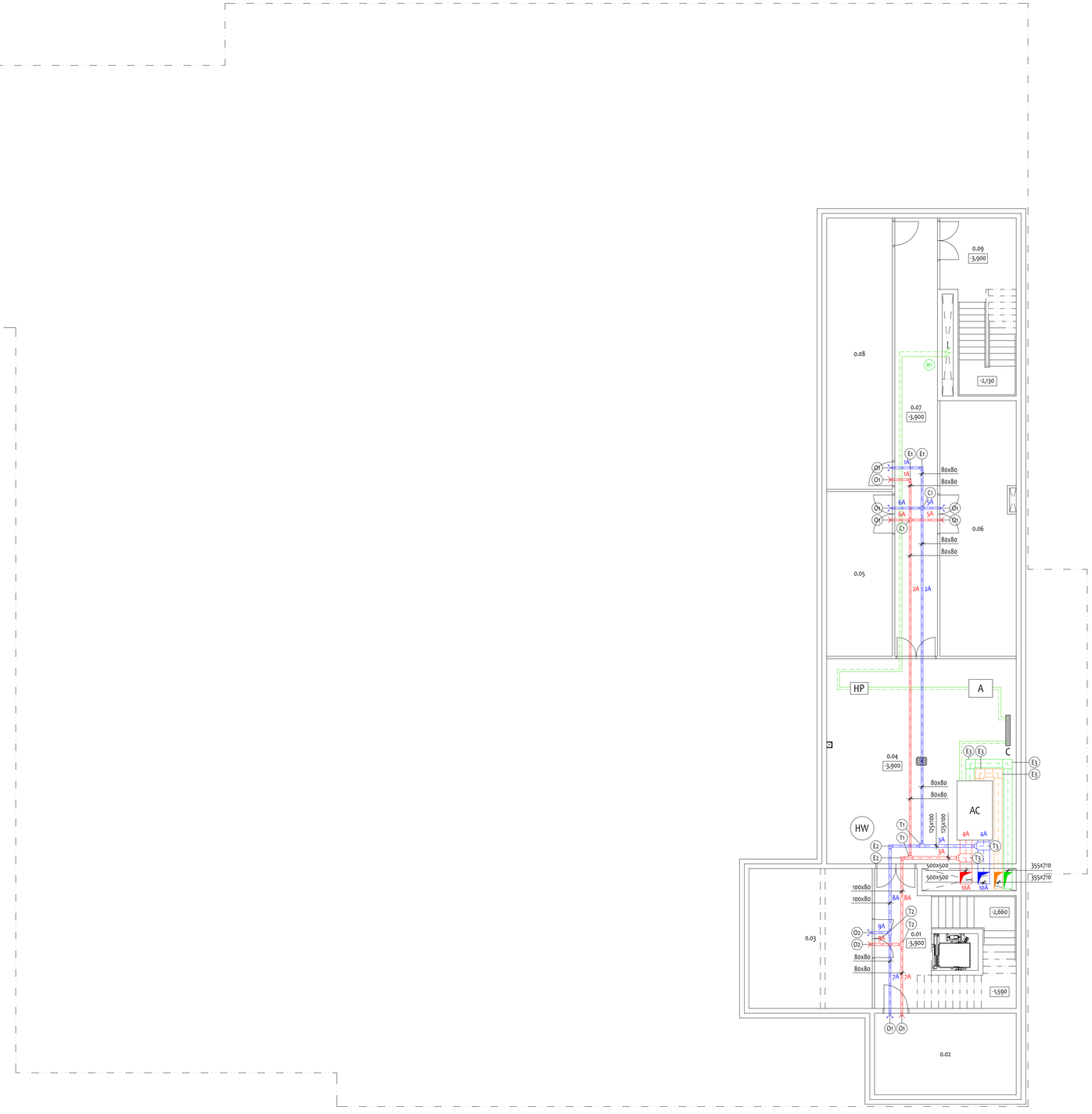
NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (HEATING) LAYOUT - FL No.2	1:100	D.1.4-8

UNDERGROUND FLOOR No.1



Community centre - Vodňany - UG FL No.1		
NO.	ROOM	AREA [m²]
0.01	CORRIDOR	30,5
0.02	STORAGE	20,6
0.03	REHEARSAL ROOM	30,7
0.04	UTILITY ROOM	69,2
0.05	STORAGE	19,3
0.06	WORKSHOP	34,3
0.07	CORRIDOR	33,3
0.08	STORAGE	31,7
0.09	CORRIDOR	20,7
	TOTAL	290,3

LEGEND OF THE ELEMENTS:

- (H1) HEATING (RISER PIPES)
- HP HEAT PUMP
- A ACCUMULATOR
- C DISTRIBUTOR/COLLECTOR
- HW HOT WATER TANK
- AC AIR CONDITIONING UNIT

LEGEND OF THE ELEMENTS:

- HEATING (SUPPLY PIPE)
- HEATING (RETURN PIPE)
- SEWERAGE
- STORM DRAIN
- FRESH OUTDOOR AIR SUPPLY DUCT
- EXHAUST AIR DUCT TO THE EXTERIOR
- FRESH AIR SUPPLY DUCT TO THE ROOMS
- EXHAUST AIR DUCT FROM THE ROOMS

LEGEND OF THE HVAC ELEMENTS (HxW):

- A1, B1, ... HVAC SUPPLY DUCT SECTION
- A1, B1, ... HVAC EXHAUST DUCT SECTION
- (O1) AIR DUCT OUTLET, 80x80
- (O2) AIR DUCT OUTLET, 80x100
- (E1) DUCT ELBOW, 80x80
- (E2) DUCT ELBOW, 80x100
- (E3) DUCT ELBOW, 710x355
- (T1) DUCT T-PIECE, 100x125 (1x REDUCTION 100x125/80x100)
- (T2) DUCT T-PIECE, 80x100 (1x REDUCTION 80x100/80x80)
- (T3) DUCT T-PIECE, 500x500 (1x REDUCTION 500x500/100x125)
- (C1) DUCT CROSS PIECE, 80x80

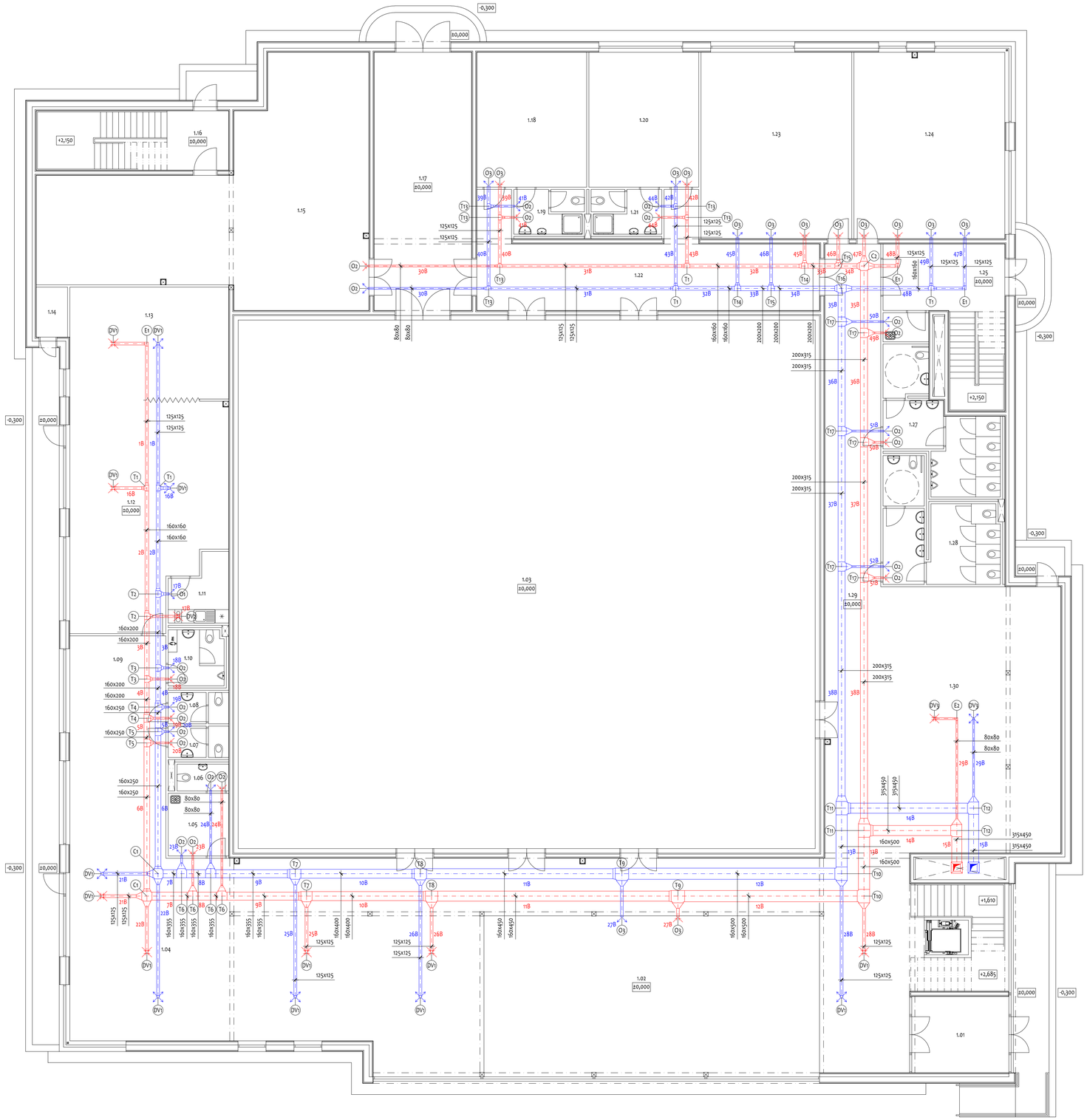
NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- All horizontal HVAC ducts are routed between the ceiling and the dropped ceiling, all vertical HVAC ducts are routed in the installation shafts.
- dimensions of the air ducts leading to the outlets and disc valves not specified on the drawings shall be of the same dimensions as their end elements, see LEGEND OF THE HVAC ELEMENTS (HxW) and Technical report of subdivision D.1.4 BUILDING ENVIRONMENT TECHNOLOGY
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	01/2023
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (AC) LAYOUT - UG FL No.1	1:100	D.1.4-9

FLOOR No.1



LEGEND OF THE ELEMENTS:

- FRESH AIR SUPPLY DUCT TO THE ROOMS
- EXHAUST AIR DUCT FROM THE ROOMS

NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- All horizontal HVAC ducts are routed between the ceiling and the dropped ceiling, all vertical HVAC ducts are routed in the installation shafts.
- In rooms with only an air outlet and no other ductwork, the dropped ceiling height will be reduced from the designed 500 mm to 150 mm (or directly below the load-bearing beams if present) so that the air outlet can be positioned below this dropped ceiling and thus flow directly into the room space.
- dimensions of the air ducts leading to the outlets and disc valves not specified on the drawings shall be of the same dimensions as their end elements, see LEGEND OF THE HVAC ELEMENTS (HxW) and Technical report of subdivision D.1.4 BUILDING ENVIRONMENT TECHNOLOGY
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

Community centre - Vodňany - FL No.1

NO.	ROOM	AREA [m²]
1.01	VESTIBULE	14,8
1.02	FOYER + STAIRCASE	256,3
1.03	BLACK BOX THEATRE	608,1
1.04	CAFÉ	143,5
1.05	STORAGE + CLEANING ROOM	7,6
1.06	WC EMPLOYEES	2,8
1.07	WC WOMEN	3,7
1.08	WC MEN	3,7
1.09	CLOAKROOM	9,6
1.10	WC CHILDREN	6,2
1.11	KITCHEN	6,8
1.12	PLAYROOM	65,1
1.13	BEDROOM	35,7
1.14	TOY STORAGE	3,1
1.15	STORAGE	108,7
1.16	CORRIDOR	22,8
1.17	VESTIBULE	50,7
1.18	DRESSING ROOM MEN	29,6
1.19	WC MEN	6,0
1.20	DRESSING ROOM WOMEN	29,6
1.21	WC WOMEN	6,0
1.22	CORRIDOR	53,8
1.23	CLUBROOM	56,0
1.24	CLUBROOM	56,1
1.25	CORRIDOR	27,4
1.26	CLEANING ROOM	2,7
1.27	WC MEN	20,9
1.28	WC WOMEN	21,8
1.29	CORRIDOR	68,4
1.30	CLOAKROOM	95,6
	TOTAL	1823,1

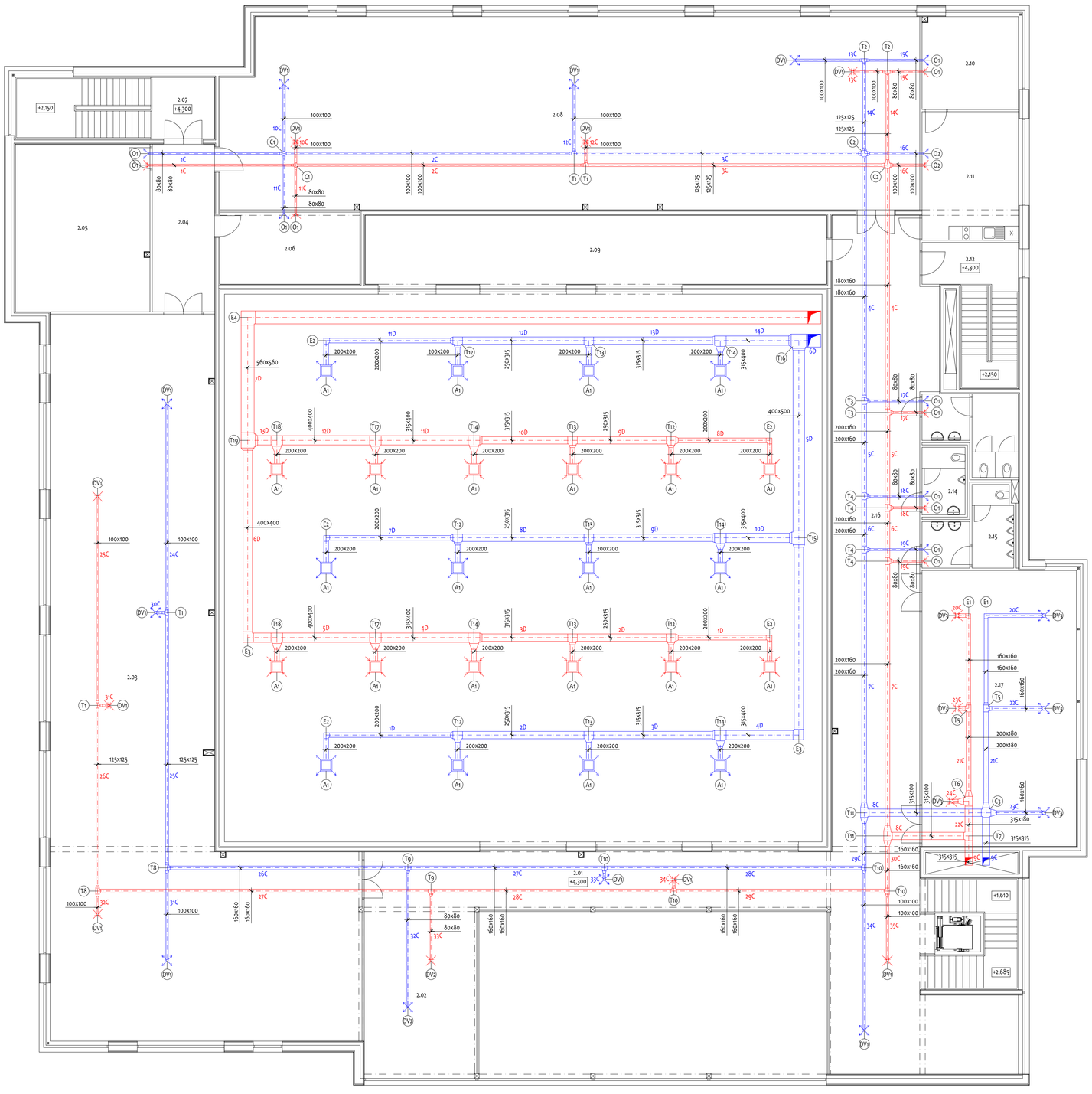
LEGEND OF THE HVAC ELEMENTS (HxW):

- A1, B1, ... HVAC SUPPLY DUCT SECTION
- A1, B1, ... HVAC EXHAUST DUCT SECTION
- (DV1) DISC VALVE, 125x125
- (DV2) DISC VALVE, 100x100
- (DV3) DISC VALVE, 80x80
- (O1) AIR DUCT OUTLET, 100x100
- (O2) AIR DUCT OUTLET, 80x80
- (O3) AIR DUCT OUTLET, 125x125
- (E1) DUCT ELBOW, 125x125
- (E2) DUCT ELBOW, 80x80
- (T1) DUCT T-PIECE, 160x160 (2x REDUCTION 160x160/125x125)
- (T2) DUCT T-PIECE, 160x200 (1x REDUCTION 160x200/160x160) (1x REDUCTION 160x200/100x100)
- (T3) DUCT T-PIECE, 160x200 (1x REDUCTION 160x200/80x80)
- (T4) DUCT T-PIECE, 160x250 (1x REDUCTION 160x250/160x200) (1x REDUCTION 160x250/80x80)
- (T5) DUCT T-PIECE, 160x250 (1x REDUCTION 160x250/80x80)
- (T6) DUCT T-PIECE, 160x355 (1x REDUCTION 160x355/80x80)
- (T7) DUCT T-PIECE, 160x400 (1x REDUCTION 160x400/160x355) (1x REDUCTION 160x400/125x125)
- (T8) DUCT T-PIECE, 160x450 (1x REDUCTION 160x450/160x400) (1x REDUCTION 160x450/125x125)
- (T9) DUCT T-PIECE, 160x500 (1x REDUCTION 160x500/160x450) (1x REDUCTION 160x500/125x125)
- (T10) DUCT T-PIECE, 160x500 (1x REDUCTION 160x500/125x125)
- (T11) DUCT T-PIECE, 160x500 (1x REDUCTION 160x500/315x450) (1x REDUCTION 160x500/200x315)
- (T12) DUCT T-PIECE, 315x450 (1x REDUCTION 315x450/80x80)
- (T13) DUCT T-PIECE, 125x125 (1x REDUCTION 125x125/80x80)
- (T14) DUCT T-PIECE, 200x200 (1x REDUCTION 200x200/160x160) (1x REDUCTION 200x200/125x125)
- (T15) DUCT T-PIECE, 200x200 (1x REDUCTION 200x200/125x125)
- (T16) DUCT T-PIECE, 200x315 (1x REDUCTION 200x315/200x200) (1x REDUCTION 200x315/160x160)
- (T17) DUCT T-PIECE, 200x315 (1x REDUCTION 200x315/80x80)
- (C1) DUCT CROSS PIECE, 160x355 (1x REDUCTION 160x355/160x250) (2x REDUCTION 160x355/125x125)
- (C2) DUCT CROSS PIECE, 200x315 (1x R. 200x315/200x200) (2x R. 200x315/125x125)

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	01/2023
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (AC) LAYOUT - FL No.1	1:100	D.1.4-10

FLOOR No.2



LEGEND OF THE ELEMENTS:

- FRESH AIR SUPPLY DUCT TO THE ROOMS
- EXHAUST AIR DUCT FROM THE ROOMS

NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- All horizontal HVAC ducts are routed between the ceiling and the dropped ceiling, all vertical HVAC ducts are routed in the installation shafts.
- In rooms with only an air outlet and no other ductwork, the dropped ceiling height will be reduced from the designed 500 mm to 150 mm (or directly below the load-bearing beams if present) so that the air outlet can be positioned below this dropped ceiling and thus flow directly into the room space.
- dimensions of the air ducts leading to the outlets and disc valves not specified on the drawings shall be of the same dimensions as their end elements, see LEGEND OF THE HVAC ELEMENTS (HxW) and Technical report of subdivision D.1.4 BUILDING ENVIRONMENT TECHNOLOGY
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

Community centre - Vodňany - FL No.2

NO.	ROOM	AREA [m²]
2.01	FOYER	106,2
2.02	EXHIBITION SPACE	35,5
2.03	LIBRARY	273,9
2.04	CORRIDOR	19,4
2.05	DEPOSITORY	41,9
2.06	DEPOSITORY	18,7
2.07	CORRIDOR	7,3
2.08	CHILDREN'S LIBRARY	247,3
2.09	TECHNICAL FACILITIES	59,9
2.10	OFFICE	16,6
2.11	OFFICE + KITCHEN	23,0
2.12	CORRIDOR	7,6
2.13	WC WOMEN	11,4
2.14	WC EMPLOYEES	5,4
2.15	WC. MEN	10,5
2.16	CORRIDOR	107,7
2.17	LECTURE ROOM	79,1
	TOTAL	1071,4

1.03	BLACK BOX THEATRE	608,1

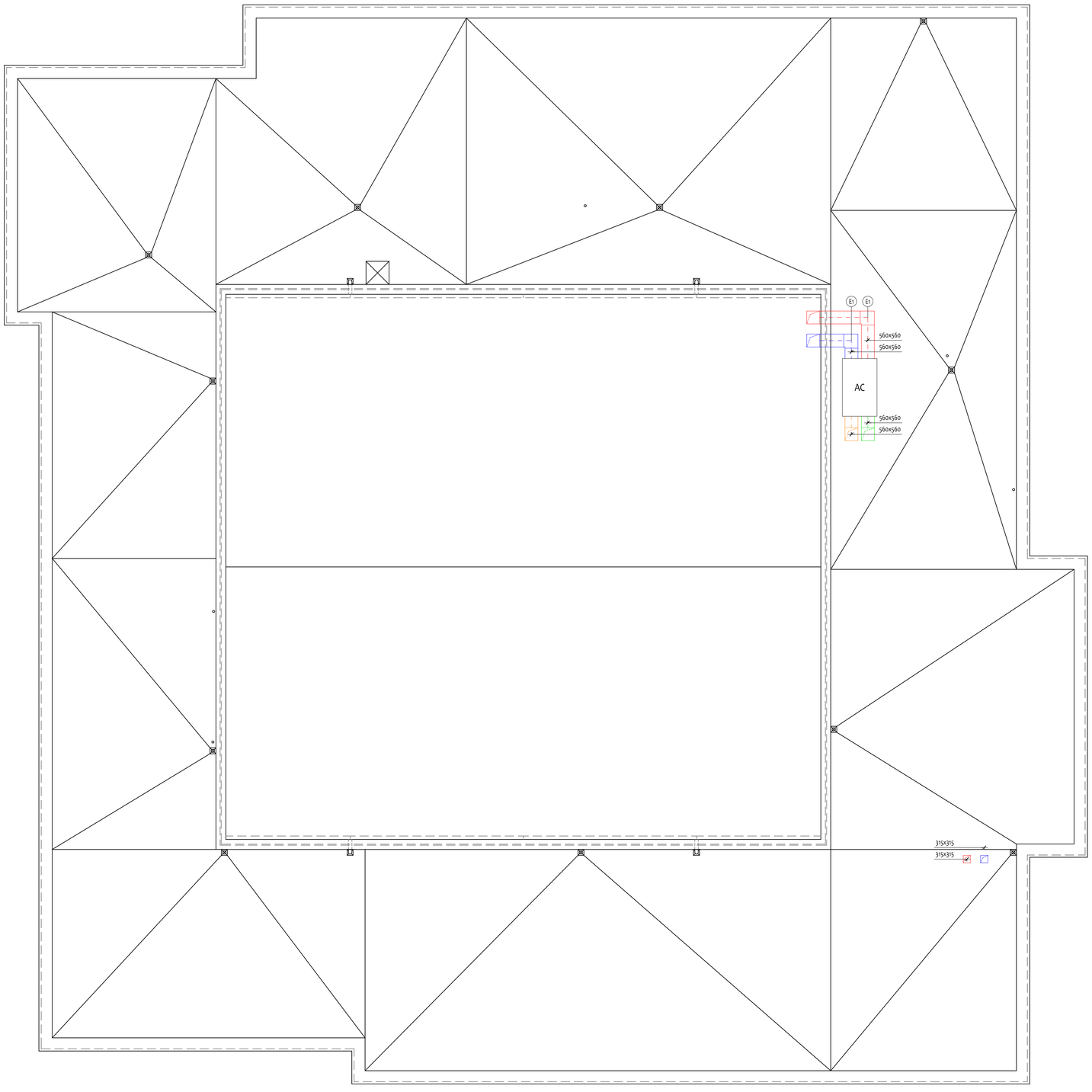
LEGEND OF THE HVAC ELEMENTS (HxW):

- A1, B1, ... HVAC SUPPLY DUCT SECTION
- A1, B1, ... HVAC EXHAUST DUCT SECTION
- DV1 DISC VALVE, 100x100
- DV2 DISC VALVE, 80x80
- DV3 DISC VALVE, 160x160
- O1 AIR DUCT OUTLET, 80x80
- O2 AIR DUCT OUTLET, 100x100
- A1 ANEMOSTAT, 500x500
- E1 DUCT ELBOW, 160x160
- E2 DUCT ELBOW, 200x200
- E3 DUCT ELBOW, 315x400
- E4 DUCT ELBOW, 560x560
- T1 DUCT T-PIECE, 125x125 (2x REDUCTION 125x125/100x100)
- T2 DUCT T-PIECE, 125x125 (1x REDUCTION 125x125/100x100) (1x REDUCTION 125x125/80x80)
- T3 DUCT T-PIECE, 160x200 (1x REDUCTION 160x200/160x180) (1x REDUCTION 160x200/80x80)
- T4 DUCT T-PIECE, 160x200 (1x REDUCTION 160x200/80x80)
- T5 DUCT T-PIECE, 180x200 (2x REDUCTION 180x200/160x160)
- T6 DUCT T-PIECE, 180x315 (1x REDUCTION 180x315/180x200) (1x REDUCTION 180x315/160x160)
- T7 DUCT T-PIECE, 315x315 (1x REDUCTION 315x315/200x315) (1x REDUCTION 315x315/180x315)
- T8 DUCT T-PIECE, 160x160 (1x REDUCTION 160x160/125x125) (1x REDUCTION 160x160/100x100)
- T9 DUCT T-PIECE, 160x160 (1x REDUCTION 160x160/80x80)
- T10 DUCT T-PIECE, 160x160 (1x REDUCTION 160x160/100x100)
- T11 DUCT T-PIECE, 200x315 (1x REDUCTION 200x315/160x200) (1x REDUCTION 200x315/160x160)
- T12 DUCT T-PIECE, 250x315 (2x REDUCTION 250x315/200x200)
- T13 DUCT T-PIECE, 315x315 (1x REDUCTION 315x315/250x315) (1x REDUCTION 315x315/200x200)
- T14 DUCT T-PIECE, 315x400 (1x REDUCTION 315x400/315x315) (1x REDUCTION 315x400/200x200)
- T15 DUCT T-PIECE, 400x500 (2x REDUCTION 400x500/315x400)
- T16 DUCT T-PIECE, 560x560 (1x REDUCTION 560x560/400x500) (1x REDUCTION 560x560/315x400)
- T17 DUCT T-PIECE, 400x400 (1x REDUCTION 400x400/315x400) (1x REDUCTION 400x400/200x200)
- T18 DUCT T-PIECE, 400x400 (1x REDUCTION 400x400/200x200)
- T19 DUCT T-PIECE, 560x560 (2x REDUCTION 560x560/400x400)
- C1 DUCT CROSS PIECE, 100x100 (2x REDUCTION 100x100/80x80)
- C2 DUCT CROSS PIECE, 160x180 (2x REDUCTION 160x180/125x125) (1x REDUCTION 160x180/100x100)
- C3 DUCT CROSS PIECE, 315x315 (1x R. 315x315/200x315) (1x R. 315x315/180x200) (1x R. 315x315/160x160)

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	01/2023
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (AC) LAYOUT - FL No.2	1:100	D.1.4-11

ROOF



LEGEND OF THE ELEMENTS:

- AC — AIR CONDITIONING UNIT
- FRESH OUTDOOR AIR SUPPLY DUCT
- EXHAUST AIR DUCT TO THE EXTERIOR
- FRESH AIR SUPPLY DUCT TO THE ROOMS
- EXHAUST AIR DUCT FROM THE ROOMS
- E1 — DUCT ELBOW, 560x560

NOTES:

- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- All horizontal HVAC ducts are routed between the ceiling and the dropped ceiling, all vertical HVAC ducts are routed in the installation shafts.
- In rooms with only an air outlet and no other ductwork, the dropped ceiling height will be reduced from the designed 500 mm to 150 mm (or directly below the load-bearing beams if present) so that the air outlet can be positioned below this dropped ceiling and thus flow directly into the room space.
- dimensions of the air ducts leading to the outlets and disc valves not specified on the drawings shall be of the same dimensions as their end elements, see LEGEND OF THE HVAC ELEMENTS (HxW) and Technical report of subdivision D.1.4 BUILDING ENVIRONMENT TECHNOLOGY
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	01/2023
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.4 BUILDING ENVIRONMENT TECHNOLOGY	SCALE	NO.
CONTENT	HVAC (AC) LAYOUT - ROOF	1:100	D.1.4-12