

## Technical Requirements

Project: SF43DL

Section: A. Building requirements

Architect:

Lead design engineer:

## Project scope

No	Project Section	Code
1	Building requirements *	A
2	Wind tunnel equipment location *	T
3	Equipment loads *	E
4	Equipment bases tolerance requirements *	H
5	Cooling system *	C
6	Cable networks *	P
7	Service floors and ladders *	K
8	Building markup and inspection *	M
9	Site works execution program *	X

\* - Full versions of all documents are available in the TunnelTech customer portal.  
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PROJECT, SECTION		T U N N E L   T E C H			
SF43DL Building requirements					
TITLE	CLIENT	DRAWN BY	CHEKED BY	APPROVED BY	DATE
Project scope		PROJECT NUMBER	DRAWING No	REV	
		SF43DL	A.000		

## Revision Schedule

No.	Index	Description	Date
1	0	Release of technical requirements.	

PROJECT, SECTION		TUNNEL TECH			
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Revision schedule		PROJECT NUMBER	DRAWING No	REV	0
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A.1.01	Table of contents	0
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A.1.04	Explanatory note	0
A.1.05	Explanatory note	0
A.2.01 *	Lower Duct, and Airjet and Axial Fans Outlet Duct levels plan views	0
A.2.02 *	Callout 1 - Airjet and Axial Fans Outlet Duct	0
A.2.03 *	Waiting Zone, and Flight Chamber slab levels plan views	0
A.2.04 *	Callout 2 - Waiting Zone base level	0
A.2.05 *	Flight Chamber finish floor level plan views	0
A.2.06 *	Axial Fans and Upper Duct base levels plan views	0
A.2.07 *	1A - 1A section view (longitudinal section)	0
A.2.08 *	2A - 2A section view (longitudinal section)	0
A.2.09 *	3A-3A, 4A-4A, 5A-5A section views (cross sections)	0

\* - All drawings are available in the full version of the document.

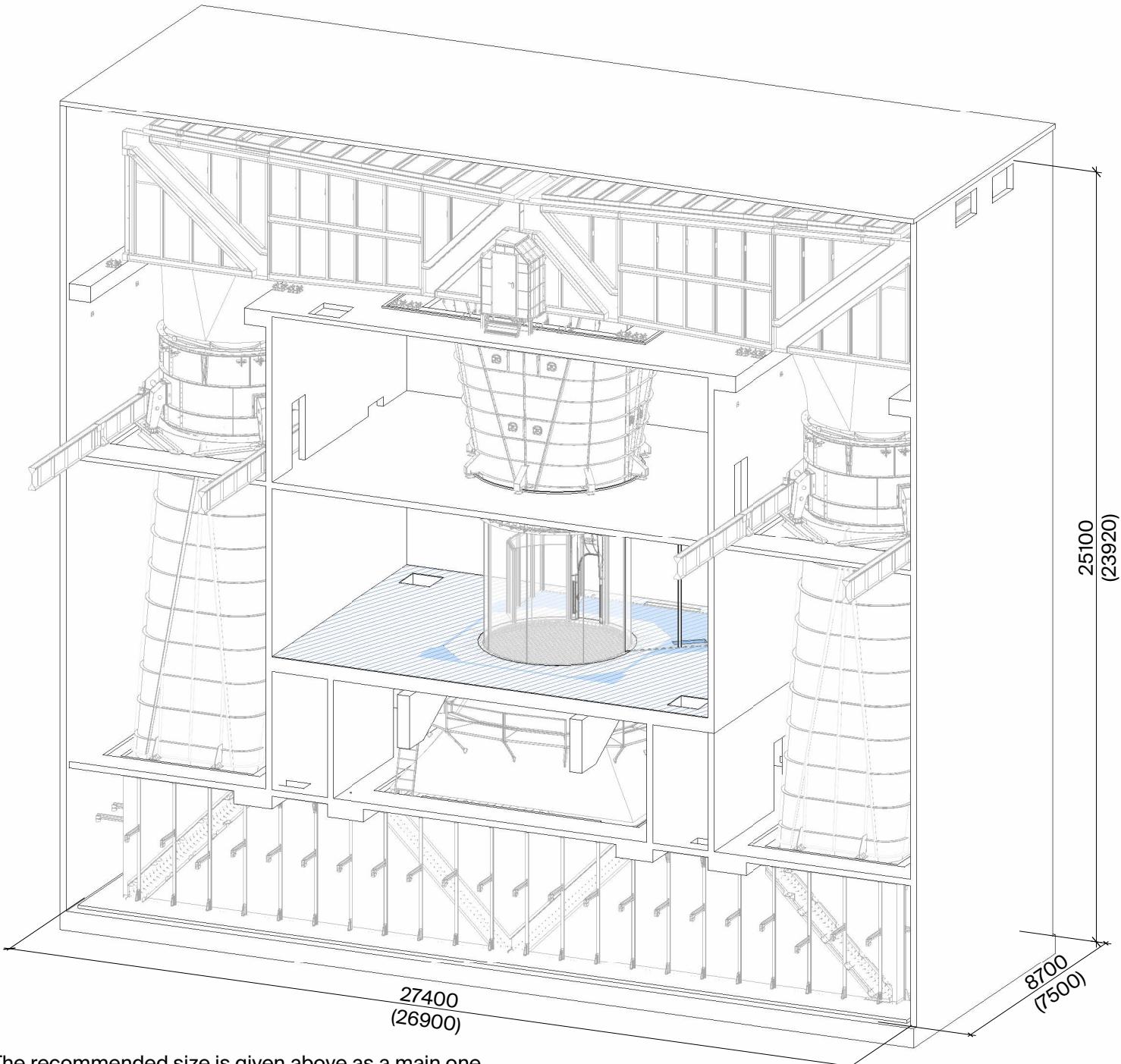
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# Introduction

This section of the technical requirements documentation contains explanations on the following:

- Architectural restrictions for the technological space of the wind tunnel in the building;
- Requirements and recommendations for the technological space of the wind tunnel and ways of access there;
- Specifics of the building design in order to provide the installation, commissioning and maintenance of the wind tunnel.



The recommended size is given above as a main one.  
(The minimum possible size for this model is given in brackets.)

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## Technological space of the wind tunnel

The technological volumes of the wind tunnel are aligned and described in relation to 4 main axes and 6 levels. See the following drawings for the necessary axes positioning and the relative elevations of the levels. The intersections of the 4 principal axes of the wind tunnel mark the centers of the 3 vertical shafts of the technological volumes:

- The central shaft (where the Flight Chamber is located);
- The two side shafts, each has an Axial Fan that creates the air flow;

The following levels and their relative elevations are crucial for the wind tunnel equipment:

1. The level of the Lower Duct. The base face for the Lower Turning Vanes' Blocks;
2. The level of the Airjet and Axial Fans' Outlet Duct. The base face of the Airjet and of the Axial Fans' Outlet Duct;
3. The level of the Waiting Zone. The base surface of the Lower Ring, the base face of the Waiting Zone frame, finish floor thickness;
4. The level of the Axial Fans. The base face (or faces) of the Fans Suspension in both side shafts;
5. The level of the Flight Chamber Diffuser base and Axial Fans. The base face of the Flight Chamber Diffuser in center shafts;
6. The level of the Upper Duct. The base faces of the Upper Axial Fans' Turning Vanes' Blocks above the both side shafts (see below, the requirements for the beams serving as the base to the blocks); the base surface of the Upper Flight Chamber Turning Vanes' Block.

## Dimensions of the technological space of the wind tunnel

The internal dimensions of the technological space of the wind tunnel are shown in the following architectural drawings.

All dimensions (linear, radial and elev. marks) that are shown in the architectural drawings are dictated by the wind tunnel technology. The dimensions must be respected in order to provide the wind tunnel equipment installation, functioning and maintenance.

Dimensions marked with '#' and '\*' are shown only as a reference and are not dictated by TunnelTech.

Prior to the wind tunnel equipment installation the measurements of the technological space must be conducted by the contractor. The measured data must be provided by the contractor to TunnelTech in accordance to "Marking and Inspection" section of the technical requirements documentation.

If, according to the meterings' report, the precision of the structure is not sufficient for the equipment installation purposes, after careful consideration TunnelTech might request the contractor to fix.

See the "Marking and Inspection" section of the technical requirements documentation for further information.

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# The specifics of installation, commissioning and maintenance of the wind tunnel by levels of the building.

## **Lower Duct level.**

Two pits for collecting water and draining must be provided on the foundation slab.

A slope between the base faces of the Lower Turning Vanes' Blocks must be organized on the foundation slab to direct the water to the draining pits.

The Lower Duct level can be accessed via a door from the other volumes on the level or via two manholes in the slab above the level. The general requirement for the door or the manhole cover is that it must be airtight to withstand the pressure up to 2000Pa. The final position of the door/manhole must be confirmed with TunnelTech.

## **Airjet and Axial Fans' Outlet Duct level.**

To provide access to the side shafts during the installation and commissioning of the wind tunnel equipment technical openings must be provided. After the wind tunnel equipment is installed, the access to the side shafts on the level is not needed and the openings can be bricked or filled with other material to reduce the noise propagation.

The dimensions of the three openings in the floor slab at the cross-sections of the principal axes must be respected in relation to the principal axes of the wind tunnel equipment with the tolerance of -20mm .. +20mm.

Openings for air intake and exhaust must be implemented above the Airjet and Axial Fans' Outlet Duct level. The position and dimensions of the openings must be clarified in course of the project and confirmed with TunnelTech.

## **Waiting Zone level.**

The final position of the Waiting Zone and the Airlock and their attachment to the building structure must be clarified in course of the project. The slab elevation and the thickness of the finish floor under the Airlock and the Waiting Zone must be implemented in accordance with the technical requirements.

The tolerance for the position of the central opening in plan view in relation to the project values is 15mm;

The dimensions of the central opening in the floor slab and the four consoles at the cross-sections of the principal axes must be respected in relation to the principal axes of the wind tunnel equipment (of the steel frame of the Flight Chamber) with the tolerance of -10mm .. +10mm.

The stability requirement for the slab around the central opening (Lower Ring base slab) and the four consoles is that the slab and equipment bases must not bend or shift more than 5mm. That includes the shifts of the structure (if any) during the first years after the construction.

## **Axial Fans' level.**

To provide the possibility of extracting the Axial Fans for maintenance after the equipment is installed, the technological openings must be created in the external wall of each side shaft. The openings must have demountable filling. The position and dimensions of the openings must be clarified in course of the project and confirmed with TunnelTech.

The additional beams needed for the Axial Fans extraction are supplied by TunnelTech.

After an Axial Fan is rolled out of a side shaft volume on the additional beams, it is the customer's responsibility to provide a way of replacing the Axial Fan.

An access to the Machine Rooms, where the Axial Fans are located, must be provided for the installation, commissioning and maintenance.

The stability requirement for the slab around the central opening (Flight Chamber Diffuser base slab) is that the slab must not bend or shift more than 5mm. That includes the shifts of the structure (if any) during the first years after the construction.

External wide doors are required on the Flight Chamber Diffuser base level for taking in and out the Variable Frequency Drives (VFDs).

An access to the Flight Chamber Diffuser base level must be provided for the installation, commissioning and maintenance.

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## The specifics of installation, commissioning and maintenance of the wind tunnel by levels of the building.

### **Upper Duct level.**

An access to the Upper Duct level must be provided for the installation, commissioning and maintenance.

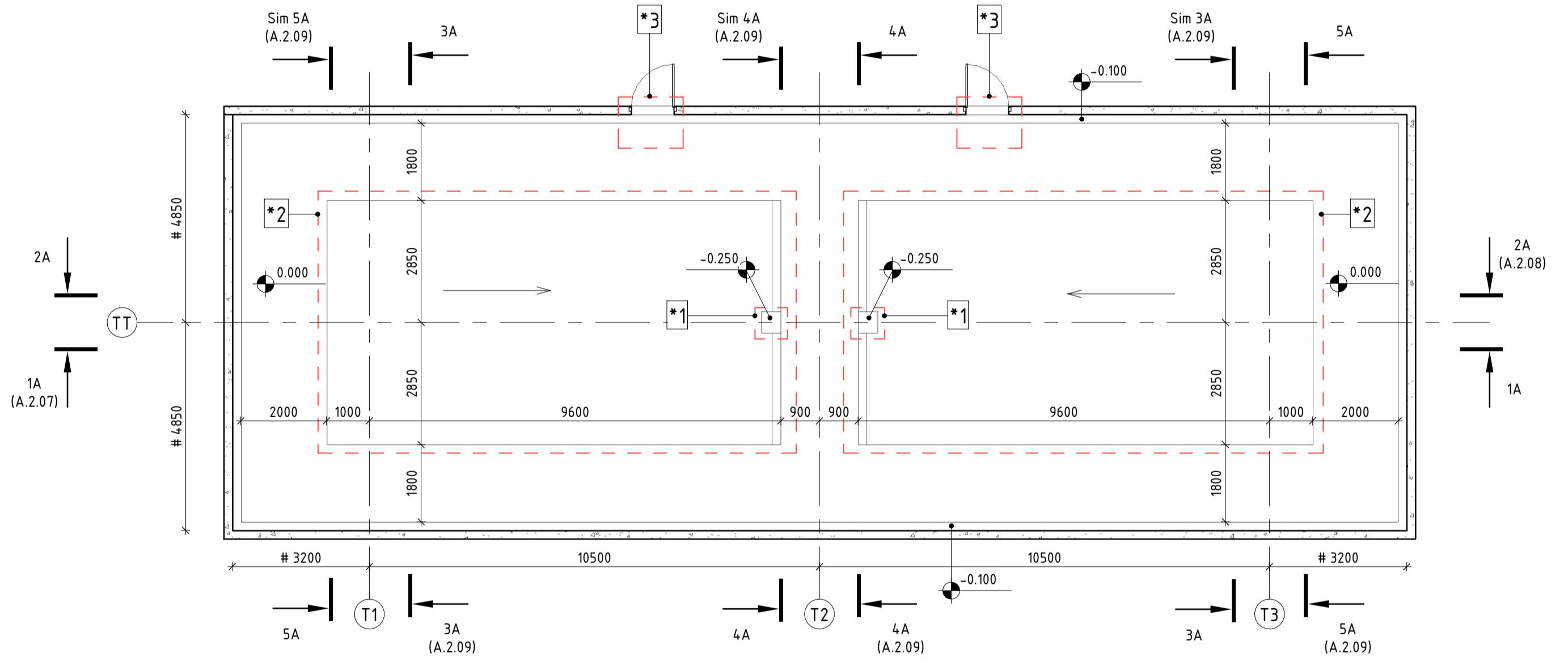
The structure of the roof is to be installed after the equipment of the Upper Duct is placed in the building.

The structure of the building is introductory before the approval of the project. The exact structural plan of the building and the procedure for installing the wind tunnel equipment will be presented in subsequent revisions and in the technical requirements section of the "X - Site works execution program".

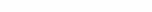
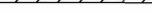
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## Lower Duct level

1:100



LEGEND

-  - Annotation frame
-  - Finish floor surface
-  - Subfloor after Tunnel Tech equipment installation

Dimensions marked '#' are shown only as a reference and not dictated by TunnelTech.

Dimensions marked '\*' are shown only as a reference and must be specified and confirmed with the local engineer.

## OTES

## Power Duct level

- A draining pit must be organised on the level for  
draining water removal.

- Slope for collecting water

- Two doors to provide an access to the Lower Duct during installation and maintenance of the wind tunnel. The dimensions and position of the doors must be clarified in course of the project.

## VISIONS

No.	Ind	Date
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OBJECT, SECTION

## Building requirements

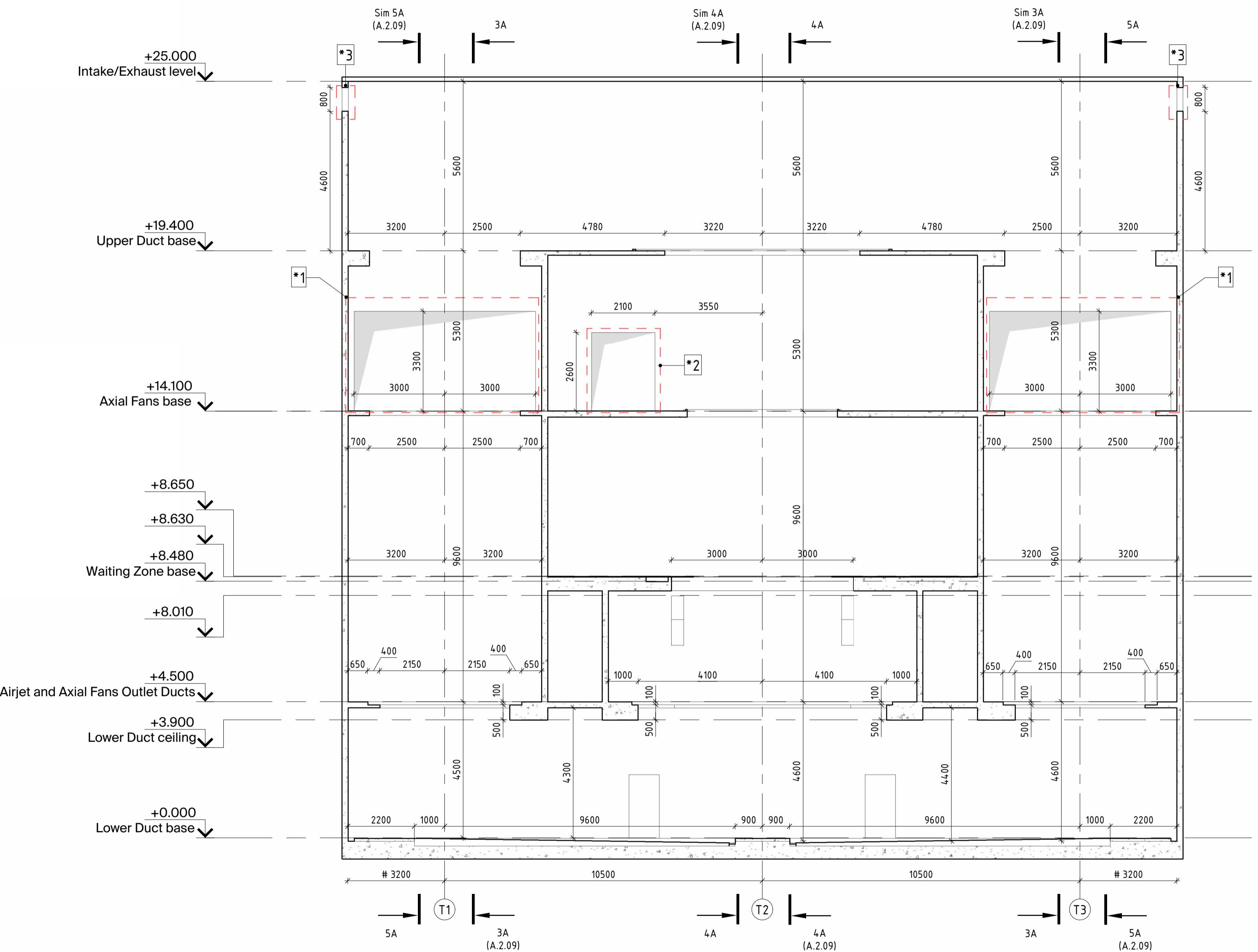
## Duct levels plan views

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1A - 1A

1:100



LEGEND

- [ - - - - - ] - Annotation frame
-  - Finish floor surface
-  - Subfloor after Tunnel Tech equipment installation

Dimensions marked '#' are shown only as a reference and not dictated by TunnelTech.

Dimensions marked '\*' are shown only as a reference and must be specified and confirmed with the local engineer.

## NOTES

## Section 1A

\*1 - Technological openings with demountable filling is required to provide the possibility of removing the fans.

\*2 - Wide door for taking in/out Variable Frequency Drives (VFDs) is required.

\*3 - Area for the exhaust opening (2 openings in total). For each of two air exhaust openings minimum required free area is 2 m<sup>2</sup>.

## REVISIONS

No.	Ind	Date
	T U N N E L	T E C H

PROJECT, SECTION

**TITLE**

### IA - IA section view (longitudinal section)

## CLIENT

SCALE	DATE	DRAWING No
As indicated		A 207

PROJECT NUMBER 6E16SDI REV C

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