



# 10th HL-LHC Collaboration Meeting Status of Civil Engineering Works

Luz Anastasia Lopez, On behalf of WP17.1 team  
Site Management & Buildings Department, CERN



6 October 2020 – CERN

# Agenda

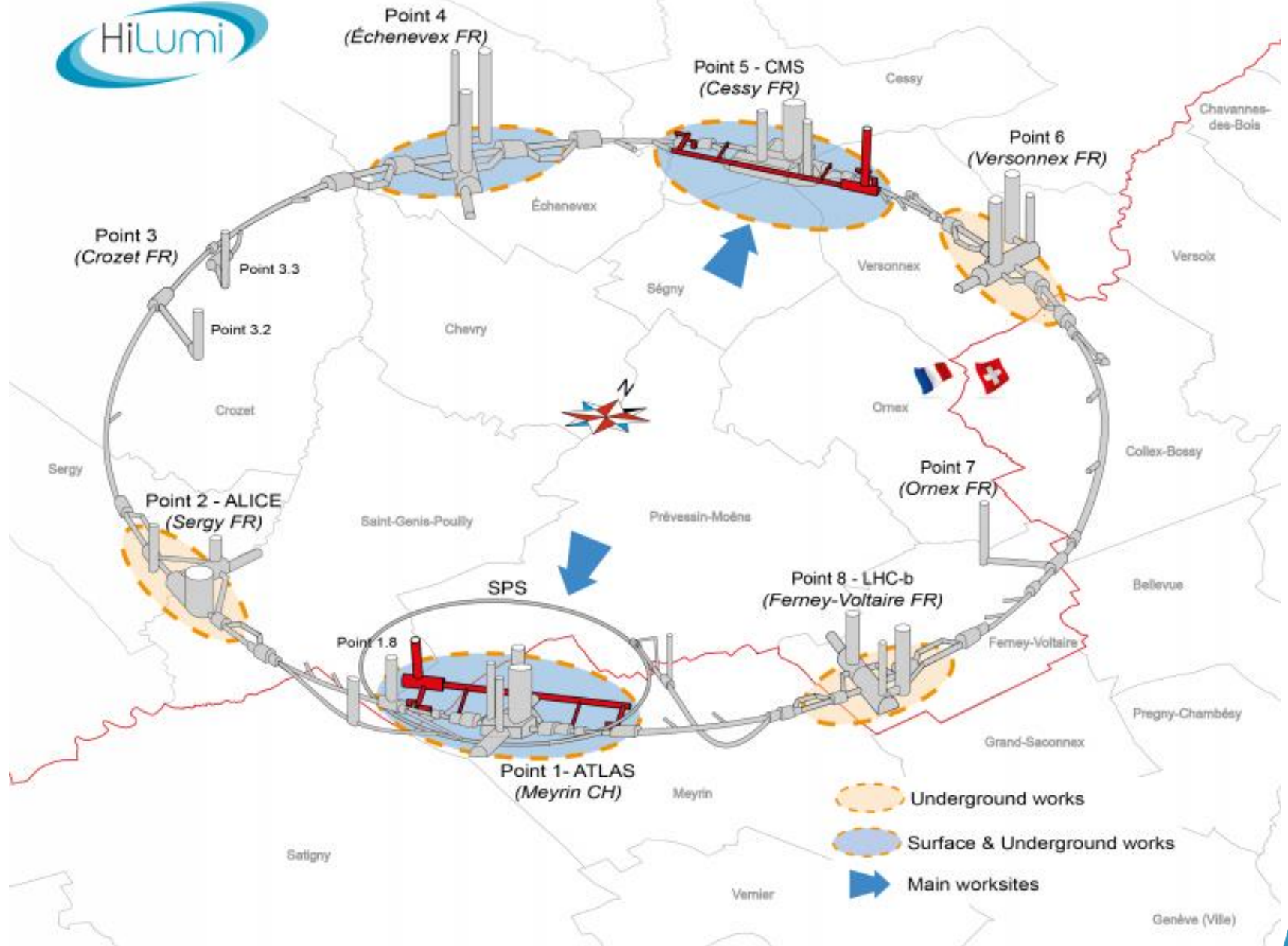
- HL-LHC Civil Works;
- Progress to date;
- Works ongoing at Point 1 & Point 5;
- Conclusions.

## Acknowledgement of WP17.1 team (SMB)

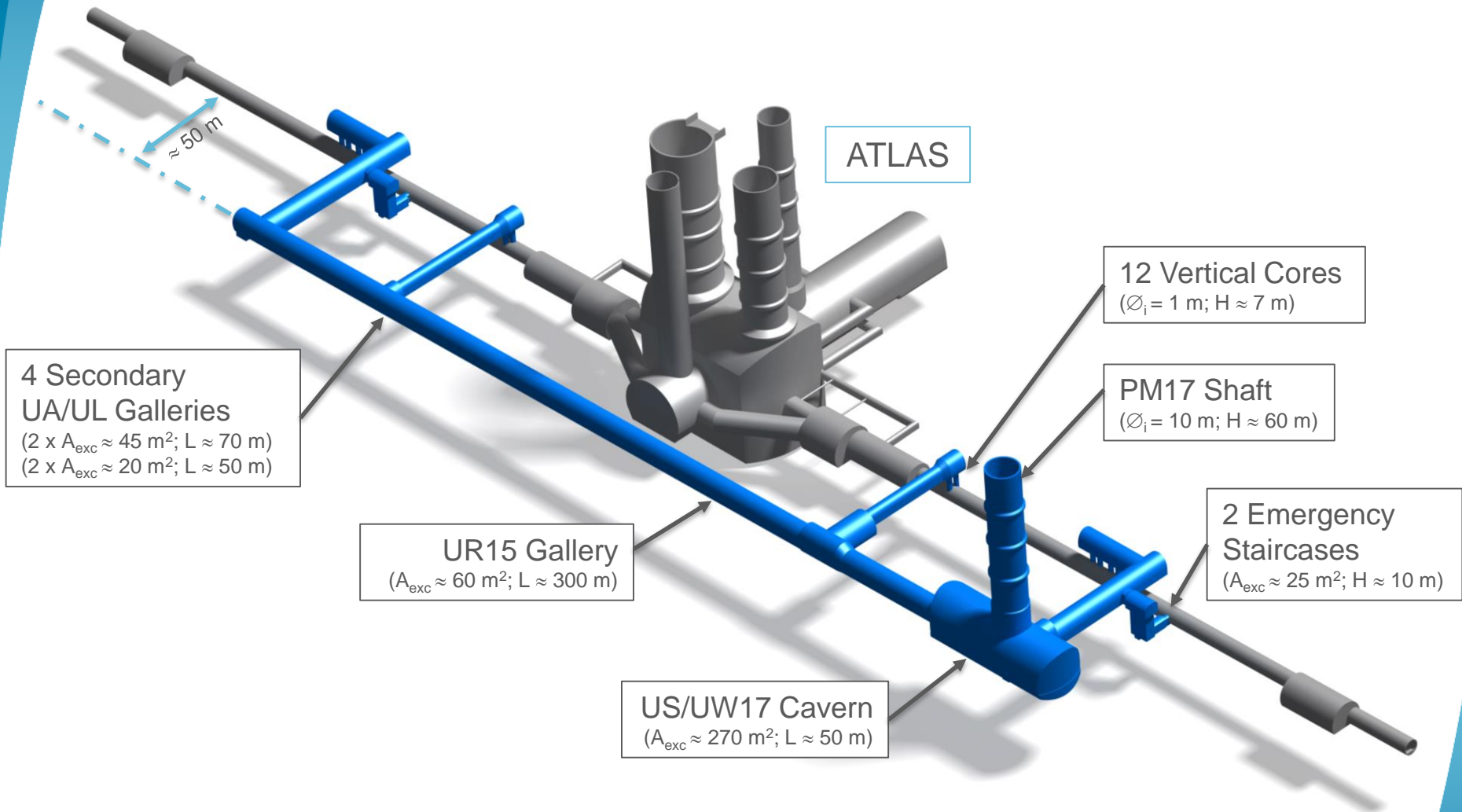
Pieter Mattelaer, Pierre Cardon, Martin Manfredi, Milton Morais, Zacharie Arenas, Ludovic Barthelemy, Angel Navascues, with ad-hoc support from Michael Poehler



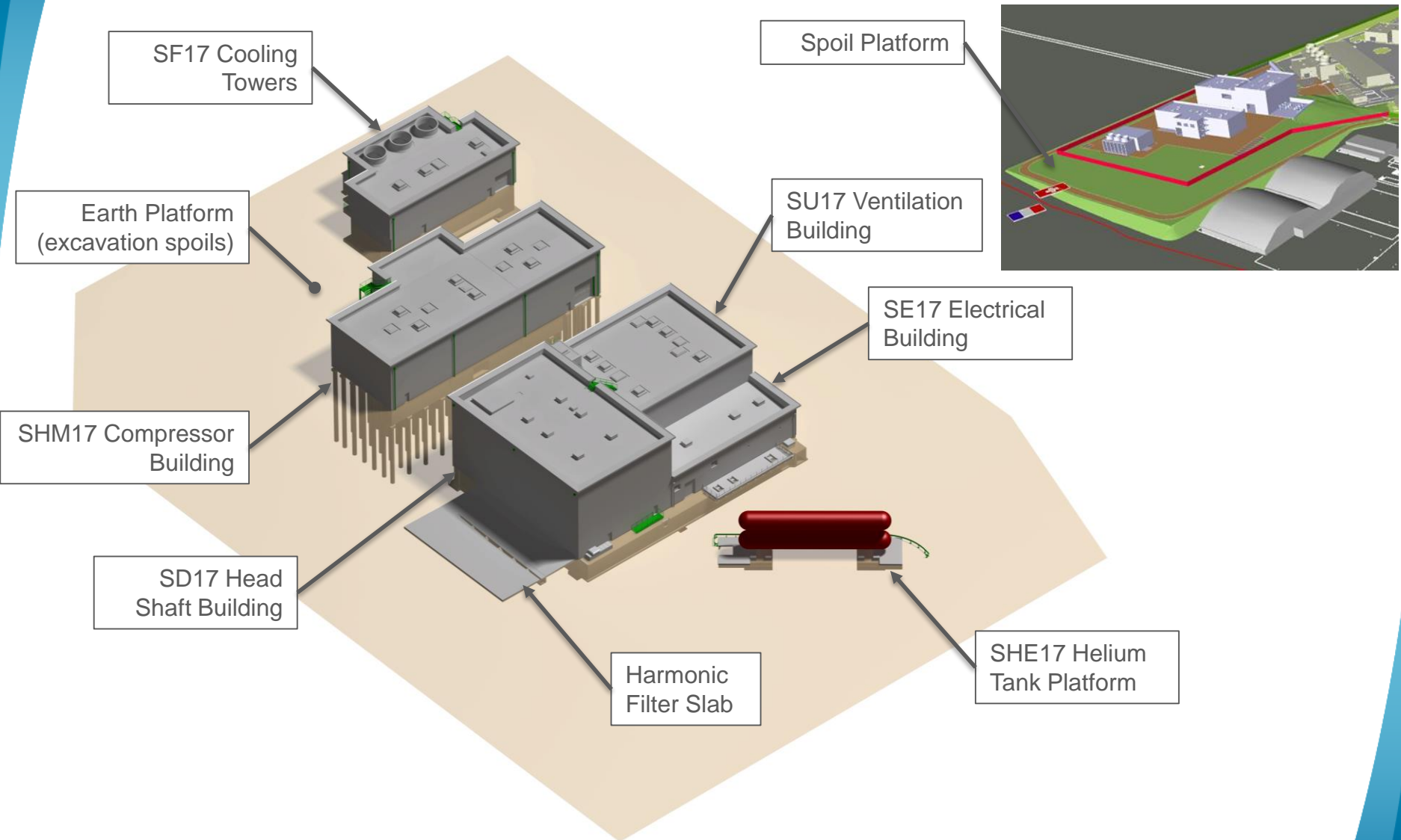
# Civil Engineering HL-LHC Works



# Underground Works at Point 1

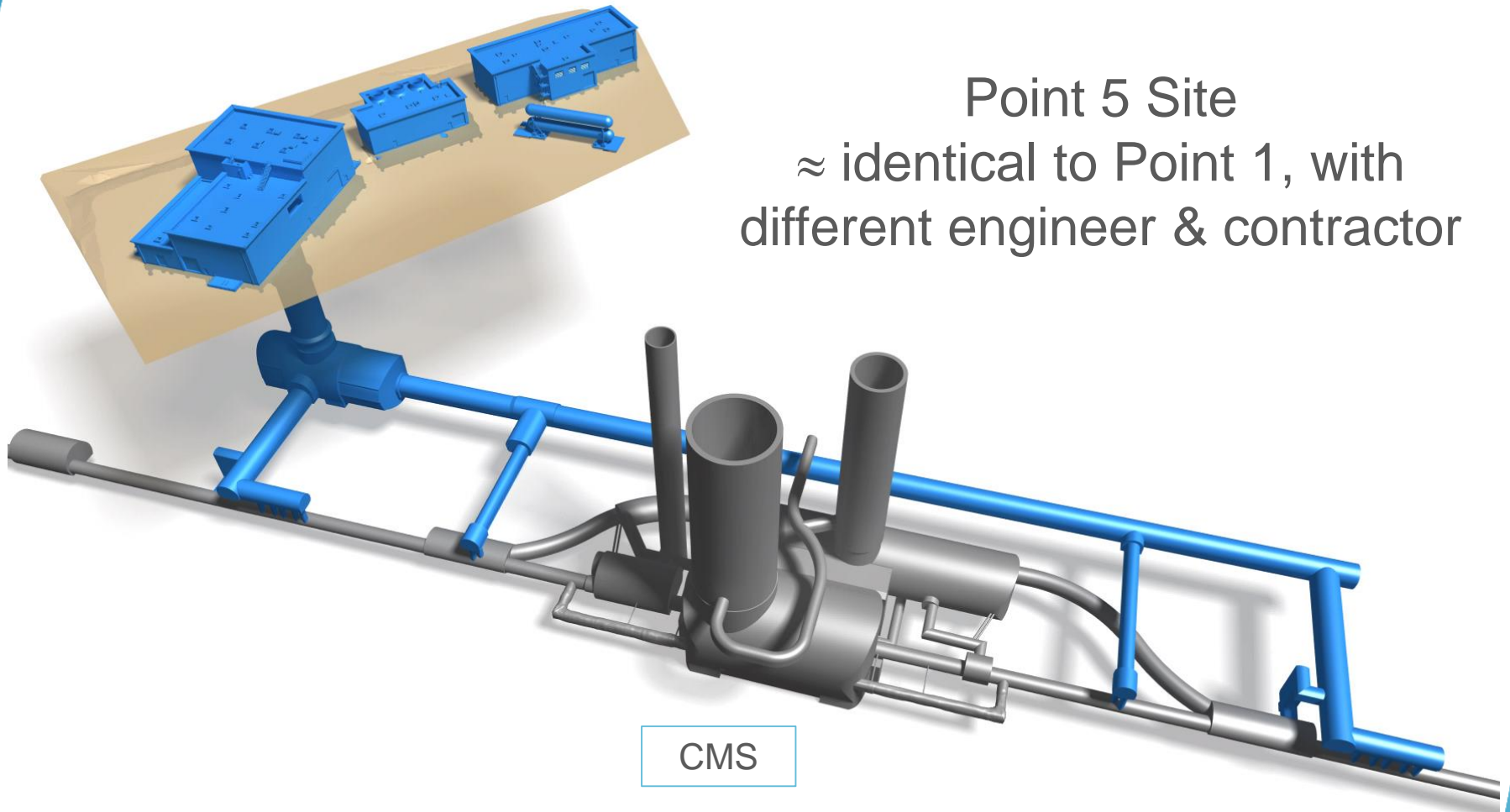


# Surface Works at Point 1



# Civil Works at Point 5

Point 5 Site  
≈ identical to Point 1, with  
different engineer & contractor

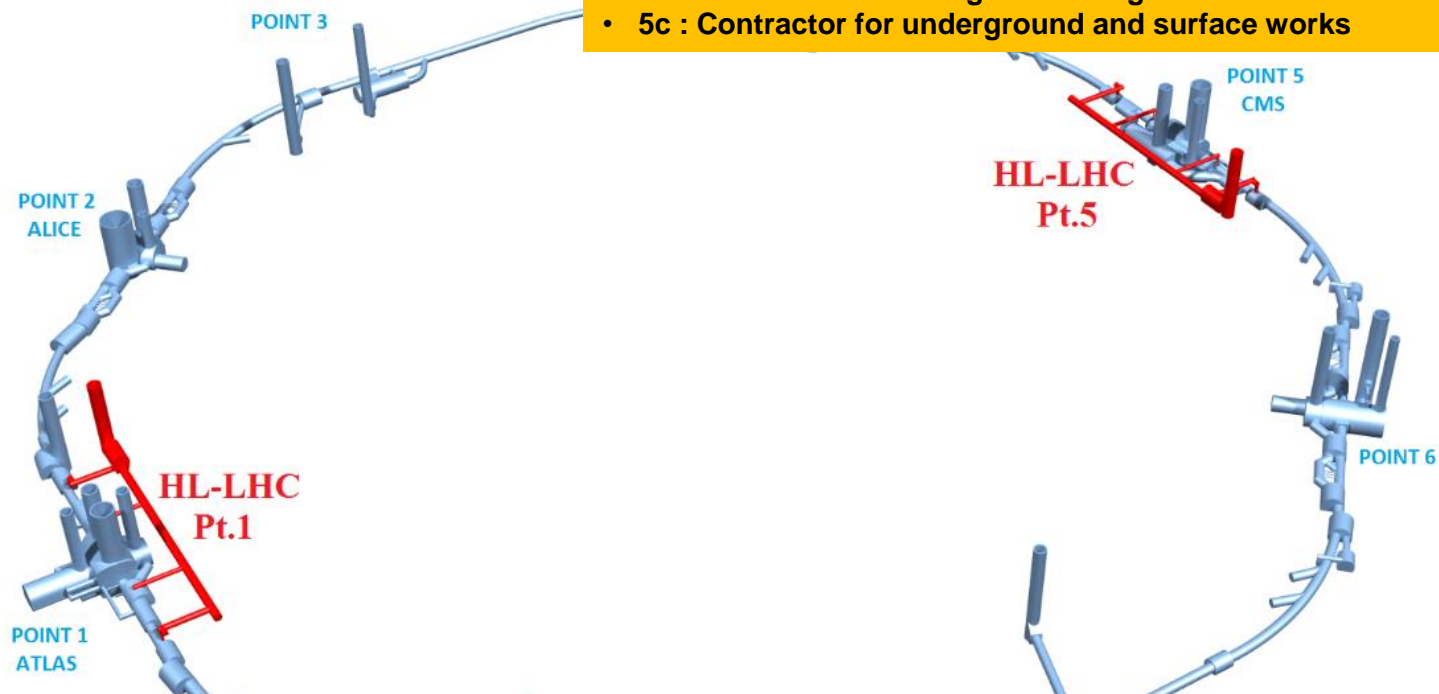


CMS

# Civil Engineering Contract Strategy

## Point 5 - CMS:

- 5a : Architect for building permit submission (F)
- 5b : Consultant for design of underground and surface works
- 5c : Contractor for underground and surface works



## Point 1 - ATLAS:

- 1a : Architect for building permit submission (CH)
- 1b : Consultant for design of underground and surface works
- 1c : Contractor for underground and surface works

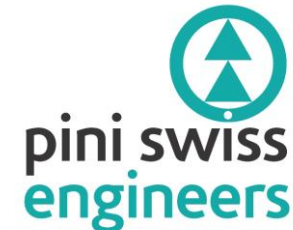


# Engineering Contracts

- Scope: Design & Construction Management; from 2016-2022; (vertical cores in 2024);
- Point 1 (CH): JV ORIGIN



- Point 5 (FR): JV LAP



# Construction Contracts



## ■ Point 1 Contractor:

- Joint Venture Marti Meyrin (JVMM);
- Accepted Contract Amount  $\approx$  67 million CHF; contract duration of 53 months (until 31.08.2022)
- Country of origin: Switzerland, Austria, Germany;



## ■ Point 5 Contractor:

- Consortium Implenía Baresel (CIB);
- Accepted Contract Amount  $\approx$  58 million EUR; contract duration of 54 months (until 30.09.2022)
- Country of origin: Switzerland, Germany, France;



## Civil Engineering Progress to date

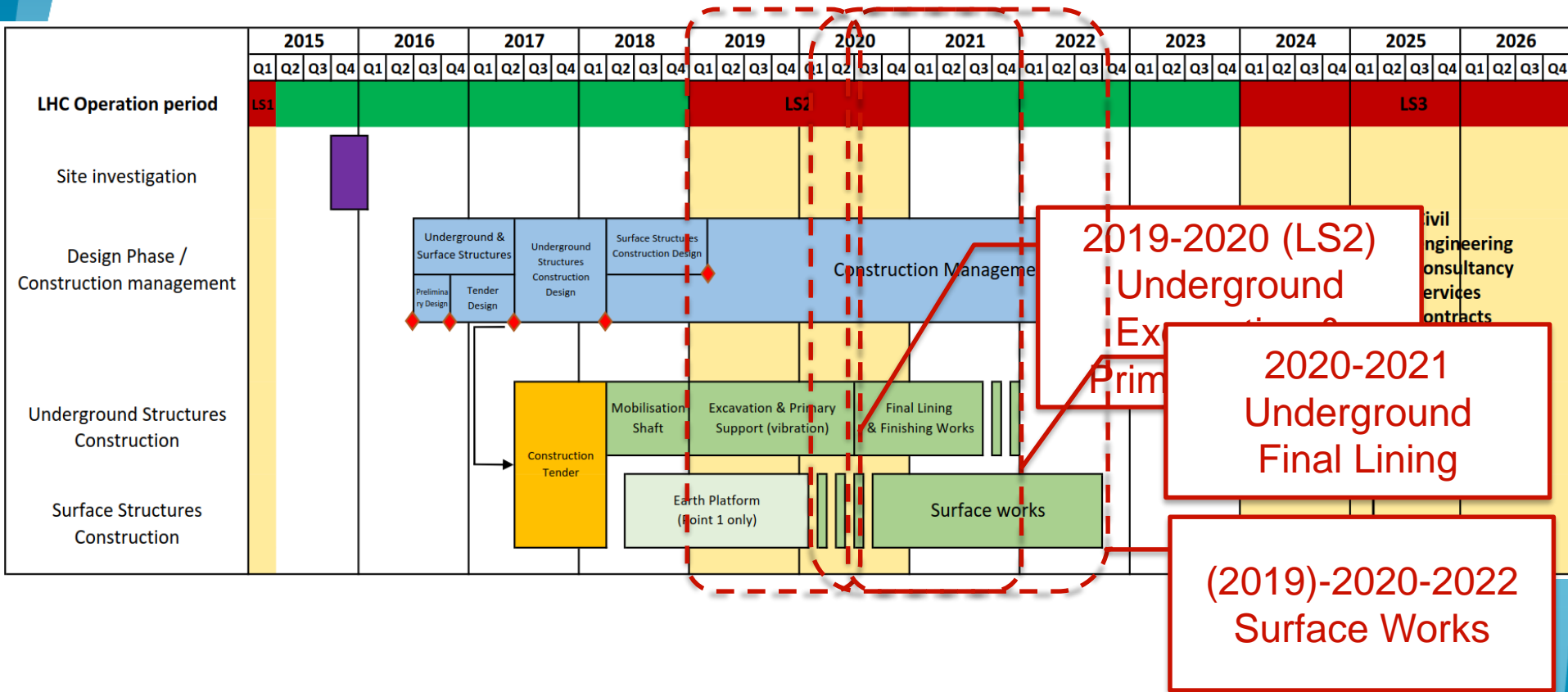
# Conclusions 9th Collaboration meeting (2019)

- Progress in 2018:
  - Signed construction contracts & mobilised on site;
  - Completed excavation of (majority of) PM shafts;
- Progress in 2019:
  - Completed excavation of (majority of) US/UW caverns; (invert remains to be excavated in 2020)
  - Excavation of URx5/UAx7/UPRx7/ULx7 galleries ongoing; approaching UPRx7 safety gallery to LHC connection;
- 1-Year look ahead:
  - Complete excavation of all underground structures;
  - Hand-over of UPRx3/x7 Sections to CERN incl. safety connection doors between HL-LHC and LHC;
  - SFx7 (almost) completed; construction of SHMx7 ongoing.

# Progress since 9th Collaboration Meeting (Oct-2019)

- Design contracts:
  - Construction design of UWKs and SWKs close to completion ;
- Construction contracts:
  - Commencement on site in Apr-2018;
  - Underground excavations completed in July-2020;
  - Underground Final Lining started in Nov-2019;
  - UPRx3/x7 Sections delivered to CERN between May and October 2020 ;
  - Surface works started in Sep-2019;
  - Construction of SFx7, SHMx7 and SLx7 technical galleries ongoing.

# WP17.1 Outline Schedule



Note: Outline schedule is only indicative. For exact dates, see T117/118 Contract Appendix K – Programme.

# Construction Contracts (Key Dates)

Sectional Completion or Employer Requirement	Point 1	Point 5
Completion for the whole of the Works	31/08/2022	30/09/2022
<b>Section 1:</b> UPRX7 and end part of UAX7 up to the connexion with UPRX7	31/03/2020	30/04/2020
<b>Section 2:</b> UPRX3 and end part of UAX3 up to the connexion with UPRX3	31/08/2020	31/07/2020
<b>Section 3:</b> Buildings SFX7, SHMX7, (SHEX7) with associated galleries SLX7, concrete slabs, roadworks and landscaping	31/08/2021	30/04/2021
<b>Section 4:</b> Buildings SUX7 with associated gallery SLX7 towards SHMX7	31/03/2022	30/06/2022
<b>Section 5:</b> Whole of the underground works, including shaft PMX7, and building SDX7, SEX7, (SHEX7) and SLNX7 with associated galleries SLX7, concrete slabs, roadworks and landscaping	31/08/2022	30/09/2022
<b>ER1:</b> Site mobilisation for the Underground Structures	03/04/2018	03/04/2018
<b>ER2:</b> Completion of shaft PMX7 excavation (up to level top of cavern vault)	31/12/2018	31/12/2018
<b>ER4:</b> Completion of excavation works for the Underground Structures	31/08/2020	31/05/2020
<b>ER5:</b> Completion of Underground Structures incl. shaft access arrangement and steel structures in USX7/UWX7 cavern	30/09/2021	31/12/2021

Notes: X is 1 for Point 1 and 5 for Point 5

LS2 assumed as ≈ 01/01/2019 to 31/12/2020

# Highlights 2020 (1/3)

## Covid 19 lockdown

- Civil engineering works were suspended at Point 1 and Point 5 on **18.03.2020** following European lockdowns due to covid-19 pandemic;
- Sites re-opened respectively on 14.04.2020 (in CH) and 20.04.2020 (in FR) after implementation of the mandatory covid-19 sanitary measures;
- Works re-started with reduced productivity which gradually increased until the summer;
- Currently, it is anticipated to have up to 2,2 months of delay to complete the whole of the works due to covid-19 crisis.



# Highlights 2020 (2/3)

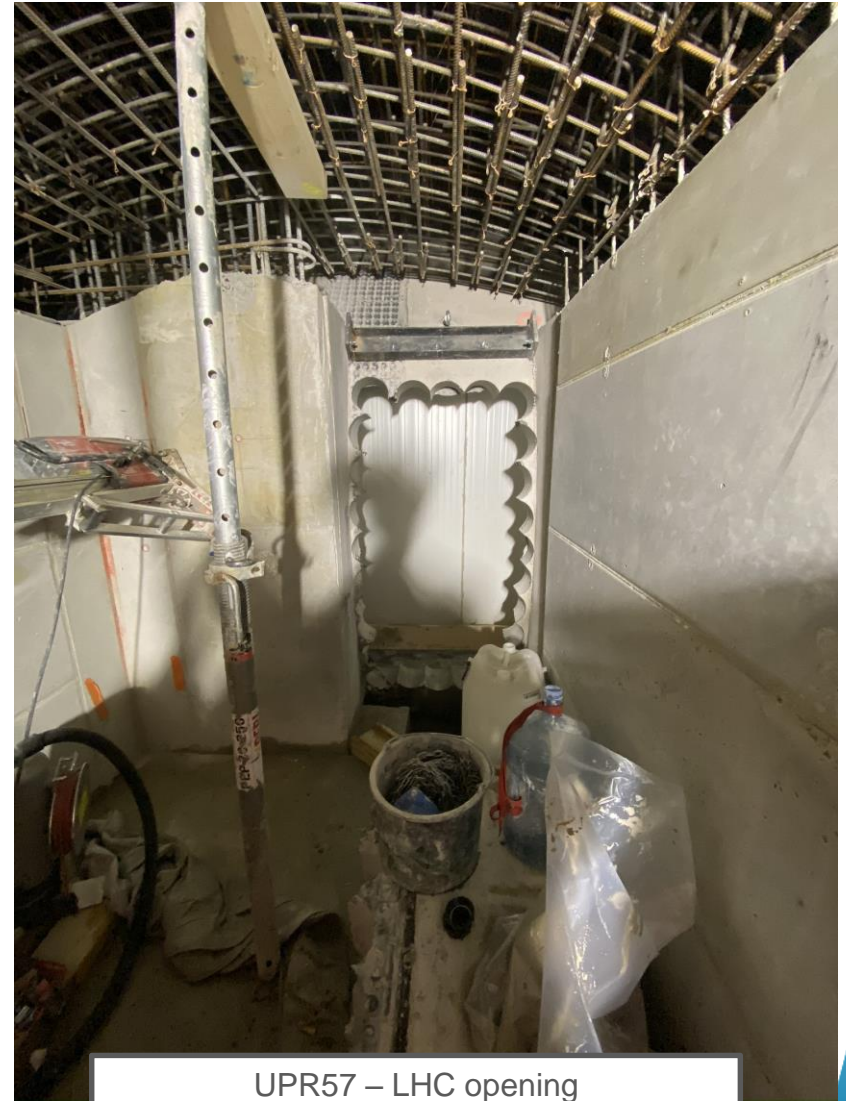
## LHC openings



UPR17 – LHC opening



UPR53 – LHC opening



UPR57 – LHC opening

# Highlights 2020 (3/3) :

## End of UWK excavation and Handover of Sections 1 & 2

Sectional completion / Employer requirement	Point 1		Point 5	
	Contract	Actual	Contract	Actual
ER4 – Completion of excavation works	31.08.2020	<b>17.07.2020</b>	31.05.2020	<b>24.07.2020</b>
Section 1 – UAx7 / UPRx7	30.04.2020	<b>20.05.2020</b>	30.04.2020	<b>07.08.2020</b>
Section 2 – UAx3 / UPRx3	31.08.2020	<b>17.09.2020</b>	30.07.2020	<b>30.10.2020 (forecast)</b>

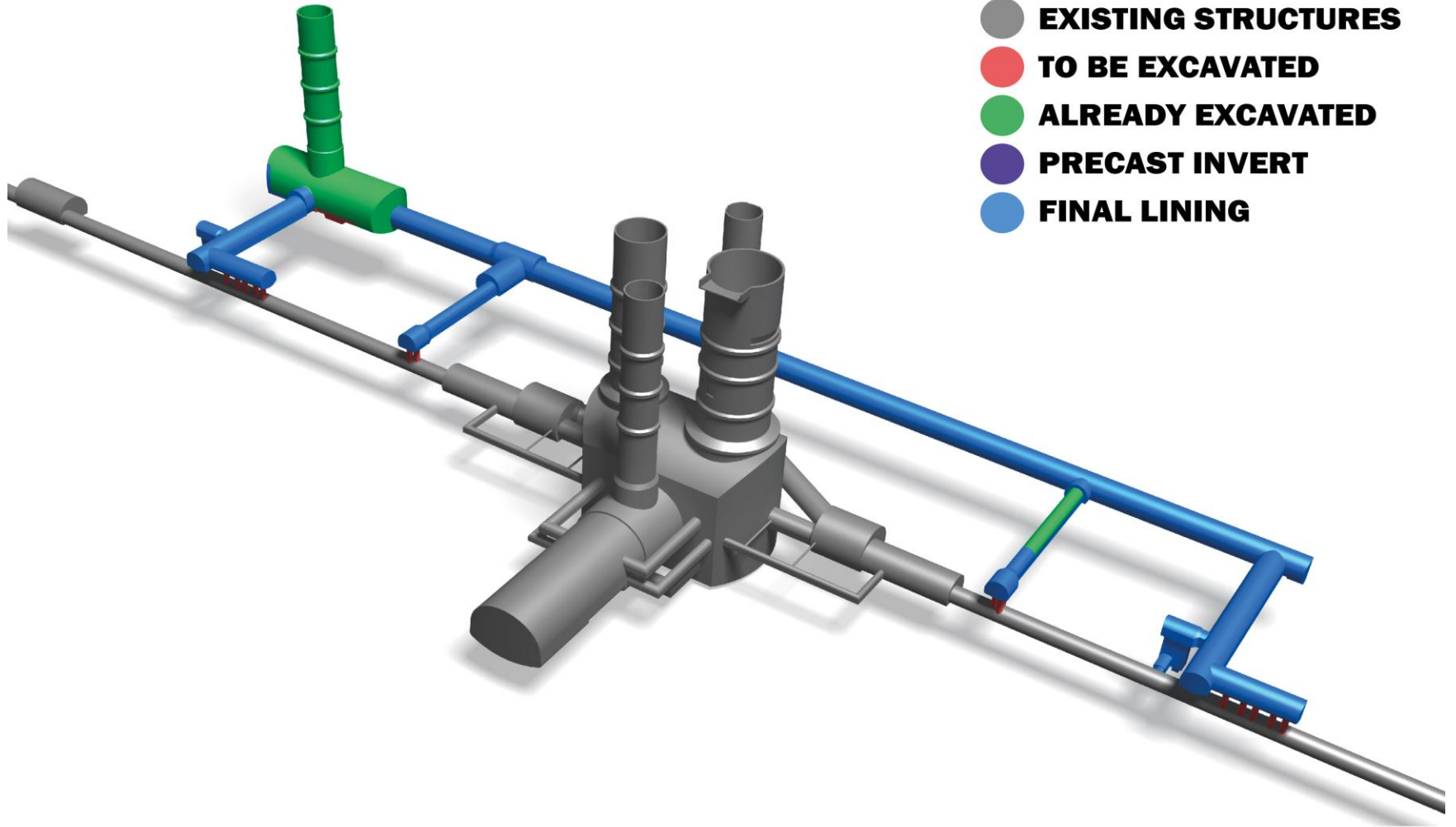


## Works Ongoing at Point 1

# UWKs Progress at Point 1

**STATUS: 2020.10.01**

- **EXISTING STRUCTURES**
- **TO BE EXCAVATED**
- **ALREADY EXCAVATED**
- **PRECAST INVERT**
- **FINAL LINING**



# Point 1 Underground Works – UR15



# Point 1 Underground Works – UA17



# Point 1 Underground Works – UPR17



# Point 1 Underground Works – UL17

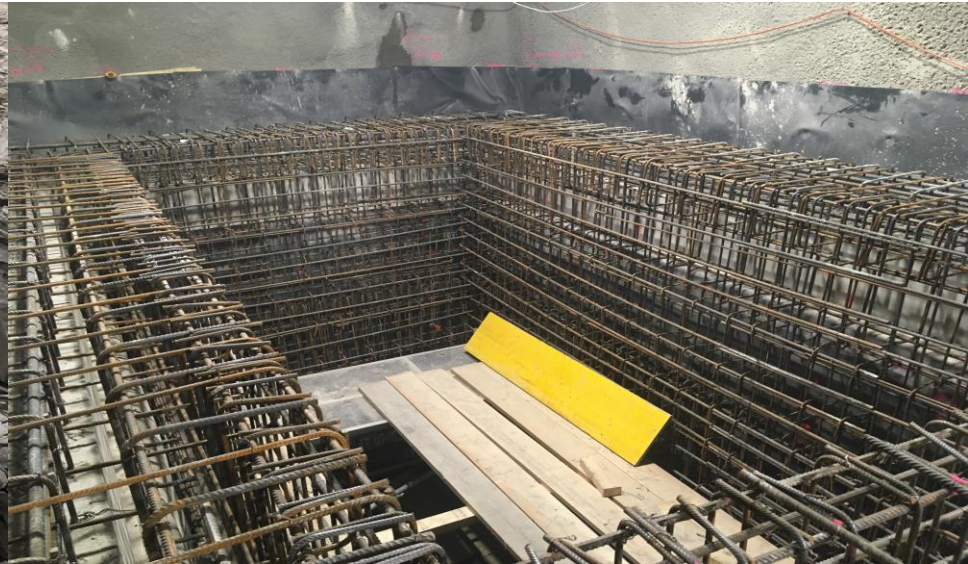




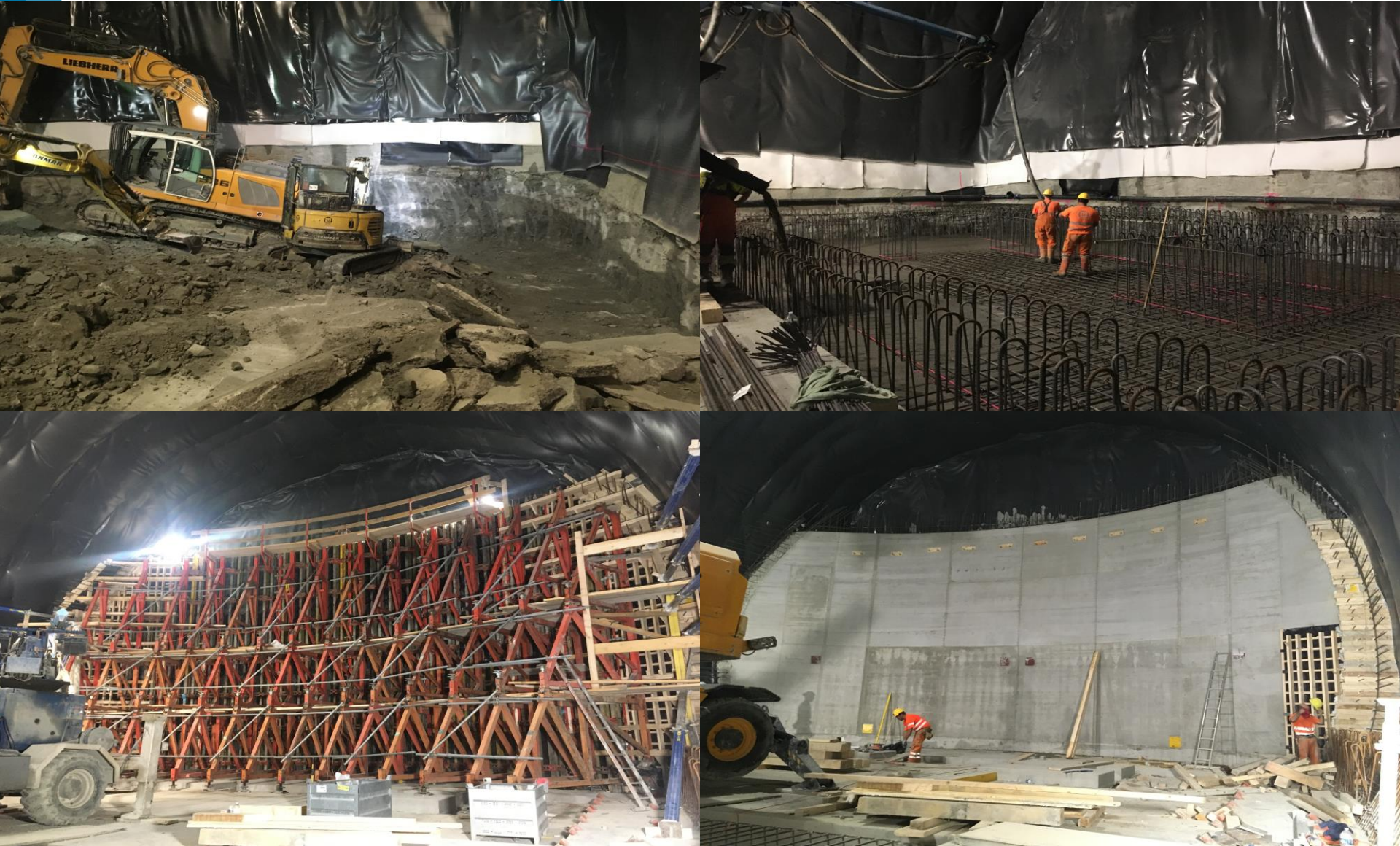
# Point 1 Underground Works – UA13



# Point 1 Underground Works – UPR13

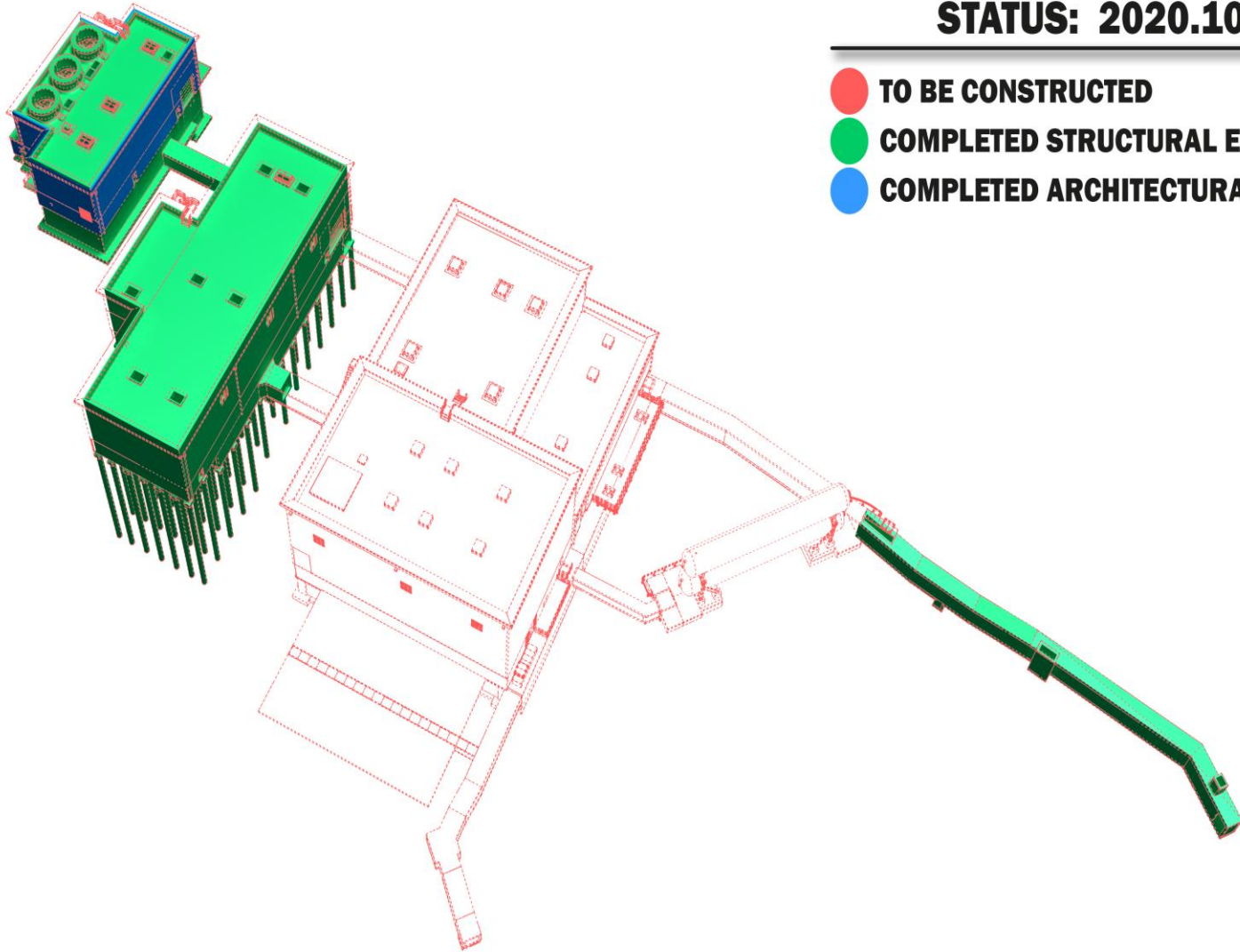


# Point 1 Underground Works – US/UW17



# SWKs Progress at Point 1

**STATUS: 2020.10.01**



- TO BE CONSTRUCTED
- COMPLETED STRUCTURAL ELEMENTS
- COMPLETED ARCHITECTURAL FINISHES

# Point 1 Surface Works



HiLumi Point 1 Site

# Point 1 Surface Works – SF17



November 2019



February 2020



May 2020



September 2020

# Point 1 Surface Works – SHM17



# Point 1 Surface Works – SL Galleries



February 2020



April 2020



June 2020



August 2020



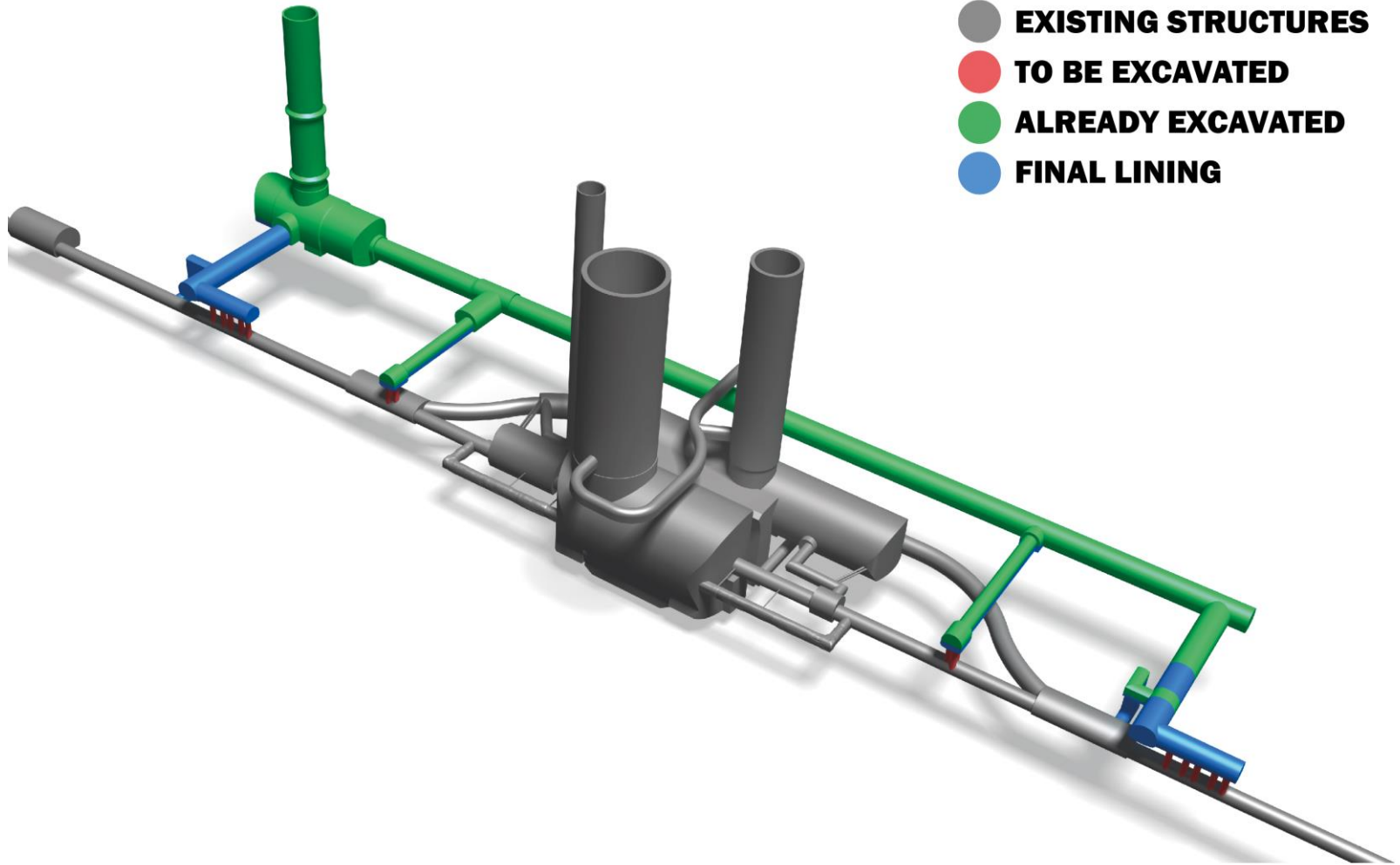


## Works Ongoing at Point 5

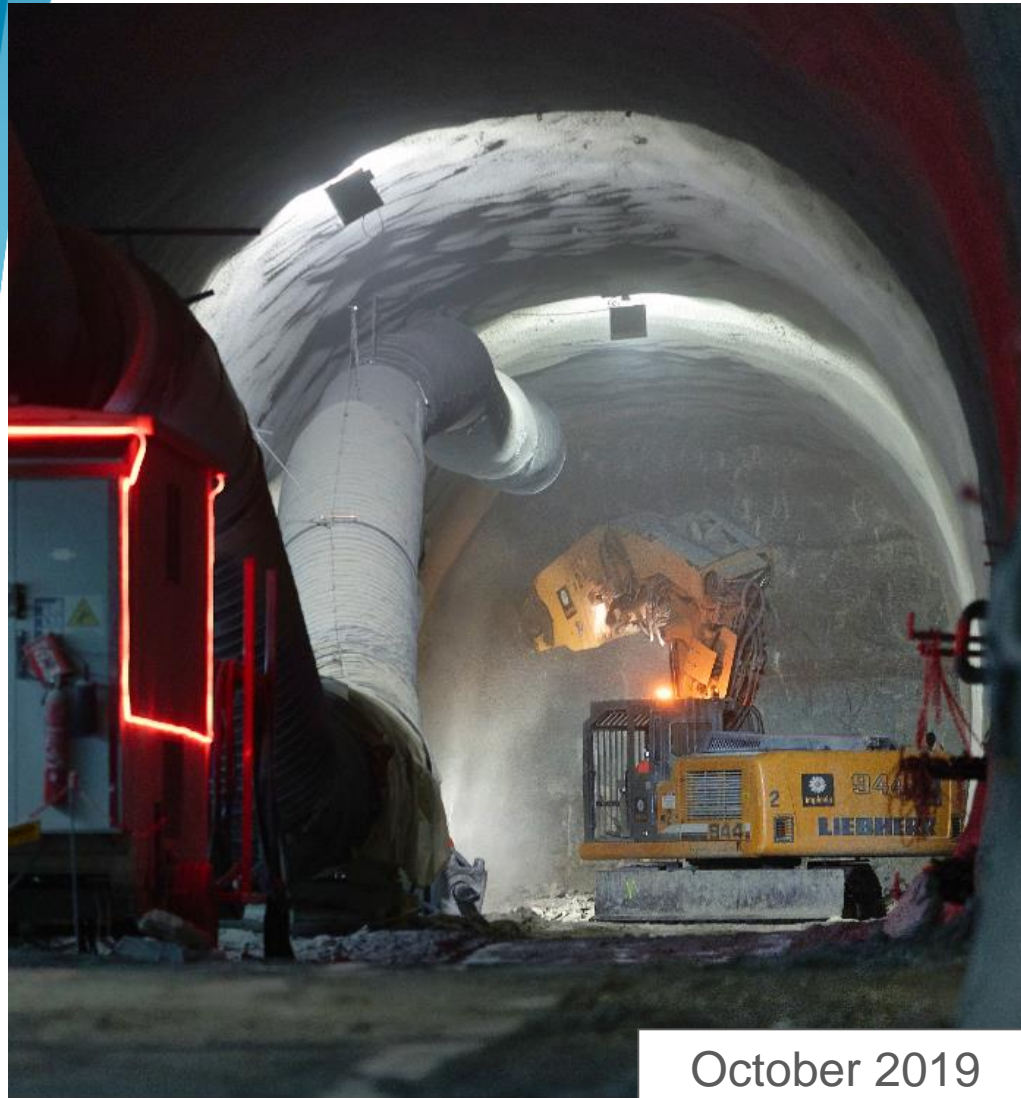
# UWKs Progress at Point 5

**STATUS: 2020.10.01**

- **EXISTING STRUCTURES**
- **TO BE EXCAVATED**
- **ALREADY EXCAVATED**
- **FINAL LINING**



# Point 5 Underground Works – UR55



October 2019

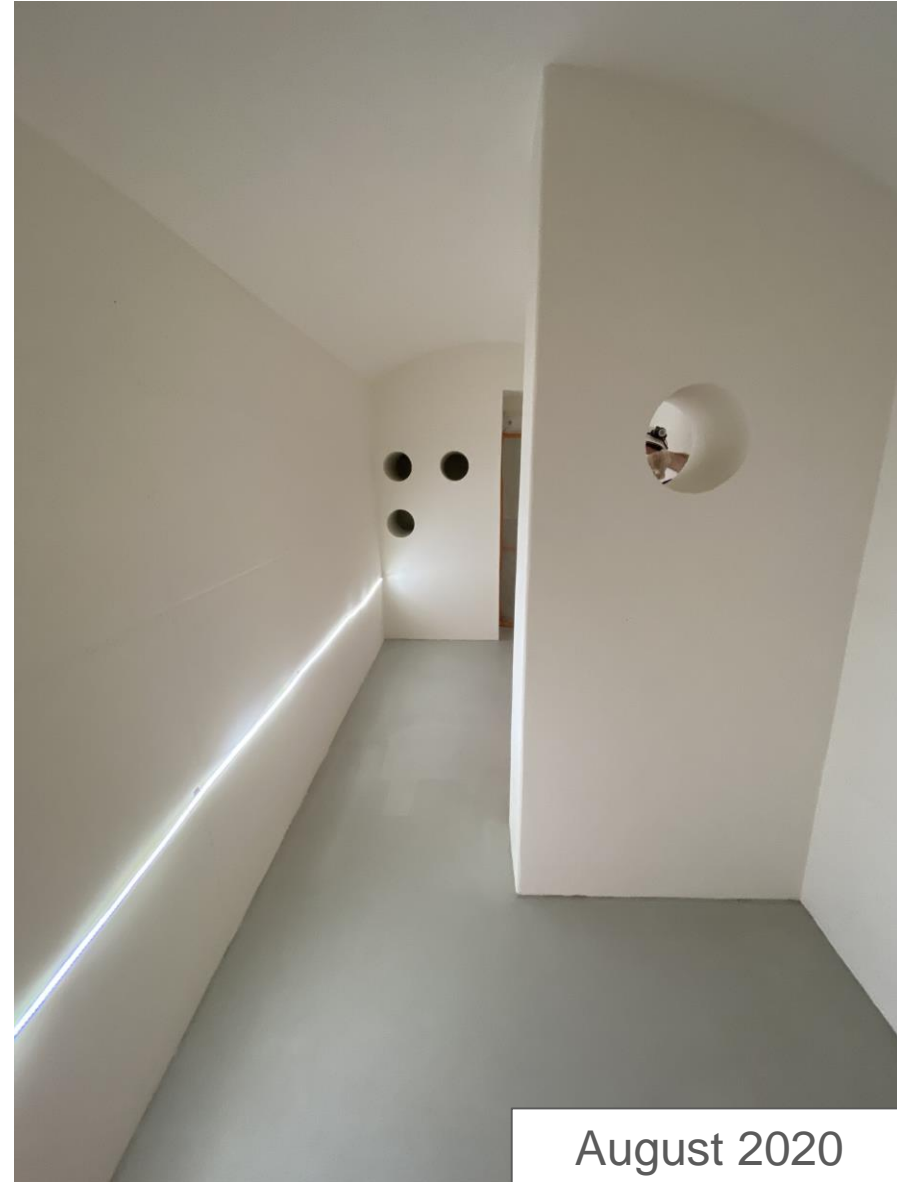


May 2020

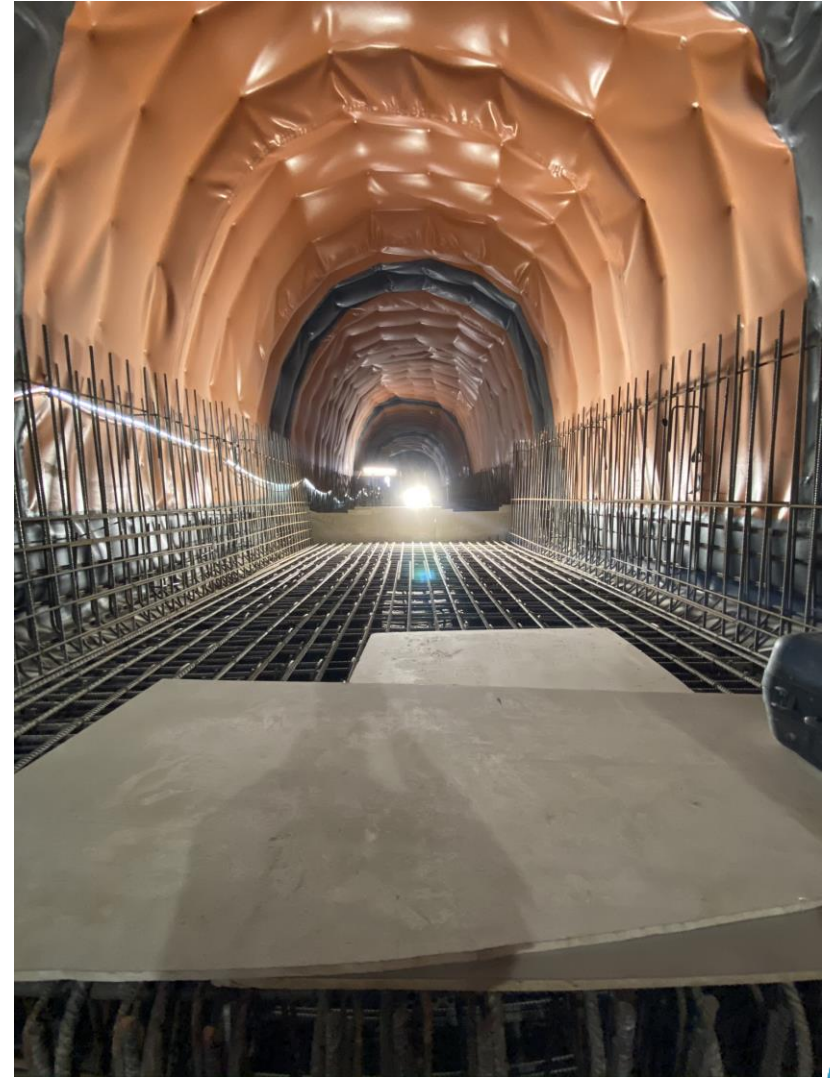
# Point 5 Underground Works – UA57



# Point 5 Underground Works – UPR57



# Point 5 Underground Works – UL57/UL53

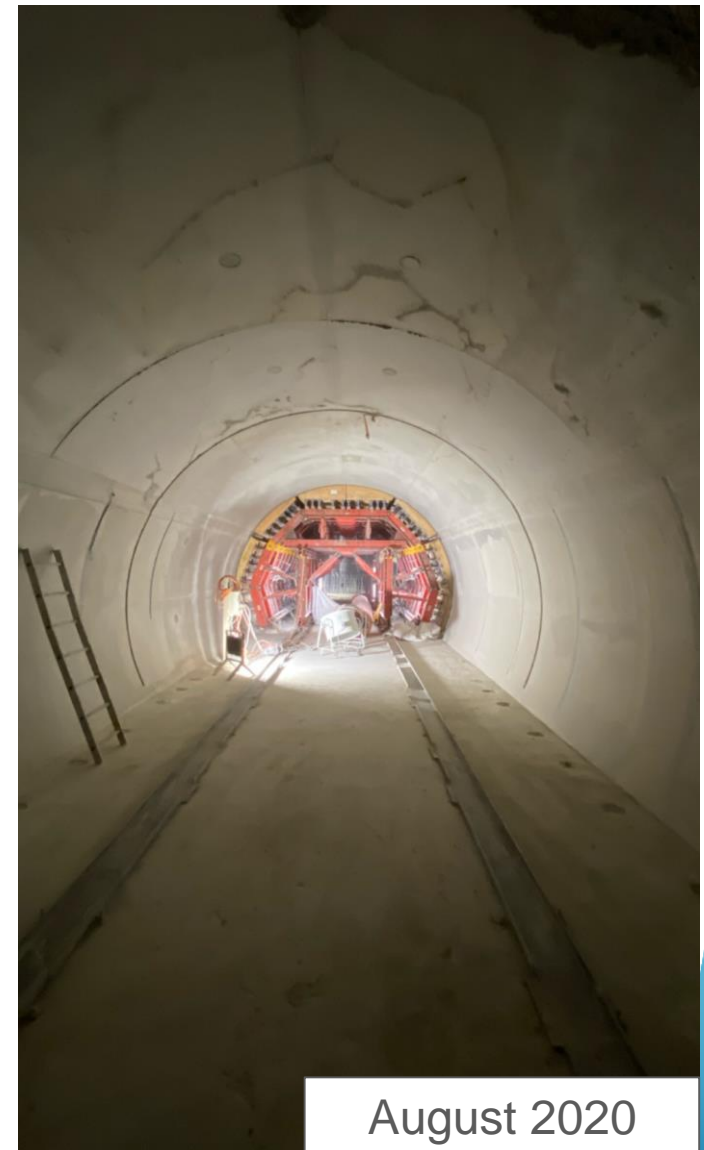


September 2020

# Point 5 Underground Works – UA53



May 2020



August 2020

# Point 5 Underground Works – UPR53



May 2020



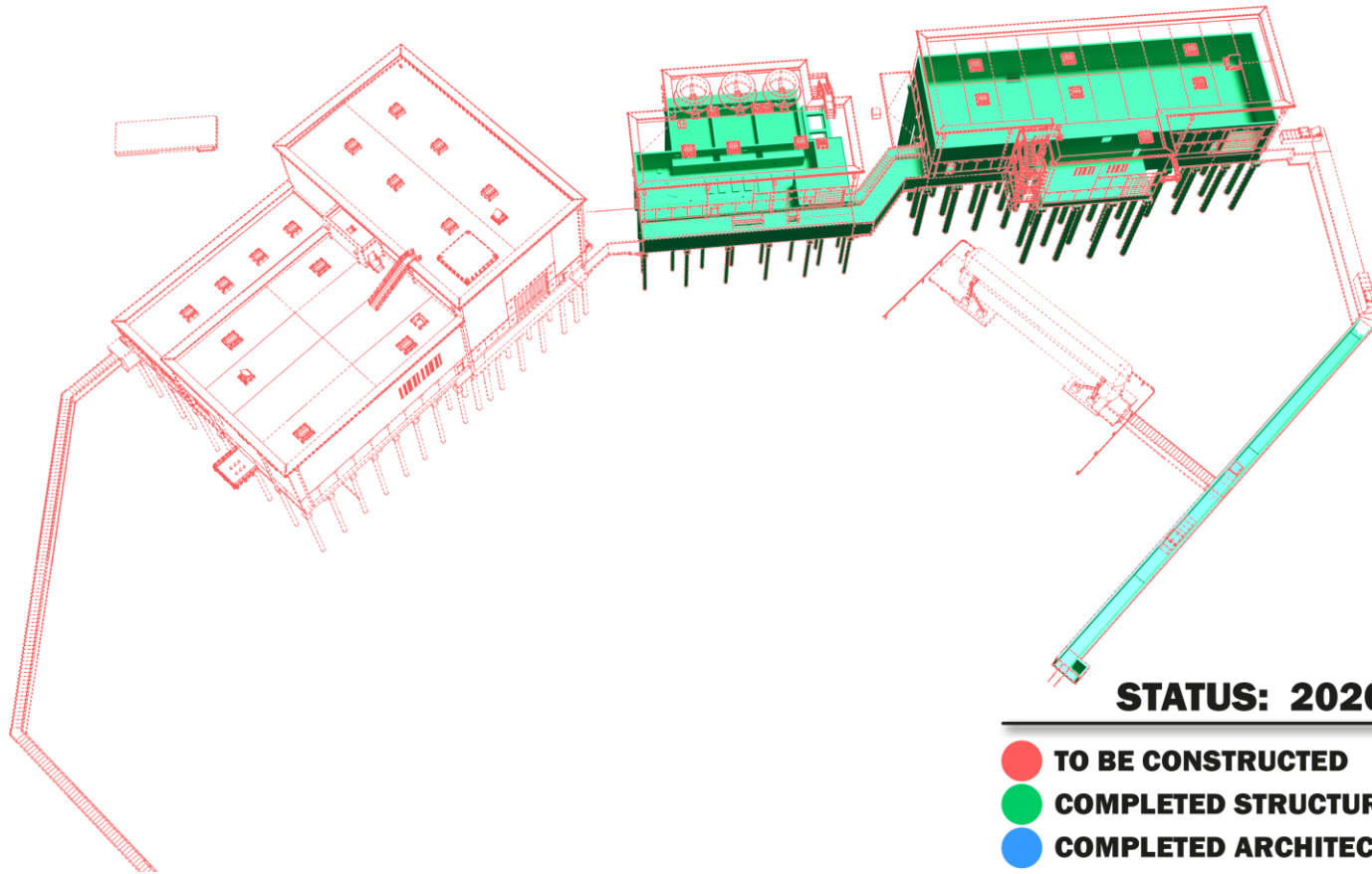
September 2020



# Point 5 Underground Works – US/UW57



# SWKs Progress at Point 5



**STATUS: 2020.10.01**

- TO BE CONSTRUCTED
- COMPLETED STRUCTURAL ELEMENTS
- COMPLETED ARCHITECTURAL FINISHES

# Point 5 Surface Works



February 2020

# Point 5 Surface Works – SF57



December 2019



September 2020

# Point 5 Surface Works – SHM57



December 2019



September 2020

# Point 5 Surface Works – SL57



October 2020



# Civil Engineering Conclusions

# Conclusions

- Progress in 2019:
  - Completed excavation of (majority of) US/UW caverns; (invert excavated in 2020)
  - Excavation of URx5/UAx7/UPRx7/ULx7 galleries ongoing; approaching UPRx7 safety gallery to LHC connection;

- Progress in 2020:
  - Complete excavation of all underground structures;
  - Hand-over of UPRx3/x7 Sections to CERN;
  - Final lining of URx5/UAx7/UPRx7/ULx7 galleries and US/UW cavern ongoing;
  - Construction of buildings SFx7 and SHMx7 ongoing ;

- 1-Year look ahead:
  - Underground concrete works (almost) completed;
  - Hand-over of SFx7 and SHM x7 buildings;
  - Construction of SDx7/SUx7/SEx7 ongoing.



# Conclusions

## Progress to date:

- Design:
  - ❖ Completed in 2020;
- Construction:
  - ❖ In full swing, moderately impacted by covid-19 crisis;
- Programme & cost:
  - ❖ up to  $\approx 2,2$  months of delay following covid-19 crisis;
  - ❖ Expenditure in line with cost estimates (2019 C&SR);
  - ❖ Contractor's claims associated with covid-19 issues, polluted soil and other subjects under discussion.



UPR53/LHC opening- June 2020



## *Questions?*

Contact: [luz.lopez-hernandez@cern.ch](mailto:luz.lopez-hernandez@cern.ch)

