Agenda

Large underground projects: past & future

$LHC \rightarrow HL-LHC \rightarrow FCC$

Large building projects: current & future

- Prévessin Computing Center (FR)
- Science Gateway (CH)
- Building 777 (FR)
- Building 140 (CH)

Procurement & Contract Strategy
Accelerating Science and Innovation
Civil works for LHC project

- 27km LEP tunnel built in ‘80s;
- Replace LEP accelerator by LHC accelerator and ATLAS/CMS detectors;
- LHC buildings, shafts, caverns & tunnels added between 1998-2005;
- 4 lots, total value ≈ 500 MCHF;
- Sites in CH & FR.
Civil works for HL-LHC project

- Upgrade LHC to HL-LHC accelerator to generate \( \approx 10 \) times more particle collisions;
- HL-LHC buildings,shafts,caverns & tunnels added between 2018-2022;
- FIDIC Red Book – Conditions of Contract for Construction (1st Ed, 1999);
- Contract amended to include special features related to tunnelling;
- 2 lots, total value \( \approx 170 \) MCHF;
- Sites in CH & FR.
Civil works for HL-LHC project

Point 1 (CH)  
Point 5 (FR)
Surface Works – 5 tech buildings at each Point
PM17 Shaft

HL-LHC underground works at Point 1 (Switzerland)
PM17 Shaft

HL-LHC underground works at Point 1 (Switzerland)
US/UW57 Cavern

HL-LHC underground works at Point 5 (France)
US/UW17 Cavern

HL-LHC underground works at Point 1 (Switzerland)
US/UW17 Cavern

HL-LHC underground works at Point 1 (Switzerland)
US/UW17 Cavern

HL-LHC underground works at Point 1 (Switzerland)
UR15 Main Gallery

HL-LHC underground works at Point 1 (Switzerland)
UR15 Main Gallery

HL-LHC underground works at Point 1 (Switzerland)
UA13 Secondary Gallery

HL-LHC underground works at Point 1 (Switzerland)
UA13 - UR15 Intersection

HL-LHC underground works at Point 1 (Switzerland)
Vertical Cores to connect to LHC

- Connections between HL-LHC galleries and LHC tunnel;
- 12 - $\varnothing 1m$ vertical cores at both Point 1 and 5 (24 cores);
- Design & build approach;
- Logistic constraints due to CERN operations and equipment (de-) installation activities;
- Invitation to Tender ongoing.
CERN’s 100 km Future Circular Collider (FCC)
CERN Timeline

Dreaming of another Nobel Prize …
Prévessin Data Center

- New 4 MW data center, scalable to 8 & 12 MW; building and building services by Contractor, IT equipment by CERN;

- Employer’s requirements incl. performance specification with PUE<1.15 (Power Usage Effectiveness) and strict temperature $T_i$ control;

- 10 years Operation & Maintenance;


- Value $\approx$ 33 MEUR;

- Site in France.
Science Gateway

https://sciencegateway.cern/

• New CERN visitor center with exhibitions, conference space, labs, restaurant, etc;

• Educational center for STEM, fundamental research & societal impact;

• 5 buildings, \( \approx 7'000\text{m}^2 \), built 2020-2023;

• FIDIC Red Book – Conditions of Contract for Construction (2nd Ed, 2017);

• Value \( \approx 65\text{ MEUR} \);

• Site in Switzerland.
New tertiary buildings 777 / 140 – Key Features

Develop buildings with an architectural quality that surpasses the existing feel of an industrial and laboratory site;

Create new buildings in which CERN staff and users truly feel at home and happy to work;

Construct environmentally friendly and state-of-the-art buildings; aiming towards net zero carbon, considering operational and embodied carbon; (using LCA)

Obtain appropriate levels of energy, sustainability and health & safety certification; (e.g. Minergie, BREEAM, WELL, SNBS, or other)
Building 777 Site

Site in the heart of CERN Prévessin

Offices for \(\approx 500\) ATS staff

Workshops & labs

New Restaurant 3

Approx. 12’000 m\(^2\)

International architectural tender

Mass timber structure
Building 777

https://building777.web.cern.ch/

https://youtu.be/7CyiNPHG4t8
Building 140

Site in the heart of CERN Meyrin

Offices and workshops for Experimental Physics (EP)

Learning center (classrooms)

Plenary room & auditoria

Cafetaria

Construction in 2 phases

Approx. 16’000 m²

Architectural tender to be sent out
Building 140

Reference design by [https://cche.ch/](https://cche.ch/)
Procurement & Contract Strategy

Consultant

Market Survey & Invitation to Tender; based on BVFM adjudication;
Agreement based on *FIDIC White Book (2017 Ed.)*, incl. CERN amendments;
Scope: design (up to tender) & construction administration;

Contractor

Market Survey & Invitation to Tender; based on lowest cost or BVFM adjudication;
Agreement based on *FIDIC Yellow Book (2022 Ed.)*, incl. CERN amendments;
Scope: construction documents & build.

For further information: [https://fidic.org/](https://fidic.org/)