

# PROGRESS OF THE EXCAVATED MATERIALS MANAGEMENT CONCEPT

Luisa ULRICI, CERN

WG3 – Integrate Europe

Task 3.4 - Management of excavated materials

D3.4: Preliminary excavation materials management plan (CETU)

# Table of contents

- 1) **Description of deliverable D3.4 *Preliminary excavation materials management plan***
- 2) **Current evaluation/studies**
- 3) **Progress**
- 4) **Schedule**

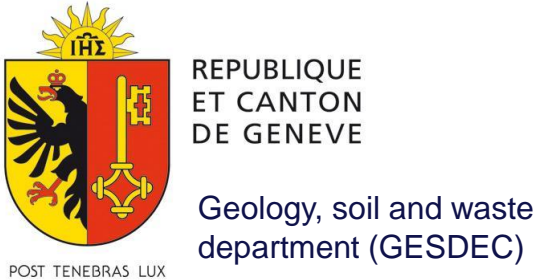


# Contributors to the deliverable D3.4:

FR:



CH:



A:



In addition to



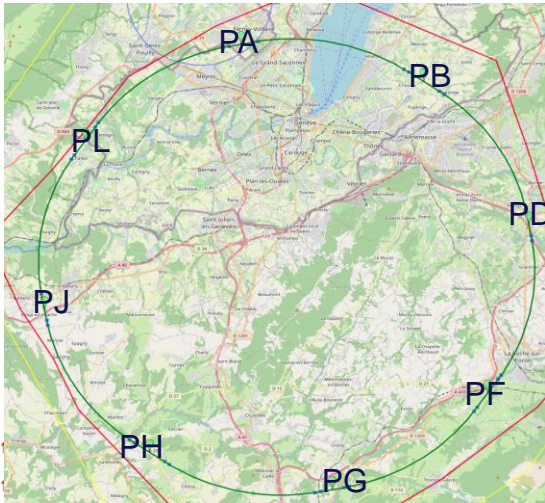
**Collaboration with external experts:**

- *Regulatory framework*: University of Lyon 3,
- *3D subsurface modelling*: University of Geneva, GESDEC, University of Grenoble, University "La Sorbonne" (Paris)

**Support by external consultants:**

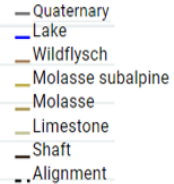
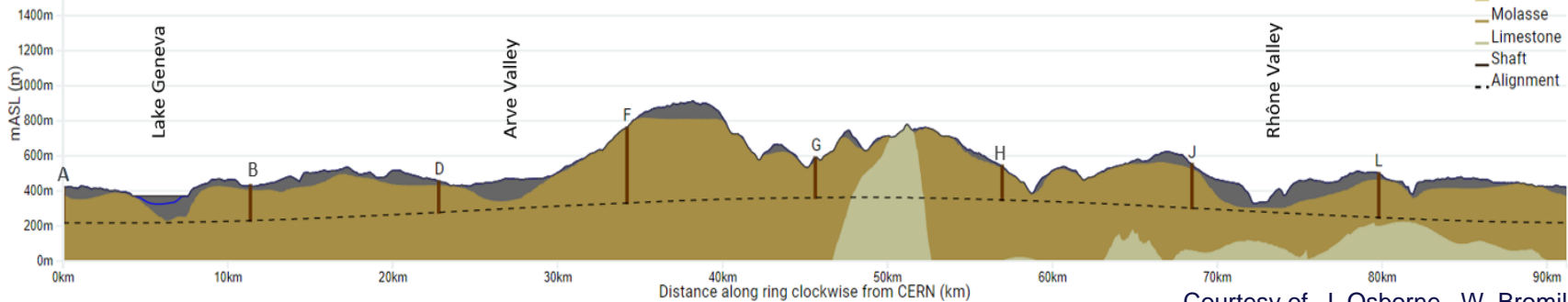
e.g. Inventory of regional opportunities:  
SETEC/Lerm

# Excavation material quantities



Site	Estimated spoil volume per site in m <sup>3</sup>	Estimated spoil volume per year at each site in m <sup>3</sup>
A	348'973	139'589
B	1'580'821	263'470
D	194'643	77'857
F	883'513	147'252
G	1'433'976	220'612
H	177'229	88'614
J	937'801	144'277
L	1'584'755	264'126
LHC	25'265	12'633
<b>Total</b>	<b>7'166'976</b>	

- Placement for illustration only
- First estimates of excavated material volumes- to be confirmed according to the final scenario and excavation method.



Courtesy of J. Osborne , W. Bromiley

# Description of deliverable D3.4 Preliminary excavation materials management plan

As mentioned in the FCCIS Program ...

*“A technical/managerial report that summarises the approach for managing the approximately **9(\*) million cubic meters of excavation materials** in a resource- and cost-effective way, pointing to innovation potentials with economic benefits for companies and environmental advantages for the European society.*

*The plan is considered to be preliminary, since specific management processes, the economic viability and the environmental benefits of the envisaged excavation materials use cases depend strongly on the precise sub-surface investigations, the evolution of legal frameworks in the EU and Switzerland and the response of companies to market surveys, all of which are expected to evolve after this H2020 project ends.”*

(\*) old figure, based on the 12 sites scenario

## Objectives:

- To demonstrate the FCC feasibility from the point of view of the management of excavated materials.
- To show that the Project Owner has taken into account all aspects (technical, regulatory, timing...).
- To define the strategy and to specify the commitments of the Project Owner.

# Content

## **Chapter 1. An exceptional project concerning the management of excavated materials**

- 1.1. Introduction
- 1.2. CERN's Future Circular Collider
- 1.3. Context and challenges
- 1.4. The project owner's priorities and commitments in terms of excavated materials management

## **Chapter 2. Risk management process for the MATEX**

- 2.1. Risk process
- 2.2. Project phases and associated activities
- 2.3. Subsurface investigations
- 2.4. Impact of excavation methods on use
- 2.5. Strategy for handling and treatment of polluted materials
- 2.6. Quality management

# Content

## **Chapter 3. Management and use of excavated materials**

- 3.1. Regulatory requirements
- 3.2. Identification of possible use cases
- 3.3. Excavation material use case descriptions
- 3.4. Logistics: treatment, transport, delivery, storage and disposal

## **Chapter 4. Innovative roadmap and action plan**

- 4.1. Predicted schedule and inventory of excavated materials
- 4.2. Evaluation of excavated materials use
- 4.3. Planned excavated material use
- 4.4. Strategy for construction contracts with regards to excavated materials

## **+ References and appendices**

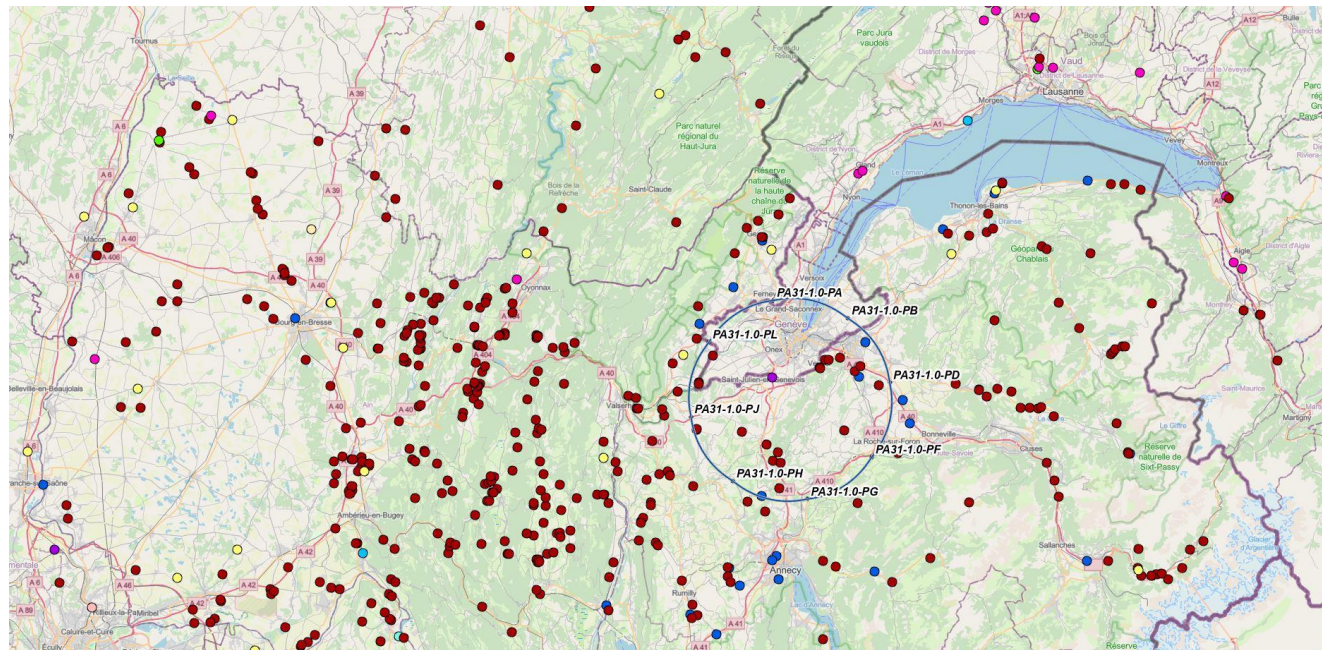
# Progress report I

## FINALISED

- **Geotechnical, mineralogical and chemical analysis** on available samples (existing boreholes, samples). Results available on ZENODO.
- A general overview of the strategy for a **risk management process**
- List of the regional **reuse/recycling/ disposal pathways**:
  - Preventing waste generation: preliminary estimate of construction material needs on site and analysis of possible matching with excavated materials - To be refined with final layout.
  - First study related to the possible reuse (tiles, bricks, glass, ceramics etc.)
  - Second study related to the landscaping/backfilling/landfilling possibilities (quarries, mines, etc.) – to be extended to Switzerland.



# List of regional opportunities



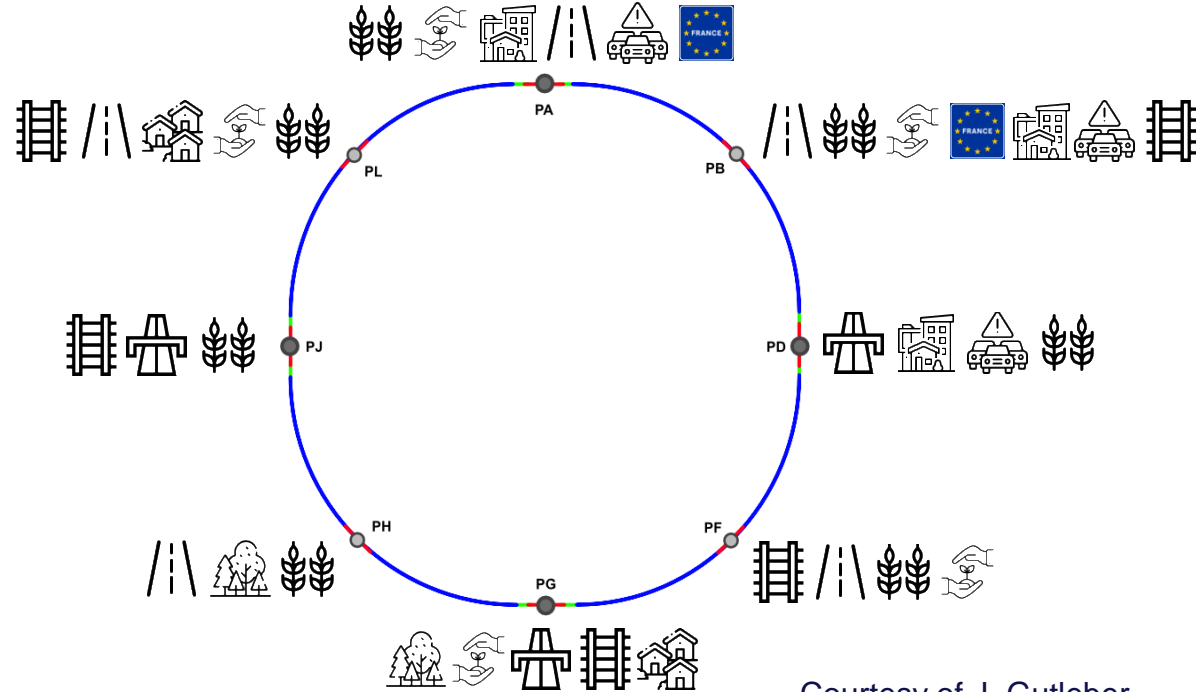
# Progress report II

## CURRENTLY ONGOING

- Finalisation of the **regulatory framework**
- A general strategy for handling and treatment of **polluted materials** with respect to the regulatory frameworks (related limits in France and Switzerland).
- Summary of **management options** for excavated materials generated under the FCC project: matrix matching the reuse/recycling pathways with
  - the results of the characterization tests
  - the regulations on the prevention and management of waste,
  - the mechanical and environmental standards dedicated to the recovery of excavated spoil during construction and development,
  - previous experience in the treatment of excavated spoil in order to improve its characteristics to facilitate reuse and recovery.
- Collaboration with TELT-Tunnel Euralpin Lyon Turin
- Logistics: **Railroad Access Feasibility Analysis launched**

# Relevant aspects for matex logistics

- Link to railway national systems
- Access roads
- Conveyor belts
- Platforms for sorting and treatment
- Traceability



Courtesy of J. Gutleber

# Progress report III

## OPEN POINTS:

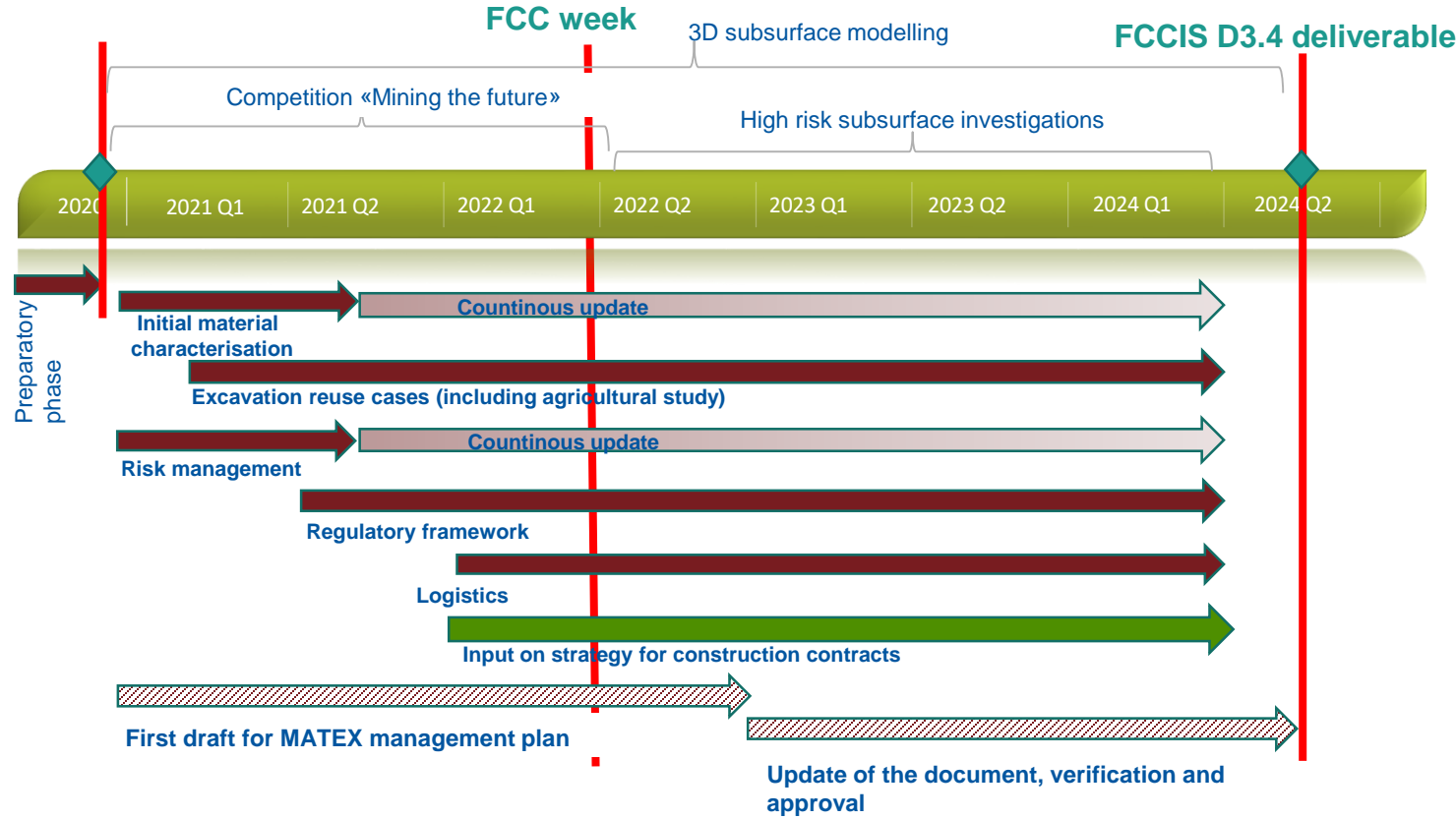
- **Subsurface investigations** will provide further insights on the geological, geo-mechanical and chemical characteristics of the excavated materials allowing to minimize the project risks.
- Confirmation on **excavation methods per site** will allow to refine current estimates on:
  - Excavated material reusability
  - Presence of pollutants
  - Logistics (surface for temporary storage, conveyor belts, traceability)
- Confirmation on **engineering solutions for surface buildings and boundary conditions** to refine evaluation of possible local reuse of excavated materials
- **Innovative reuse pathways** for molasse (“Mining the future®”)

# “Mining the future<sup>®</sup>”

- **Publication** of the competition Mining the future<sup>®</sup> on 1st May 2021
- **First phase** ended in October 2021: 12 proposals, 4 selected by international jury (9 members)
- Proposed **applications** focus on different phases of the excavated material treatment and reuse.
- **Type of participants:** Key players in excavation projects as well as new startup and research institutes
- **Second phase:** 4 selected are progressing with the feasibility study to bring the proposal to at least TRL4 . Submission by end of June 2022.
- **Final result by Autumn 2022.**



# Schedule



Legend:

- Documentary effort
- Ongoing Activity
- Activity To be started

# Conclusion

**First draft** of the management plan will be available by beginning of 2023, excluding:

- cost estimate
- circular economy evaluation

**Continuous update** will be performed as far as information on layout and technical solutions will become available.

CONTRIBUTE TO FCC FEASIBILITY STUDY:

- Cost evaluation
- Input to the excavation contracting strategy with respect to excavation material



# Thank you for your attention.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 951754.