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RAILWAY ACCESS STUDY PRELIMINARY RESULTS

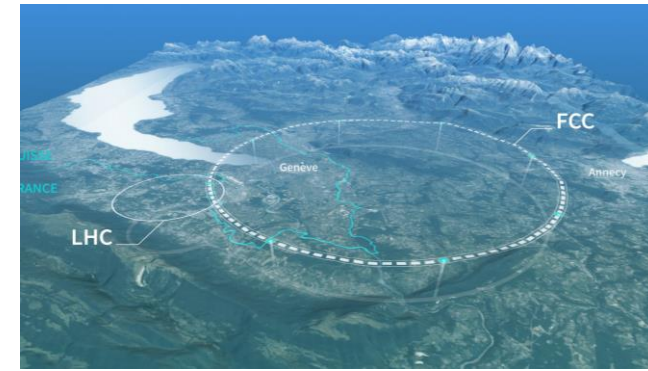
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SUMMARY

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- 02. METHODOLOGY OF THE STUDY**
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- 04. EXAMPLE OF RAILWAY CONNECTION IMPLEMENTATION**
- 05. COMPLEMENTARY STUDIES**

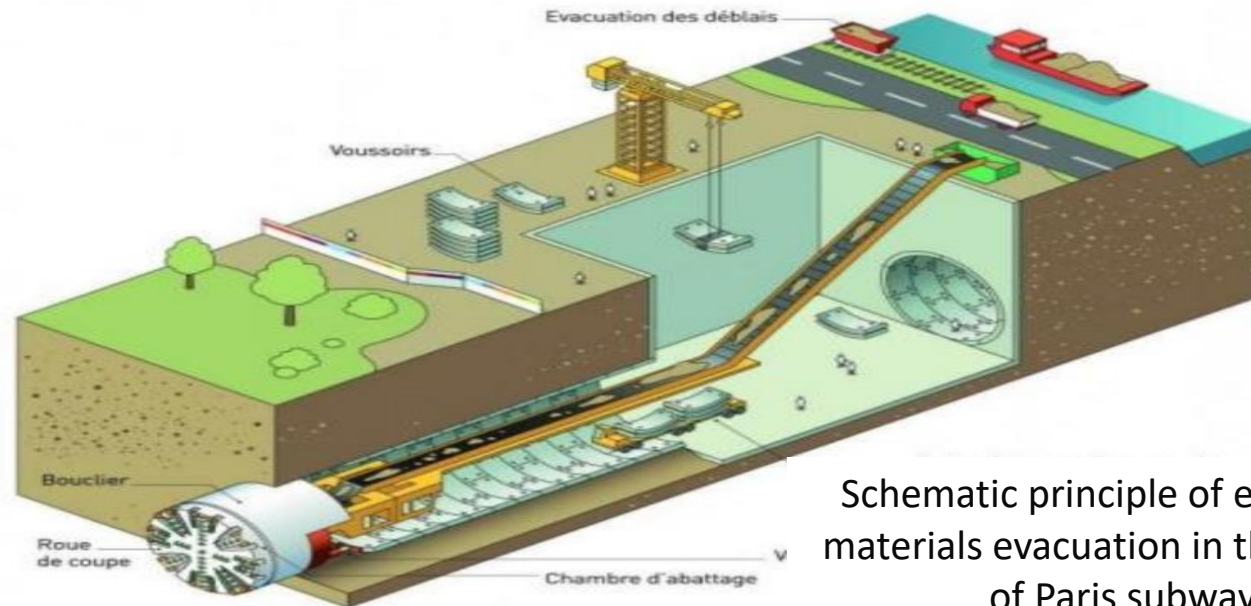
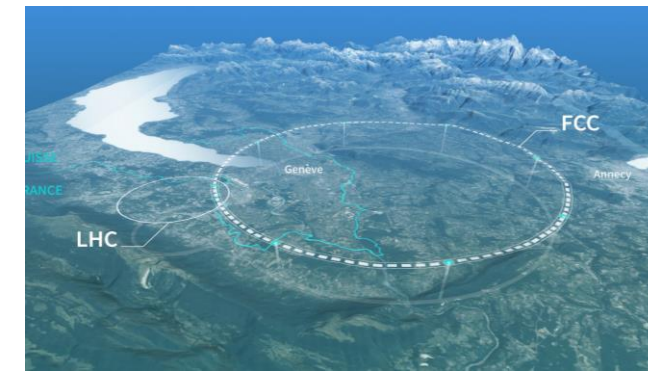


01. CONTEXT OF THE STUDY

Context

Tunnel boring machine of the future FCC will extract about 8 Mm3 distributed as follows :

Type of material	Proportion	Volume (Mm3)	Density	Tonnage (Mtons)
Total	100%	8,00	2,2	17,6
Molasse	96%	7,68	2,2	16,9
Limestone	3%	0,24	2,2	0,53
Quaternary post-glacial and glacial Deposit	1%	0,08	1,8	0,14



Schematic principle of excavated materials evacuation in the project of Paris subway



01. CONTEXT OF THE STUDY

Acceptance of the project

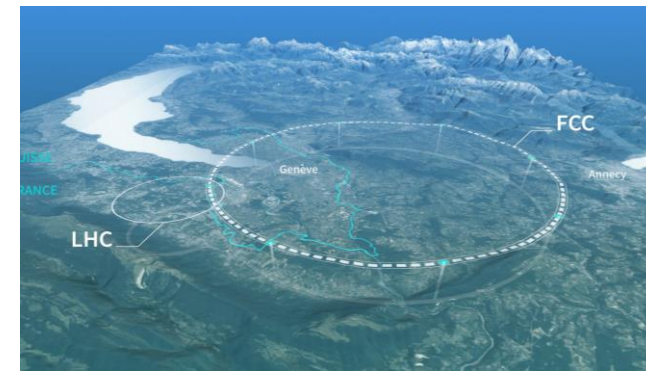
- Management of the excavated material is a very sensitive aspect for the acceptance of the project .

Local and innovative management solutions for reuse

Excavation materials management strategy

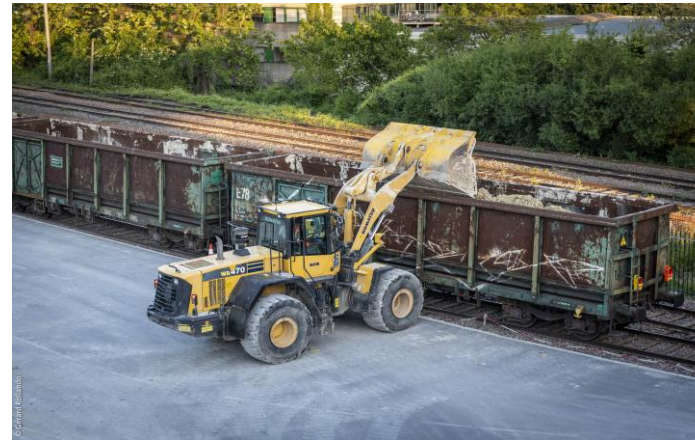
L. Ulrici

- Goal: Reduce of the nuisances (noise, dust, pollution, Carbon footprint) for the neighbouring population.



Highway access study results

P. Laiduni, P. Boillon

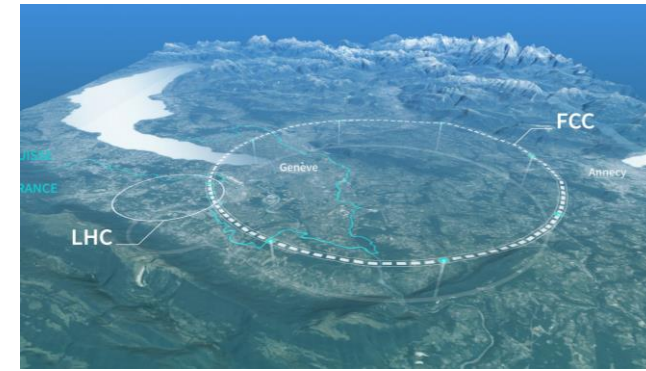


Railway access study

Ch. Barre, T. Halle

Excavated materials evacuated by train for the new Parisian metros (Sources : SNCF RESEAU)

02. METHODOLOGY OF THE STUDY



Input

French regulation
General data on FCC

French rail infrastructure manager
(SNCF Reseau)
General data on FCC

Study stages



Avoid populated areas
Avoid natural areas
Consider rail access close to extraction sites and to the national rail network

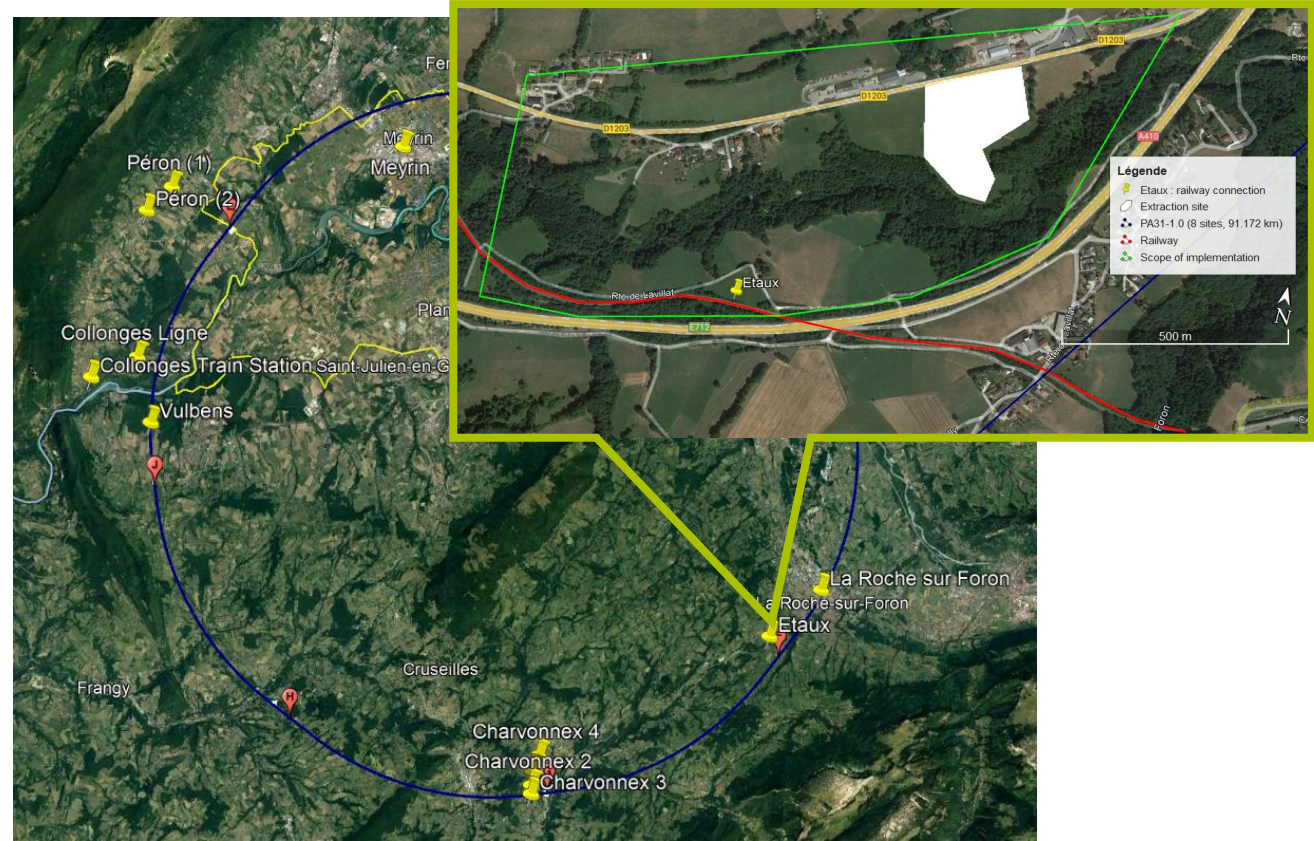
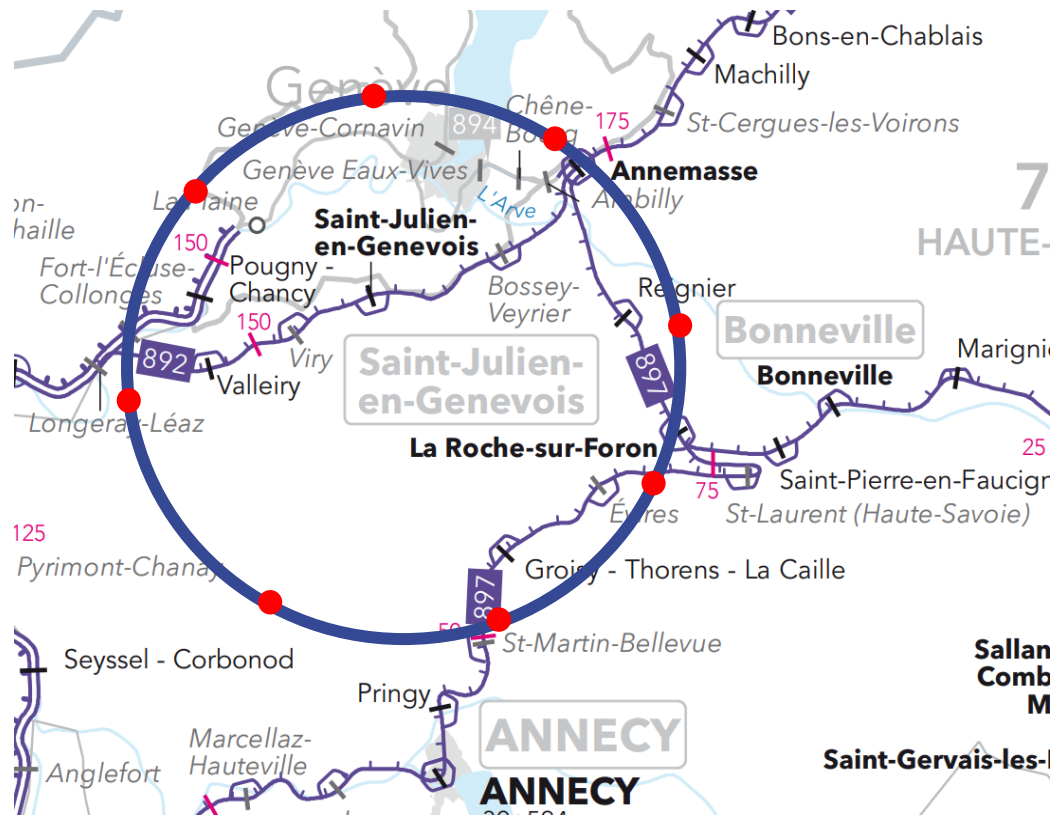
Sizing of number and length of trains (existing of railway line capacity)
Railway access site sizing (railway track number, length, surface storage of materials,...)

Implementation of railway access site on selected area
Sizing of connection between extraction site and railway connection (road, conveyor belt)

02. METHODOLOGY OF THE STUDY



1st Stage: Preselection of area for railway connection

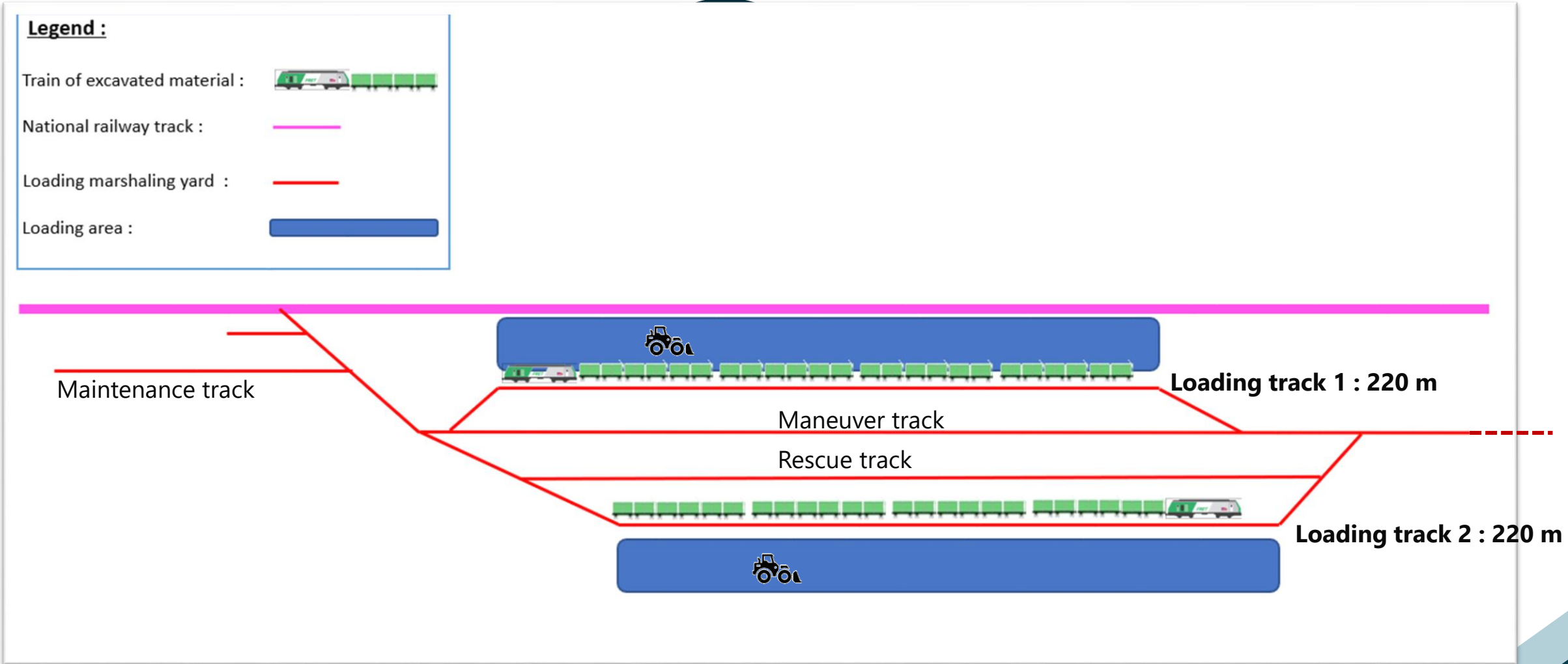


- Human environment
- Natural environment
- Physical environment
- Proximity extraction site
- Proximity existing railway

02. METHODOLOGY OF THE STUDY



2nd stage : Sizing of railway connection



03. POTENTIAL RAILWAY CONNECTION STUDIED

Preselection of area for railway connection

Sizing of railway connection

Evaluation of the implementation of railway connection

Multicriteria analysis

Multi-criteria analysis of rail site disconnectability																				
Extraction site	PA		PB			PD	PF		PG				PH	PJ			PL			
	Railway operating site	Meyrin	CEVA (Railway station Genève - Cornavin)	CEVA (Railway station de la Praille)	Annemasse 1 (Railway station)	Annemasse 2	No sites identified	Étaux	La Roche sur Foron	Chavronnex 1	Chavronnex 2	Chavronnex 3	Chavronnex 4	No sites identified	Collonges train station	Collonges ligne	Vulbens	Challex	Collonges train station	Collonges ligne
The proximity of the potential site to an existing railroad line	2	2	2	2	2	-2	2	2	2	2	2	2	2	-2	2	2	2	-1	2	2
Disconnectability from the French or Swiss national rail network (RFN)	2	2	2	2	2	-2	1	2	1	1	1	1	1	-2	2	2	1	-1	2	2
The presence of an existing service track or railway sidings nearby	1	1	1	1	0	-2	0	1	0	0	0	0	0	-2	2	0	0	-1	2	0
Connection method between rail site and extraction site	-2	-2	-1	-1	-1	-2	1	-1	-1	-1	-1	-1	-1	-2	-2	-1	1	0	-1	-1
Les contraintes d'environnement urbain (poussière/bruit) pour le chargement	-2	-2	-2	-2	0	-2	1	-2	-1	0	-1	-1	-1	-2	0	2	2	-1	0	2
Urban environment constraints (dust/noise) for loading	2	1	2	2	1	-2	2	1	2	0	1	2	2	-2	1	2	2	0	1	2
Associated environmental constraints	NA	NA	NA	-2	0	-2	2	-2	2	2	2	2	2	-2	-2	-2	-2	0	-2	-2
The number of convoys required to transport all the excavated material	2	2	2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	2	2	-2	NA	2	2
The line's traffic capacity	0	-2	-2	-1	0	-2	1	-2	1	1	1	1	1	-2	0	0	1	0	0	0
Average score <i>EGIS numbering (-2 to 2)</i>	1	0	1	0	0	-2	1	0	0	0	0	0	0	-2	1	1	1	-1	1	1
Average score <i>CERN numbering (1 to 5)</i>	4	3	4	3	3	1	4	3	3	3	3	3	3	1	4	4	4	2	4	4
Rating by extraction site <i>CERN numbering (1 to 5)</i>	3		3			1	3		3				1	4			3			

- 5 : Achievable with minor adjustments or efforts
- 4 : Achievable with moderate adjustments or efforts
- 3 : Achievable with major adjustments or efforts
- 2 : Low feasibility
- 1 : Unlikely feasibility

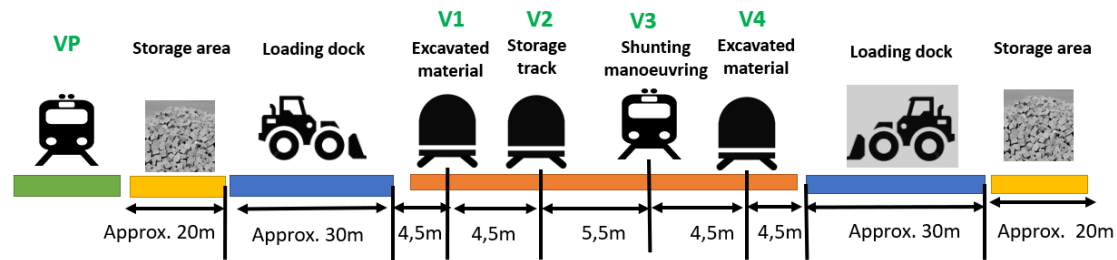
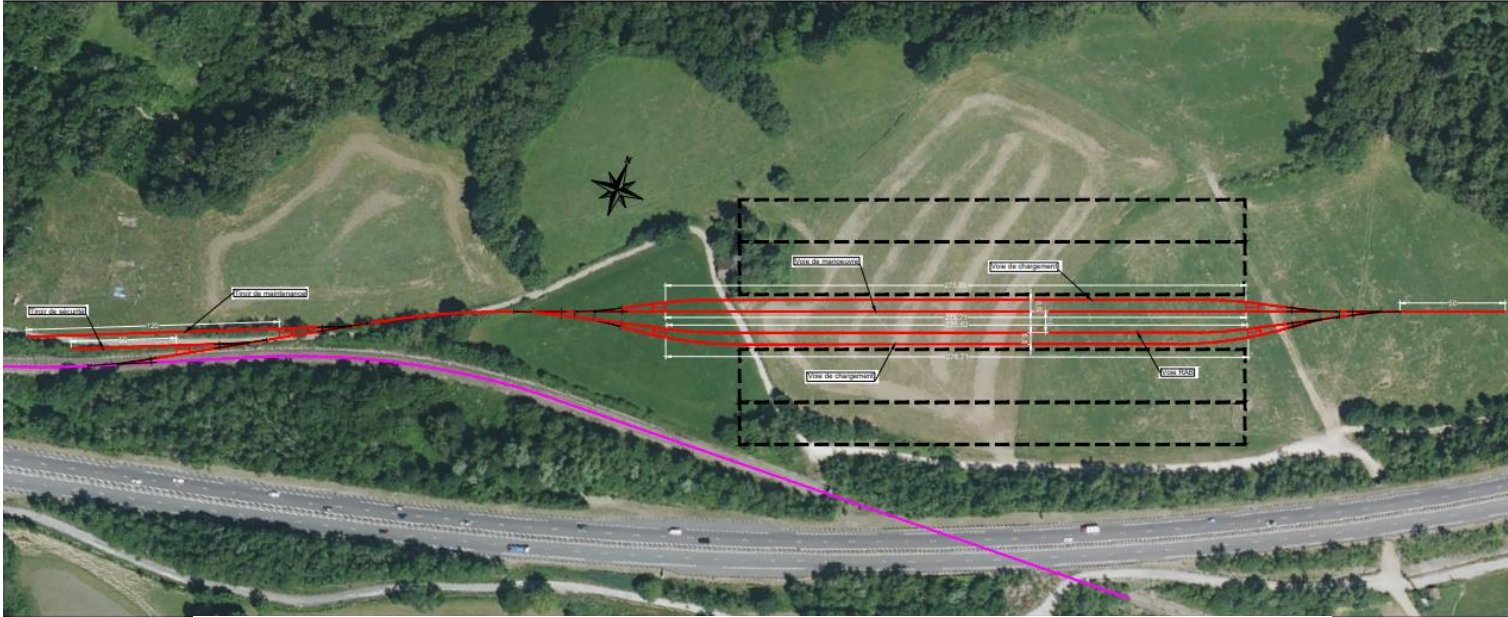
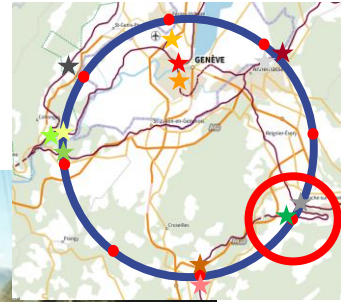
04. EXAMPLE OF RAILWAY CONNECTION IMPLEMENTATION

Preselection of area for railway connection

Sizing of railway railway connection

Evaluation of the implementation of railway connection

Preliminary studies near Etaux (Extraction site F)



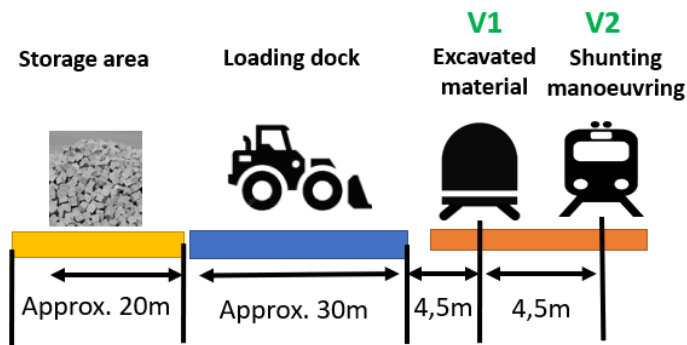
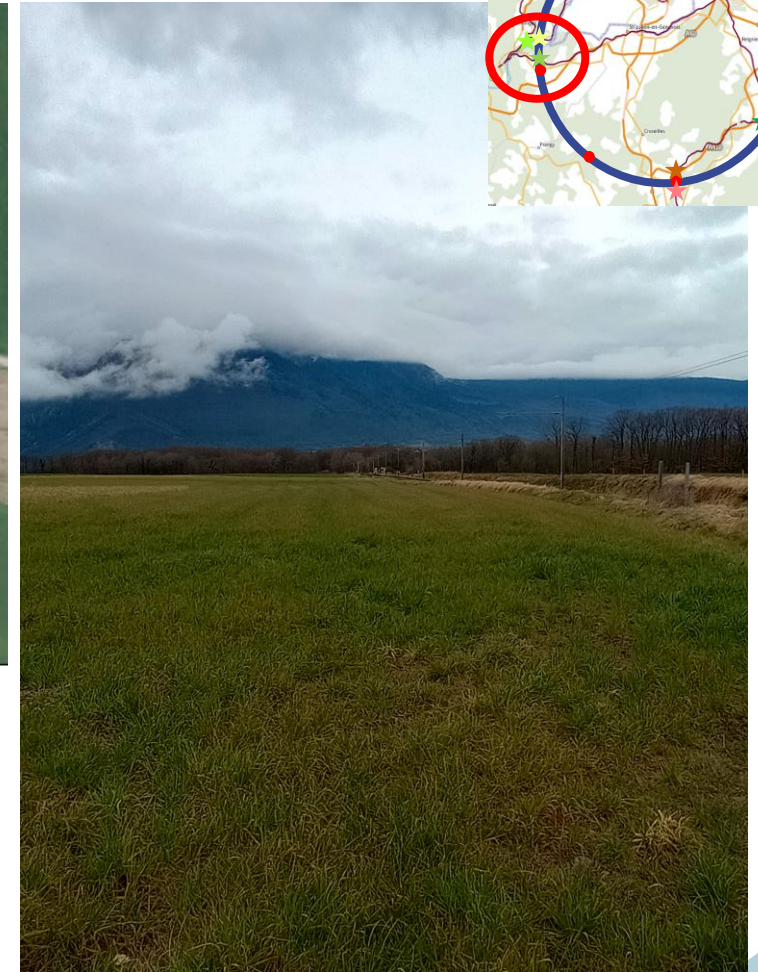
04. EXAMPLE OF RAILWAY CONNECTION IMPLEMENTATION

Preselection of area for railway connection

Sizing of railway connection

Evaluation of the implementation of railway connection

Preliminary studies near Vulbens (Extraction site J)



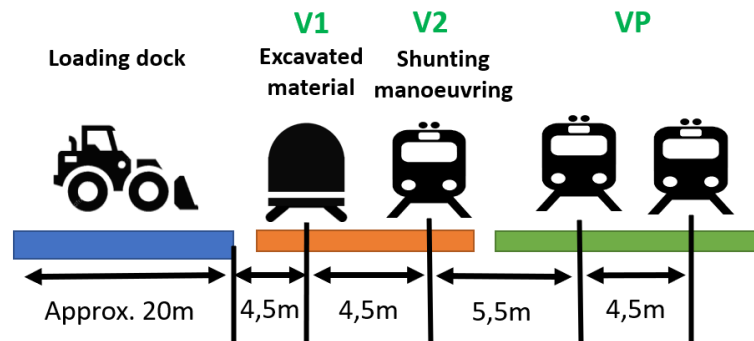
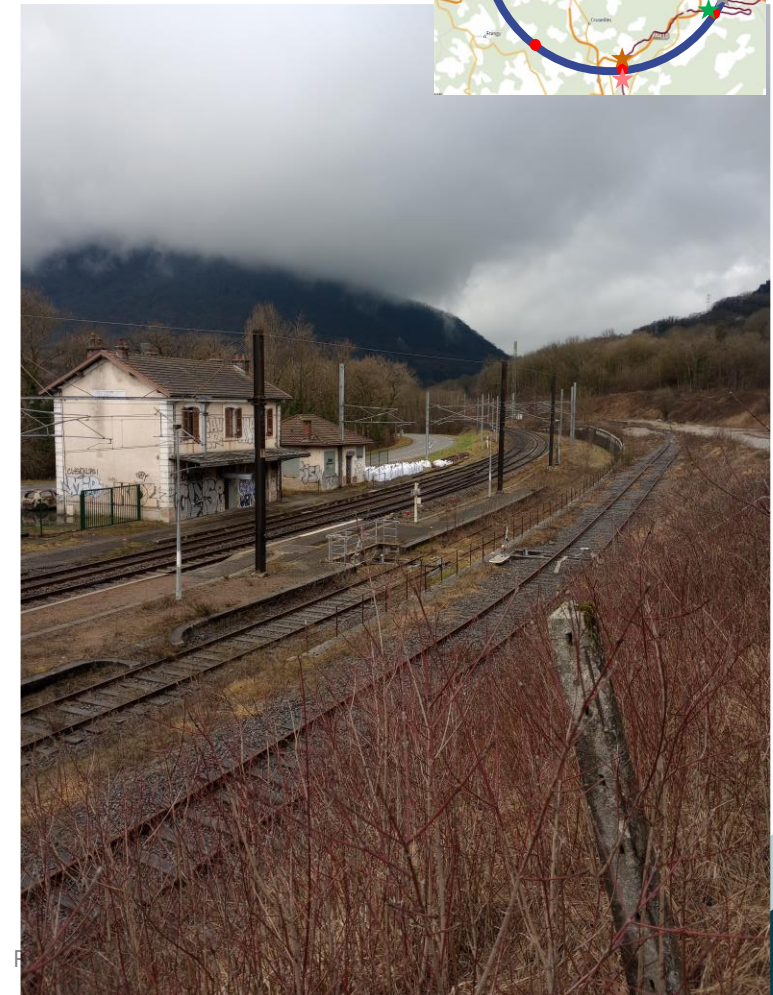
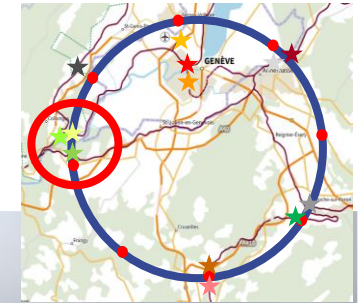
04. EXAMPLE OF RAILWAY CONNECTION IMPLEMENTATION

Preselection of area for railway connection

Sizing of railway connection

Evaluation of the implementation of railway connection

Preliminary studies near to Collonges train station (Extraction site J or L)



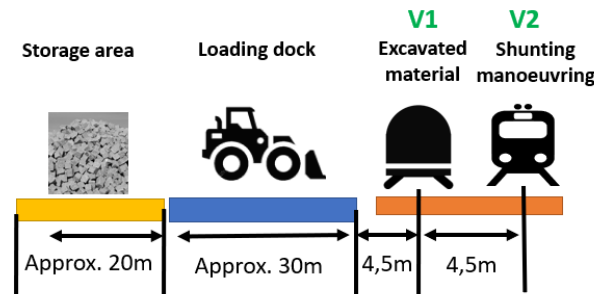
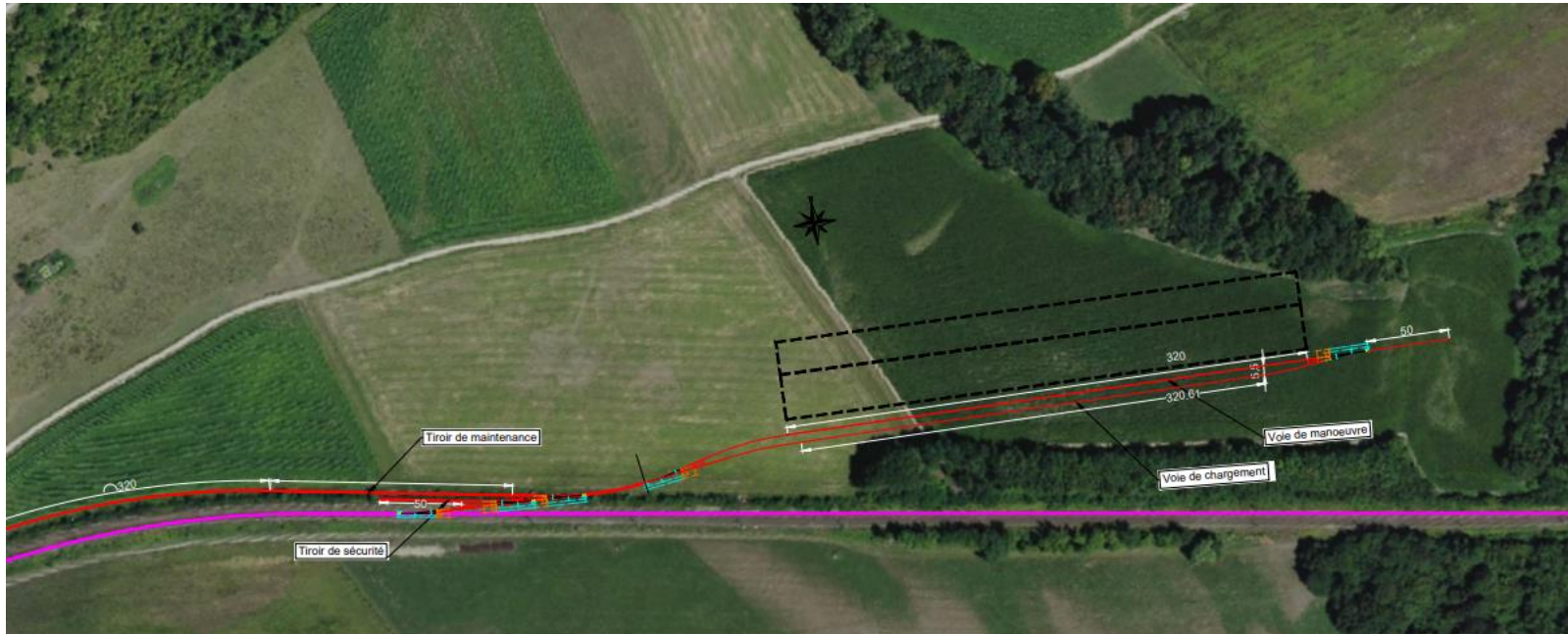
04. EXAMPLE OF RAILWAY CONNECTION IMPLEMENTATION

Preselection of area for railway connection

Sizing of railway connection

Evaluation of the implementation of railway connection

Preliminary studies near to Collonges railway line (Extraction site J or L)



05. COMPLEMENTARY STUDIES

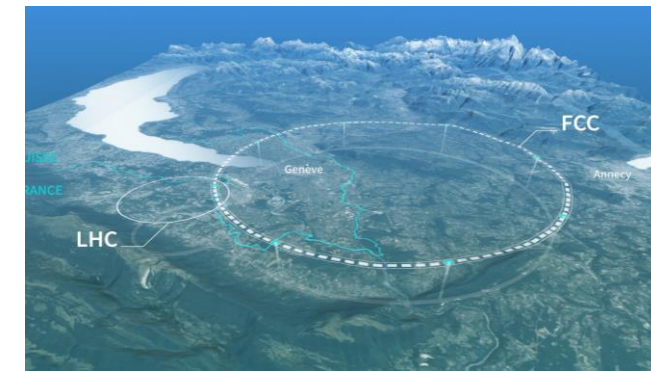
On going studies :

Carbon impact study
of the transport mode
On going study

- Carbon impact of transport by train
- Carbon impact by diesel truck
- Carbon impact by electric truck

Connection study
between the sites
Started study

- Feasibility of inserting conveyor belts
- Traffic study of the roads used
- Feasibility study of road creation



Studies to be started at the moment of implementation of railway connection :

Railway operation study
To be done

- Traffic availability
- Residual capacity of railway lines
- Railway station land availability

THANKS FOR YOUR ATTENTION

www.egis.fr



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