CERN CH-1211 Geneva 23 Switzerland

EDMS NO.	REV.	PROCESS STEP
1971688	**1.6**	**STEP 1**

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IPP-2018-007

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INFRASTRUCTURE PROJECT PROPOSAL
New Building- MTE Kickers

☒ NEW INFRASTRUCTURE **PROPOSAL**	☐ NEW INFRASTRUCTURE **REQUEST**

STEP 1: Proposal FORMULATION

Originator: TE-ABT – Francesco Castronuovo/ Germana Riddone

Motivation: Free space in building B367 in order to install POPS +.

Brief description and scope: The 3 kicker's generator systems KFA4-13-21 for the PS are currently installed in building B367 and must be remove in order to free space to install POPS +. A new building is required to re-install the kicker generator system.

Expected cost / schedule / financing:

A rough estimation of the expected cost is about 1.5 MCHF.

This project has to be launched beginning of 2021 and ending in June 2024.

TE will finance it as part of the POPS + budget.

Indicate what space will be freed by the realisation of this project: The kicker's system, which are in B367, occupy around 144 m2.
Justify the allocation of the freed space: The new POPS+ requires this allocation..

MAIN TECHNICAL PARAMETER (by requester)		MAIN PROJECT PARAMETER (by technical team)	
Infrastructure Type (M/T):	Machine/~~Tertiary~~	Consolidation scope items included:	**N/A**
Surface (m^2)	225	Schedule estimation:	2024
Crane:	Max 3 T	Non consolidation funding contribution:	
Process Heating and Cooling:	Yes	MasterPlan evaluation	
Electrical Power:	~30 kW	Project cost estimate: Yearly Operation and Maintenance:	**1.5 MCHF**

STEP 2: Study decision	**STEP 3:** Preliminary study	**STEP 4:** Evaluation
☐ Rejected. ☐ Ranked with Rs = ☒ Ranked with Ps =	Summary:.	Summary:
Date of DECISION:	**Date of STUDY:**	**Date of EVALUATION:**

Decisions of the Enlarged Directorate

STEP 5 – STEP 6: PROJECT RECOMMENDATIONS AND DECISION

☐ Rejected ☐ Accepted for execution.

DATE OF RECOMMENDATIONS:
DATE OF APPROVAL:

ACTIONS TO BE UNDERTAKEN:

Schedule of Implementation:.

1. REASONS FOR CHANGE

by the originator

1.1 MOTIVATION

In the framework of the POPS+ project, the surface occupied today by the MTE kicker's system in the building B367, is required by TE-EPC.

1.2 PROPOSED STRATEGY

The strategy proposed takes into account the existing HV cables to the PS. In order to avoid pulling new HV cables to the PS Ring, the new building shall be built near the existing one. The location proposed is show on the figure1 below in red colour.

Figure 1: New Building location

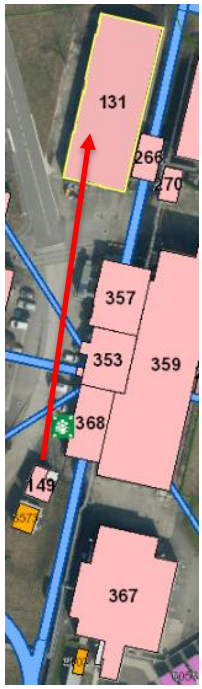


Figure 2: RF Storage move to B131

The removal of the "Barrack" 6573 is mandatory.

In order to ensure correct access to the new building, the removal of the RF storage area of B149 is necessary.

This storage could be move to B131 as shown in Figure 2 and the structure dismantled.

1.3 SUMMARY OF SURFACES

The surface required, and showed in Figure 1, to install the MTE kicker's System, is of **225 m²**. The height of the building should be adapted to install a lifting bridge of 5.7 m under hook (see EDMS 136296).

To be added technical room for HVAC and EL equipment!

2. PROPOSAL DESCRIPTION

by the originator and/or SMB-SE

2.1 BUILDING REQUIREMENTS

2.1.1 SPACE REQUIREMENTS

In order to ensure the safety during the maintenance and the intervention on the following equipment;

- 3 Pulse Forming Network (PFN)
- 2 Hydraulic groups
- 2 Coolers
- 5 HV switches
- 3 Drums - Pulse Forming Line (PFL)
- 25 Electronics Control Racks,

The space requirement is 225 m2 with a height of around 7 m.

2.1.2 HANDLING REQUIREMENTS

To handle the different equipment listed in 2.1.1, a lifting bridge of 3 T with a hook at 5.5 m minimum, is mandatory. See EDMS 136296.

2.1.3 BUILDING SPECIFICATION AND EXTERNAL LAYOUT

A false floor and a platform accepting loads of 500 kg/m^2 is required with technical cable duct.

The necessary platform could be recuperated from the existing installation in B367.

2.1.4 ELECTRICAL POWER AND HVAC REQUIREMENTS

The electrical power supply to operate the Kicker's System is composed of at least:

- 5 pulsed generators - 5 circuits of 400 V+T+N, 16 A
- 2 hydraulics groups – 2 circuits of 400 V+T+N, 16 A
- 2 cooling systems - 2 circuits of 240 V, 16 A
- Others circuits

The lighting of the building must be sufficient to allow the maintenance and intervention work to be carried out on each equipment (around Em = 400 lux minimum, 0.85 m above the ground by default).

AUG and AUL are used to ensure the operational safety, emergency lighting and fire detection.
An access control is required to access the building in operation.

A connection to the CERN technical Ethernet service is requested for remote system control (CCC or monitoring)

2.1.4.1 Building requirements

The followings services are required:

- Oil retention ground covering the oil equipment area - +/- 100 m^2
- Mineralized Water
- Cooling water (15°C) (to be checked and confirmed)
- Pressurized Air (6 bar)

2.1.4.2 PROCESS requirements

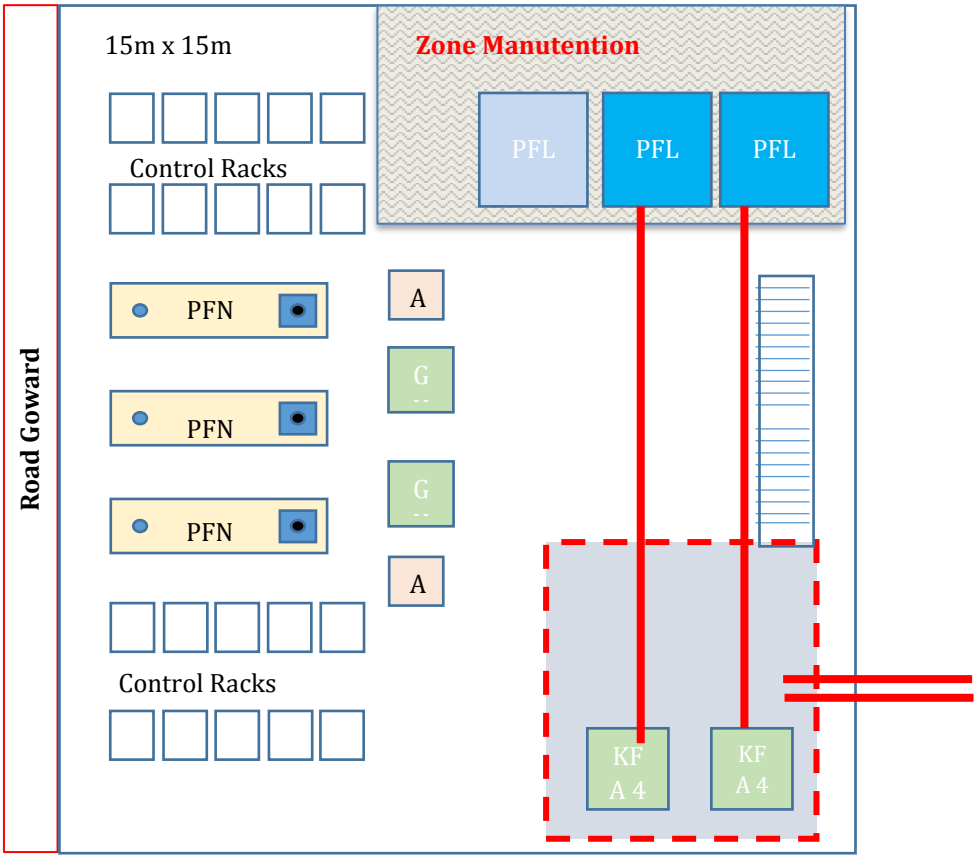
In order to maintain and guarantee the good operation of the PS by the Kicker's system, the temperature requirements is of 20°C +/- 3°C and the humidity 45% +/- 10%.

2.2 PROPOSED LOCATION

The location proposed is shown in Figure 1.

Reminder: This location was chosen in order to avoid the dismantling and pulling of new HV cables to the PS.

2.3 PROPOSED LAYOUT



The building requires a fire detection system.

The access is restrict and so an access control type "access card" is required.

The ABT's control system reuired an internet connection and Wi-Fi.

Figure 3: Proposal layout inter-building connection cables

The proposal layout about te inter-building connection cables is shown in orange colour in figure 3.

2.3.1 AVAILABLE SURFACES

The new building will have around 225 m2 (15x15)

2.3.2 INTERNAL DISTRIBUTION

A first proposal is presented in the figure above (2.3) and where the Kicker's equipment are in their functional position.

2.3.3 DESIGN LOADS

The floor needs to resist the Kicker's equipment weight. (3 T for the heaviest)

2.3.4 HANDLING FACILITIES

A lifting bridge of 3 T with a hook at 5.5 m minimum, is required in order to handle the equipment.

2.3.5 ACCESS FACILITIES

The removal of the "barracks" 6573 is mandatory and to guarantee a better access to the new building, the dismantling of B149 (RF Storage) is a best choice. This storage could be easily moved close their users into B131.

2.4 OVERALL COST ESTIMATE & SCHEDULE BY REQUESTER

2.4.1 BASE OF ESTIMATE

The base of estimate for the tasks indicated in the table below is of 1.5 MCHF for civil works and 0.25 MCHF for process works.

This base needs to be validated with the help of SMB and EN (chap. 3).

Rough first estimation Construction New B-MTE , Study and Bnuiding permit included						
What & Where	**How Long**		**Who**			**Estimated**
	Start	**Finish**	**EN**	**SMB**	**TE**	**Cost kCHF**
Demolition B149	tbd	tbd	X	X		20
Removal of the barrack 6573	tbd	tbd	X	X		15
Construction New B-MTE (225 m2 – 10 m high)	tbd	tbd		X		900
Preparation infrastructure and Services (Electricity, air, water, lifting bridge, etc.)	tbd	tbd	X	X	X	400
Oil retention 180 m2 and false floor	tbd	tbd		X		180
Drawings	tbd	tbd			X	5
					Building - Total estimated	1520
Removal of the HV TX Cables from B367	tbd	tbd			X	16
Removal of the PFN Drums from B367	tbd	tbd	X		X	1.6
Removal of the equipment from B367 (HW and Control)	tbd	tbd			X	100
Re-route of the HV TX Cables in B-MTE	tbd	tbd			X	10
Installation of the PFN Drums in B-MTE	tbd	tbd	X		X	2
Installation of the equipment in B-MTE (HW and Control)	tbd	tbd	X		X	120
					Dismantling & Instalaltion - Total estimated	249.6

2.4.2 FINANCING

Departmental funds in the framework of the POPS+ project.

2.4.3 SCHEDULE NEEDS

The project should start enough soon in order ***to deliver the new building in state to accept the kickers' system, end of June 2024.*** A first proposal of schedule is presented in Figure 4 below.

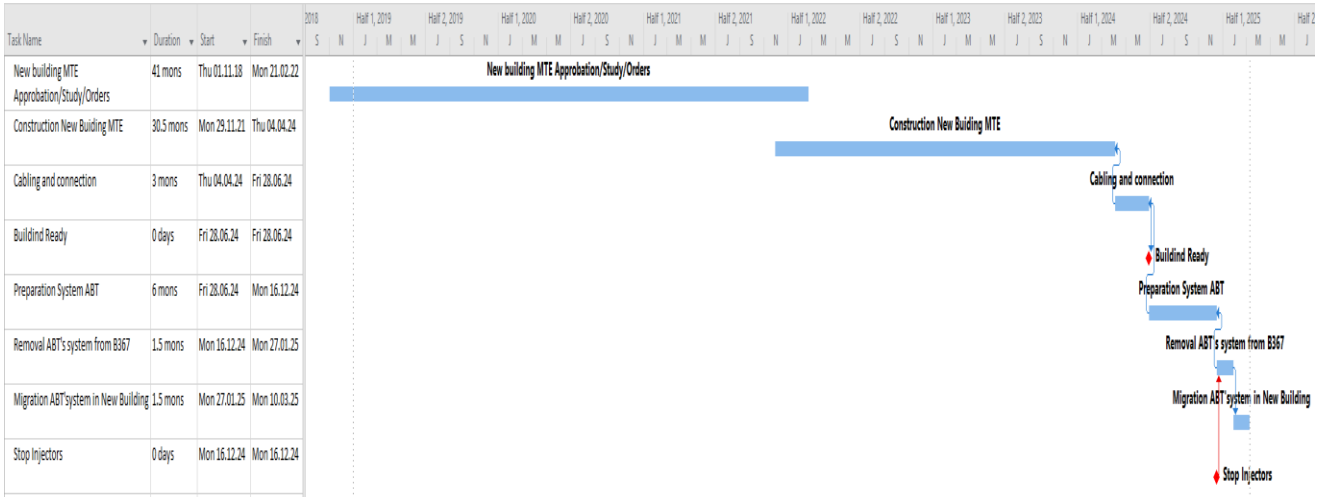


Figure 4: First Schedule Proposal

3. PRELIMINARY DESIGN SUMMARY (STEP 3)

3.1 MASTERPLAN EVALUATION

3.2 CIVIL ENGINEERING

3.2.1 BUILDING STRUCTURE

3.2.2 ARCHITECTURAL BUILDING WORK AND FINISHES

3.2.3 CAR PARKS, ROADS AND EXTERNAL NETWORKS

3.3 TECHNICAL INSTALLATIONS

3.3.1 ELECTRICAL SPECIFICATIONS

3.3.2 HVAC SPECIFICATIONS

3.4 OVERALL PROJECT SCHEDULE

3.4.1 CIVIL ENGINEERING SCHEDULE

3.4.2 TECHNICAL INFRASTRUCTURE SCHEDULE

3.5 OVERALL COST, SCHEDULE & RESOURCES

3.5.1 PROJECT

3.5.2 OPERATION AND MAINTENANCE

3.6 IMPACT ON OTHER ITEMS **by the originator and/or SMB-SE and the other involved groups**

3.7 COMMENTS (COMPULSORY) **by SMB-SE and HSE**

3.8 COMMENTS (IF REQUIRED) **by other involved Group Leaders**

4. COMMENTS (IF ANY) **by the Enlarged Directorate**

ANNEX 1 – RANKING METHOD

- Ranking consolidation: Rs = P x Max (Io, Ir, If, Is)
  - Where:
    - **P** is the probability of failure (1 to 4 -> rare to possible)
    - **Io** is the impact on scientific objective (1 to 5 -> Insignificant to catastrophic)
    - **Ir** is the impact on CERN reputation (1 to 3 -> Insignificant to major)
    - **If** is the financial impact (1 to 5 -> from <120kCHF to many millions)
    - **Is** Health and safety impact (1 to X -> insignificant to mandatory)

- Ranking new infrastructure: Ps = (Pst + Psc+ Pt + Po) x Pi
  - Where:
    - **Pst** values the masterplan need
    - **Psc** values the scientific need
    - **Pt** values the technical need
    - **Po** values the operational need
    - **Pi** values the impact if not done
    - Values are ranked as follows: 3-High : 2-Medium

ANNEX 2 – CERN 2030 MASTERPLAN EVALUATION

FORMULAIRE D'EVALUATION DE PROJET

T	*OBJECTIFS-CADRES*		*MESURES*		*RES.*	*COMMENTAIRES*
URBANISM	U1	Normaliser l'utilisation des espaces bâtis.	U1.1	Développer une politique de gestion des espaces bâtis avec une stratégie spécifique pour chaque usage.		
			U1.2	Etablir un monitoring des bâtiments existants.		
			U1.3	Etablir un programme de rénovation.		
	U2	Densifier l'occupation du sol en assurant la flexibilité et la réversibilité des affectations.	U2.1	Identifier les périmètres destinés à la densification		
			U2.2	Etablir différents scénarios (normalisation, + 1'000 utilisateurs, + 3'000 utilisateurs) visant à anticiper le développement d'infrastructures tertiaires.		
			U2.3	Etablir un plan de développement d'infrastructures à usage technologique (Atelier, Stockage, Assemblage).		
	U3	Rendre autonomes les sites de Meyrin et Prévessin.	U3.1	Renforcer la structure des sites par zones : académique, scientifique et technologique.		
			U3.2	Créer un /des pôle/s de services décentralisés dans chaque site regroupant notamment centre de services, restaurant, espaces publics, etc.		
MOBILITE	M1	Optimiser l'offre et la gestion du stationnement.	M1.1	Favoriser un taux de rotation en phase avec les usages dans les zones desservies.		
			M1.2	Mettre en place une gestion différenciée des parkings longue, moyenne et courte durée.		
			M1.3	Privilégier l'utilisation des zones de stationnement pour les usages professionnels.		
			M1.4	Considérer les parkings en étage (aérien, enterré) dans le cadre de nouveau développement.		
	M2	Promouvoir les offres alternatives de transport inter et intra sites.	M2.1	Encourager les déplacements en mode doux (piétons/vélos) par des mesures d'aménagement et d'incitation.		
			M2.2	Favoriser le co-voiturage et augmenter l'attractivité et l'offre des navettes.		
			M2.3	Renforcer et diversifier l'offre de véhicules en libre-service.		
	M3	Favoriser une accessibilité efficace et fluide aux sites du CERN.	M3.1	Optimiser la fluidité des accès au CERN.		
			M3.2	Améliorer la hiérarchie du réseau routier à l'intérieur du domaine CERN.		
			M3.3	Favoriser les synergies avec les services de transport public et les initiatives d'offre d'infrastructure de transport.		

Energie & Environnement	E1	Contrôler les besoins en ressources nécessaires au fonctionnement des infrastructures tertiaires.	E1.1	Diagnostiquer et rationaliser les consommations d'énergie (gaz, électricité) et d'eau.		
			E1.2	Augmenter l'efficacité énergétique des infrastructures tertiaires du CERN.		
			E1.3	Promouvoir les nouvelles technologies de production d'énergie.		
	E2	Maîtriser les niveaux de nuisances du domaine CERN.	E2.1	Limiter les nuisances à la source dans les domaines Air - Eau - Sols - Bruit.		
			E2.2	Entreprendre une politique globale de traitement des déchets.		
			E2.3	Mettre en place une stratégie de gestion des eaux pluviales du CERN.		
	E3	Engager un plan d'actions en faveur de la biodiversité, des espaces verts et des espèces protégées.	E3.1	Elaborer un diagnostic de la biodiversité existante, des espèces protégées et des espaces verts.		
			E3.2	Mettre en place une politique de protection, de gestion et de mise en valeur des différents milieux.		
Paysage	P1	Développer une identité paysagère	P1.1	Harmoniser les aménagements paysagers		
			P1.2	Améliorer la perméabilité des espaces verts pour les piétons et les cyclistes		
	P2	Mettre en relation le paysage du CERN avec celui des territoires voisins.	P2.1	Paysager les franges en limite du domaine		
			P2.2	Garantir la préservation des vues remarquables depuis le domaine CERN.		