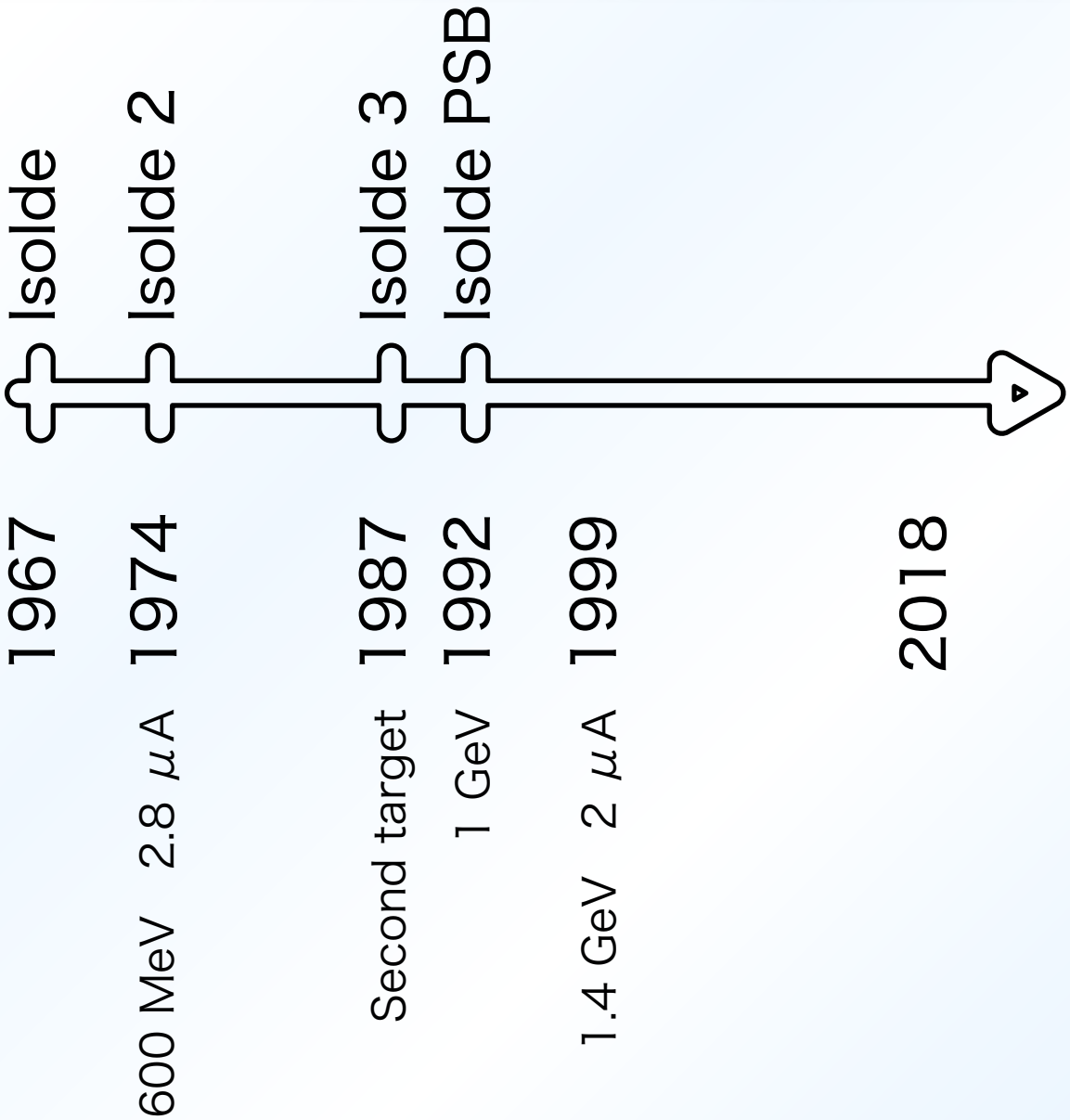
Isolde V

Tim Giles

Timeline



Isolde 5 ?

2 GeV 4 - 6 μA

New target stations

Motivation

2 GeV : increased production of exotic isotopes

4 - 6 μA : all-round higher beam intensity

2 - 3 x increase in beamtime

4 - 8 x increase in RIB output

Multiple simultaneous beams & flexible switching

Improved beam dynamics & isobar separation

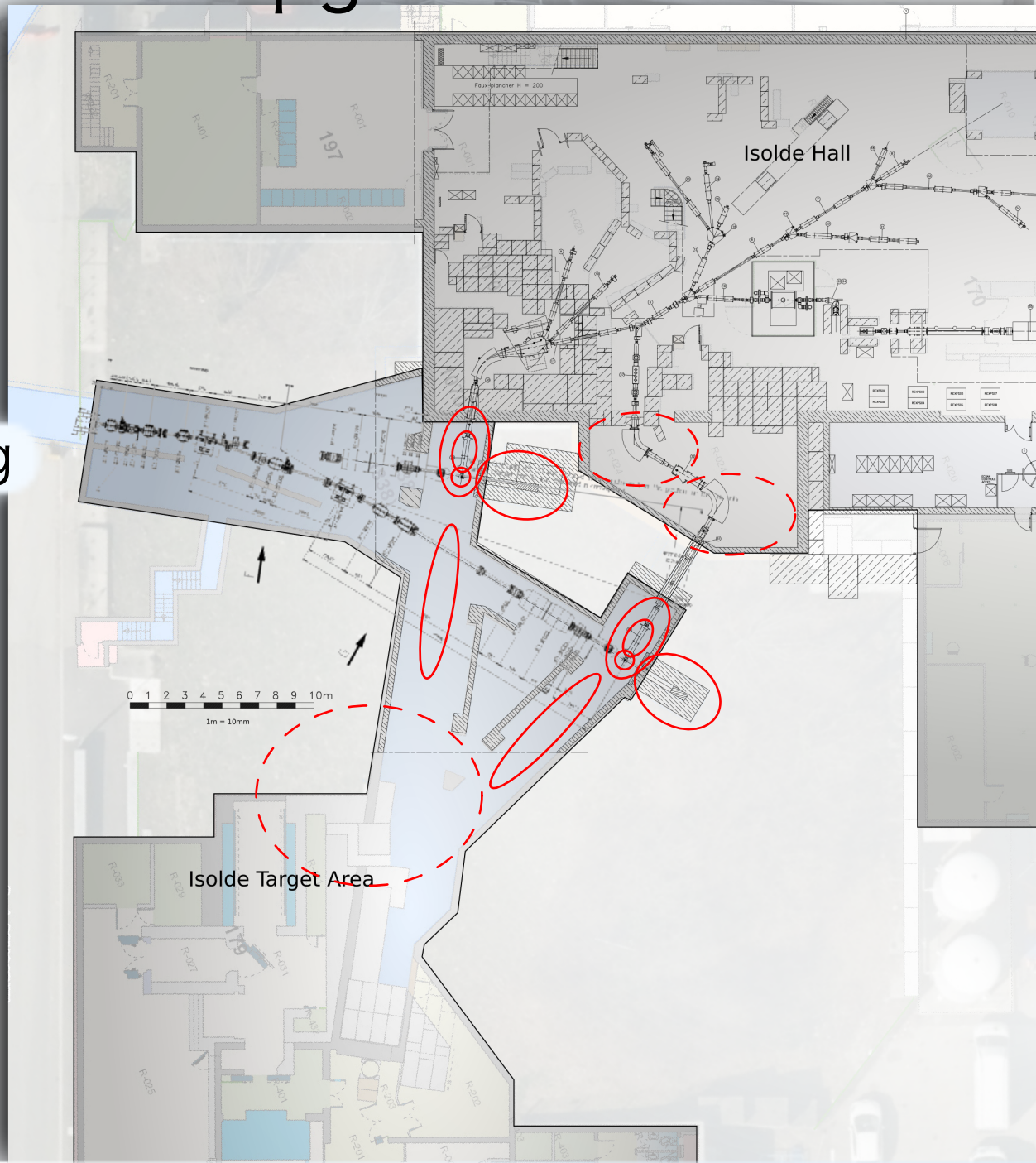
In-situ upgrade

Replace :

- Target units
- Target handling
- Target services
- Frontends
- Frontend handling
- Ventilation
- Shielding
- Beam dumps

No upgrade :

- Separators
- Beam delivery



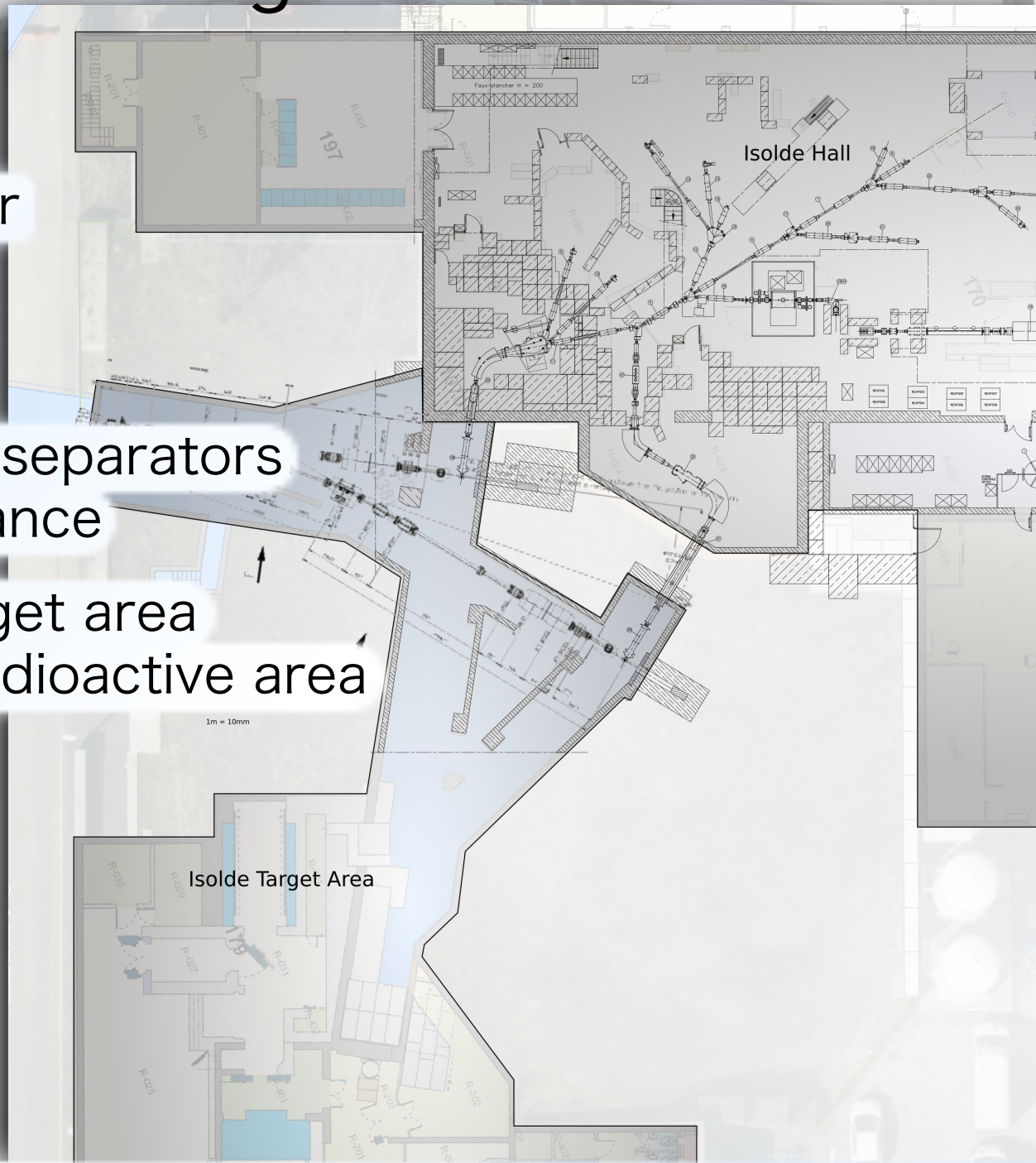
New Target Area

Higher beam power

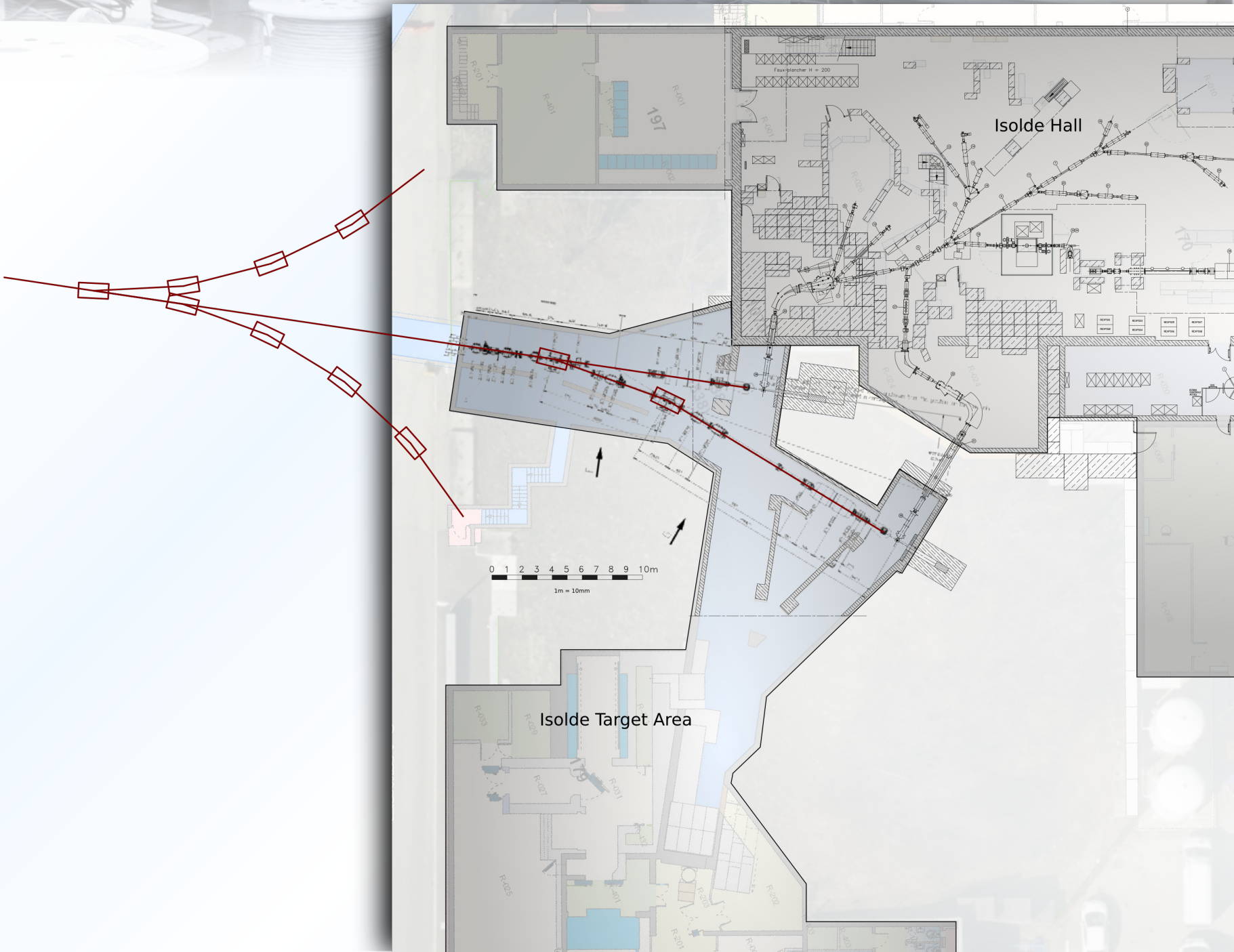
+

Multiple beams
High-performance separators
Improved maintenance

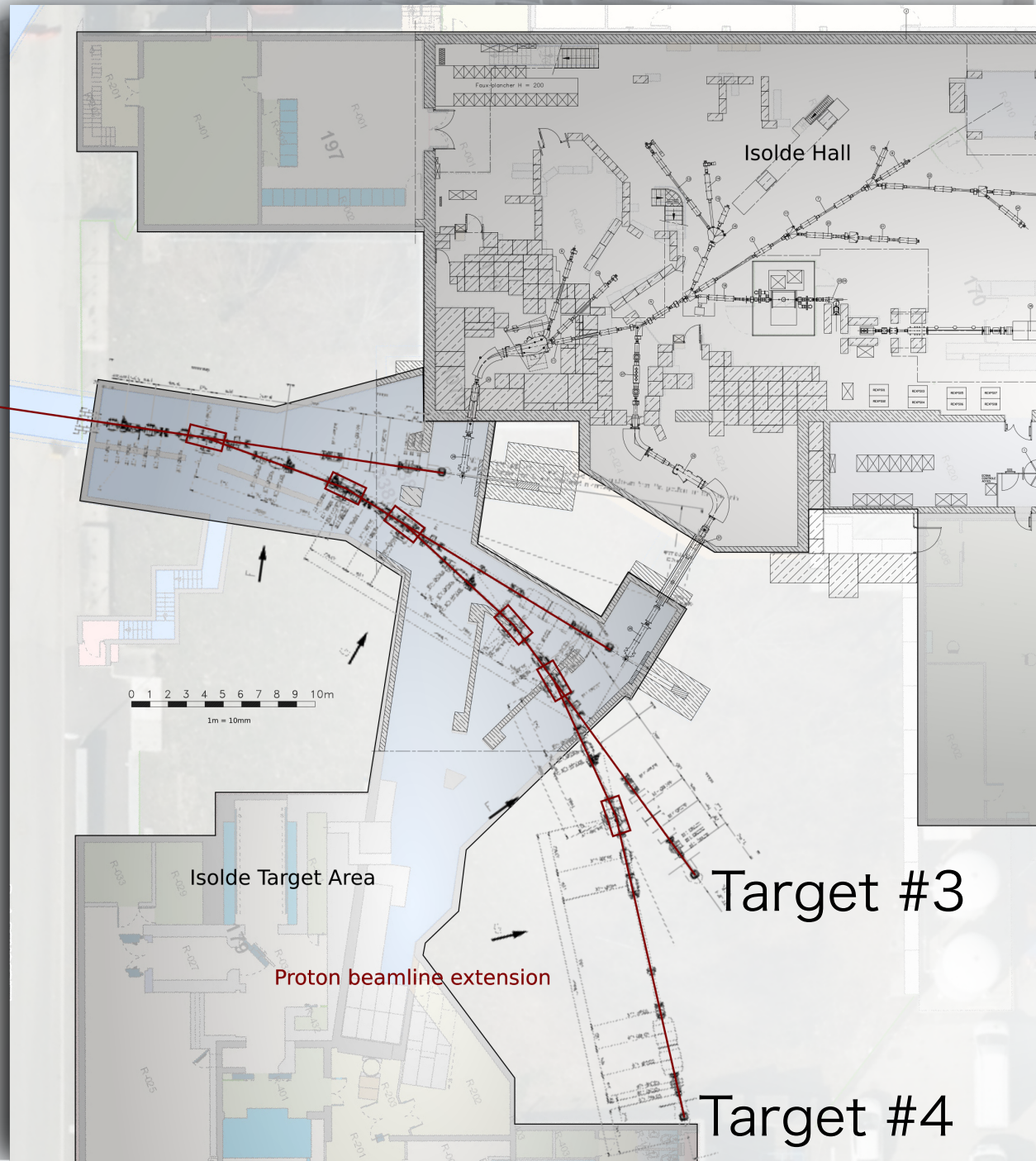
Retain existing target area
Avoid reworking radioactive area



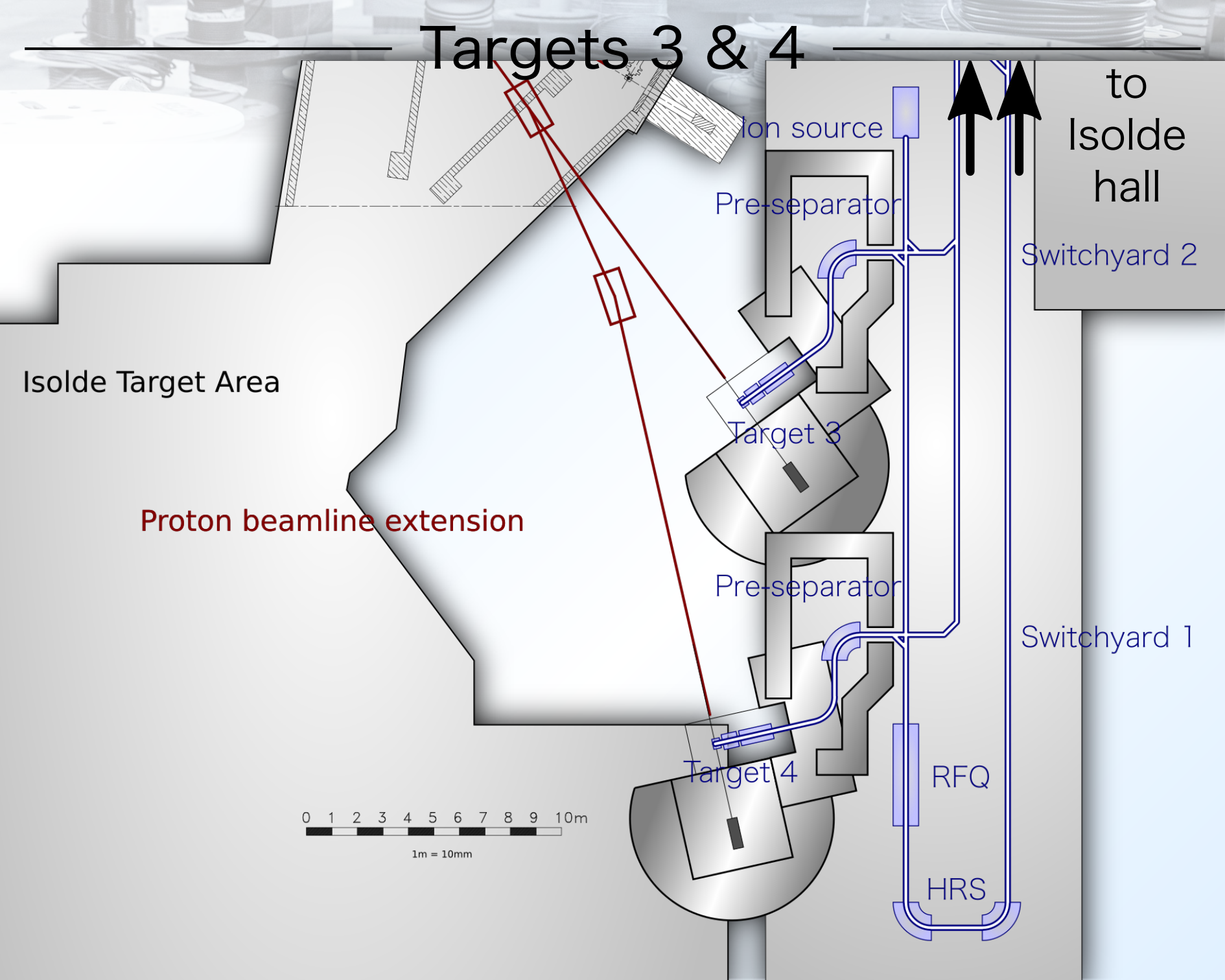
New Proton Beamline?



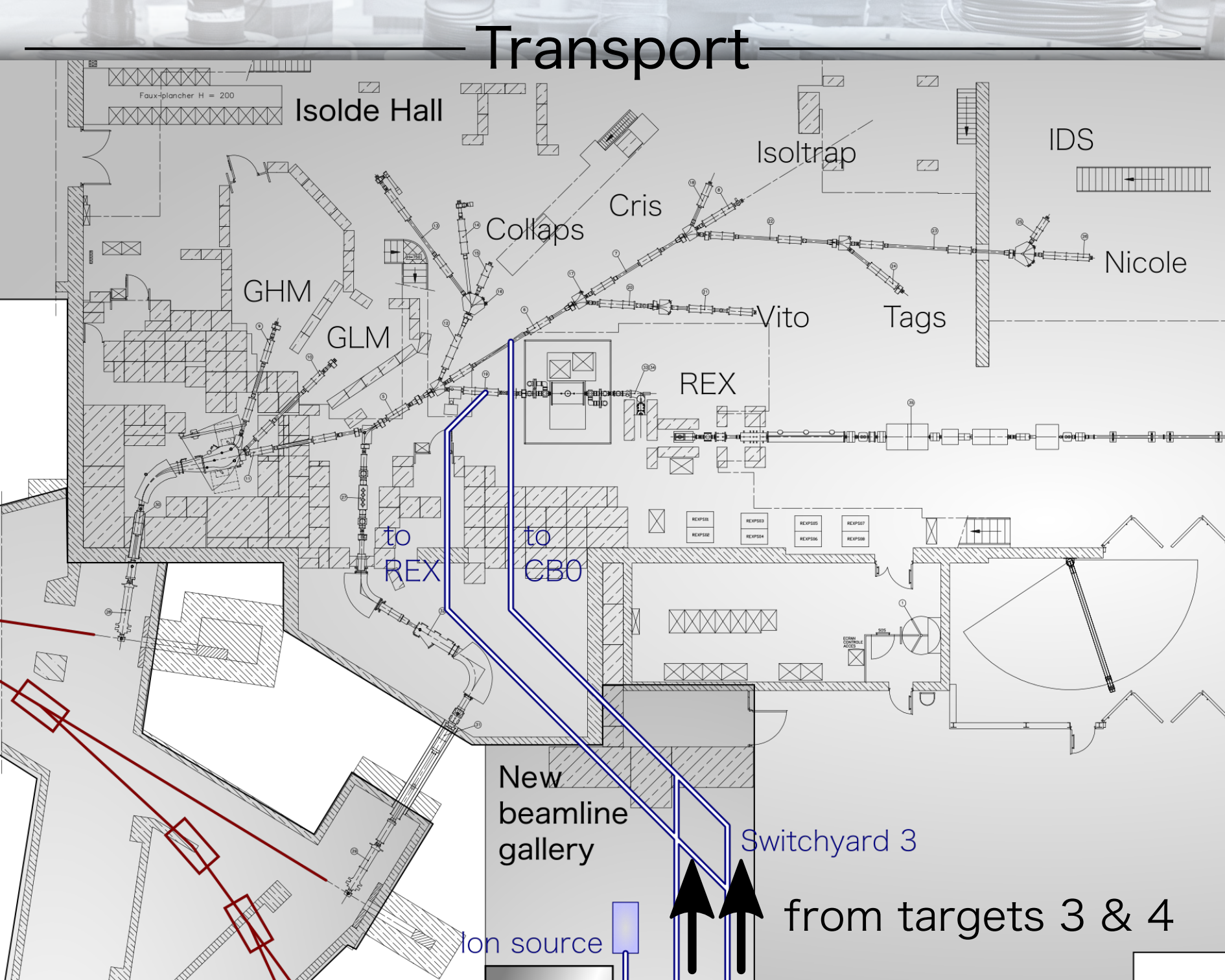
New Proton Beamline?



Targets 3 & 4


to Isolde hall
ion source
Pre-separator
Switchyard 2
Isolde Target Area
Target 3
Proton beamline extension
Pre-separator
Switchyard 1
Target 4
RFQ
HRS
0 1 2 3 4 5 6 7 8 9 10m
1m = 10mm

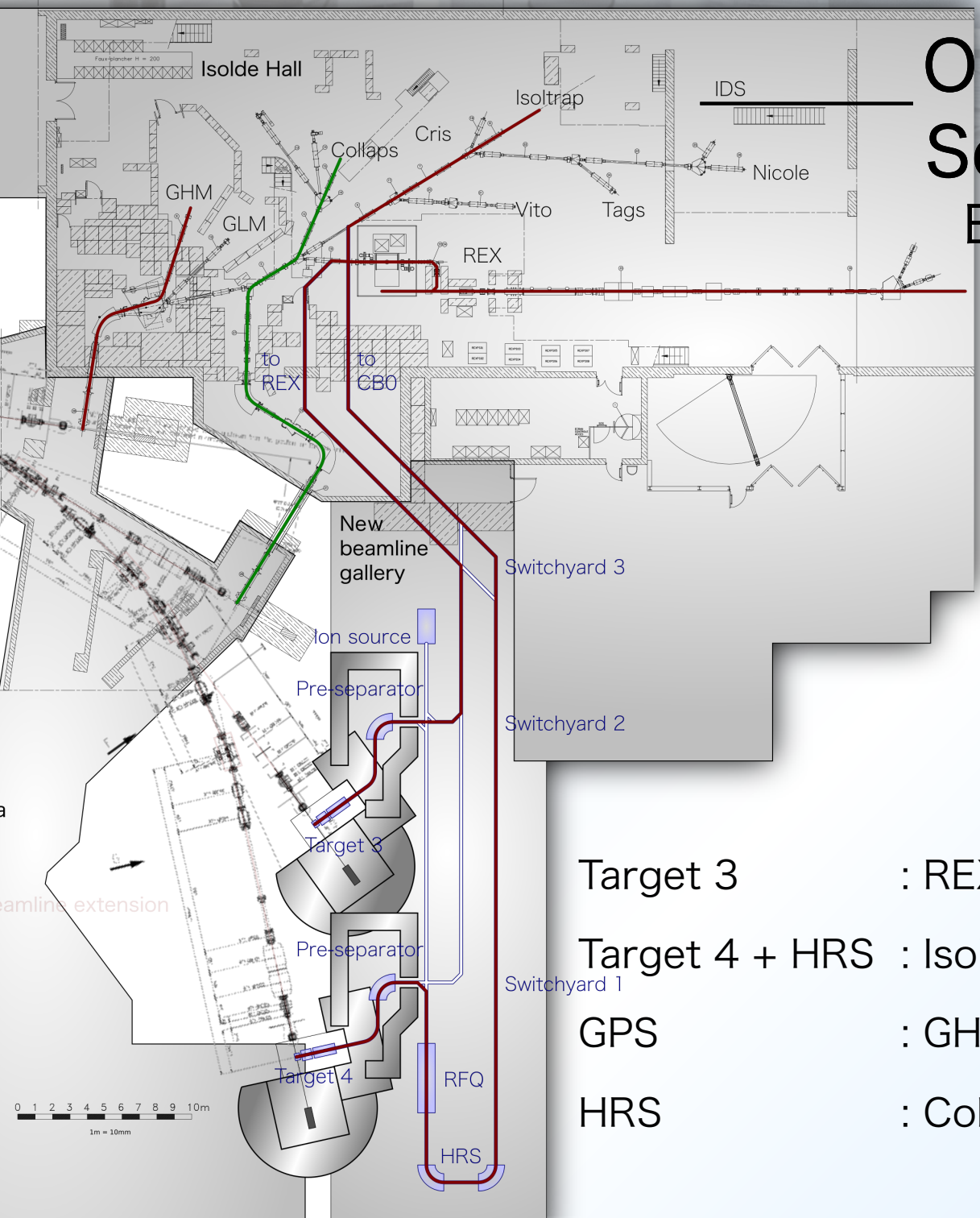
Transport


Faux-plancher H = 200
Isolde Hall
Isoltrap
IDS
Cris
Collaps
Nicole
GHM
GLM
Vito
Tags
REX
to REX
to CB0
New beamline gallery
Switchyard 3
from targets 3 & 4
Ion source

Operating Scenarios

Operating Scenarios

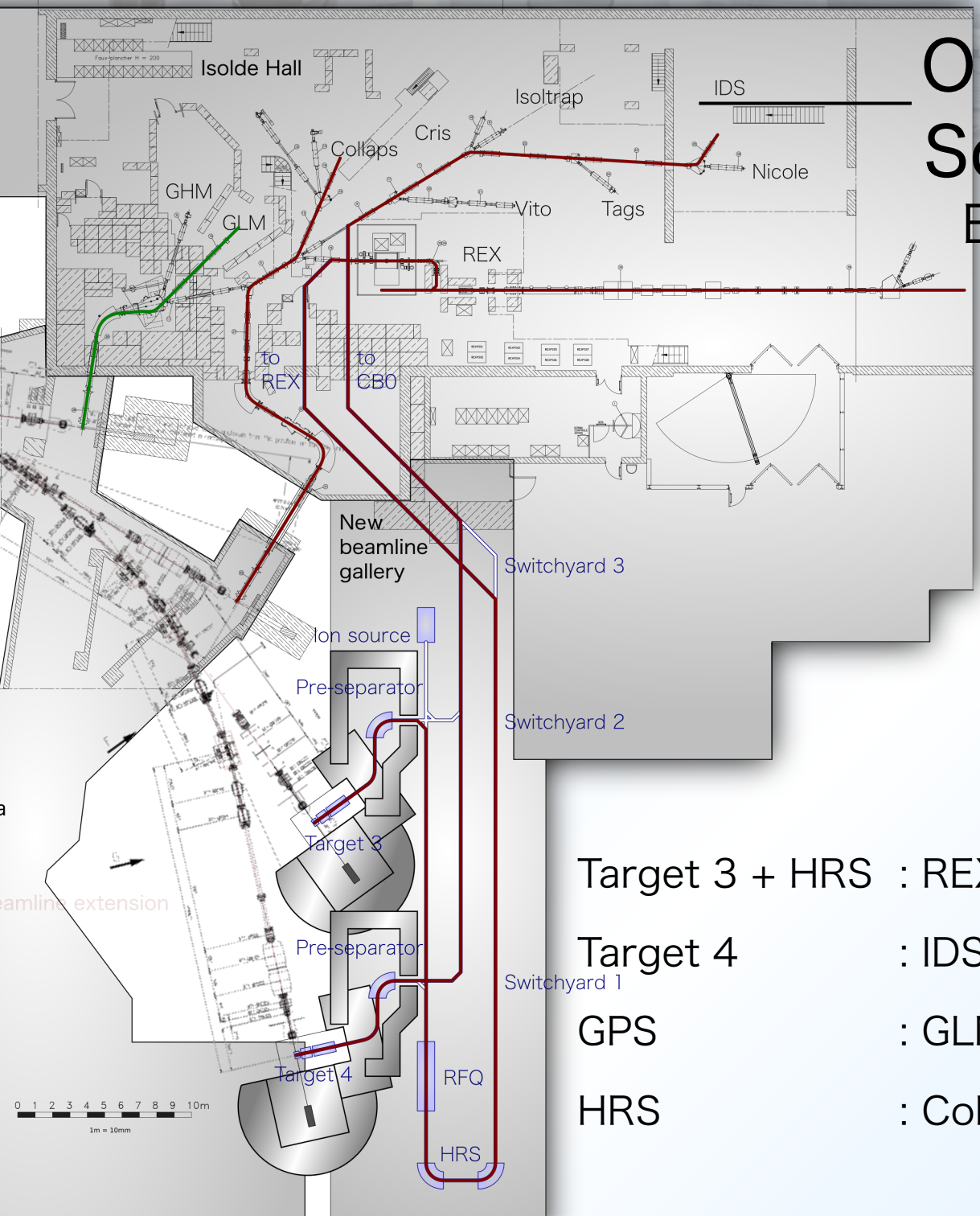
Example 1



Target 3	: REX	: high-intensity
Target 4 + HRS	: Isoltrap	: radioactive setup
GPS	: GHM	: low-intensity running
HRS	: Collaps	: stable-beam

Operating Scenarios

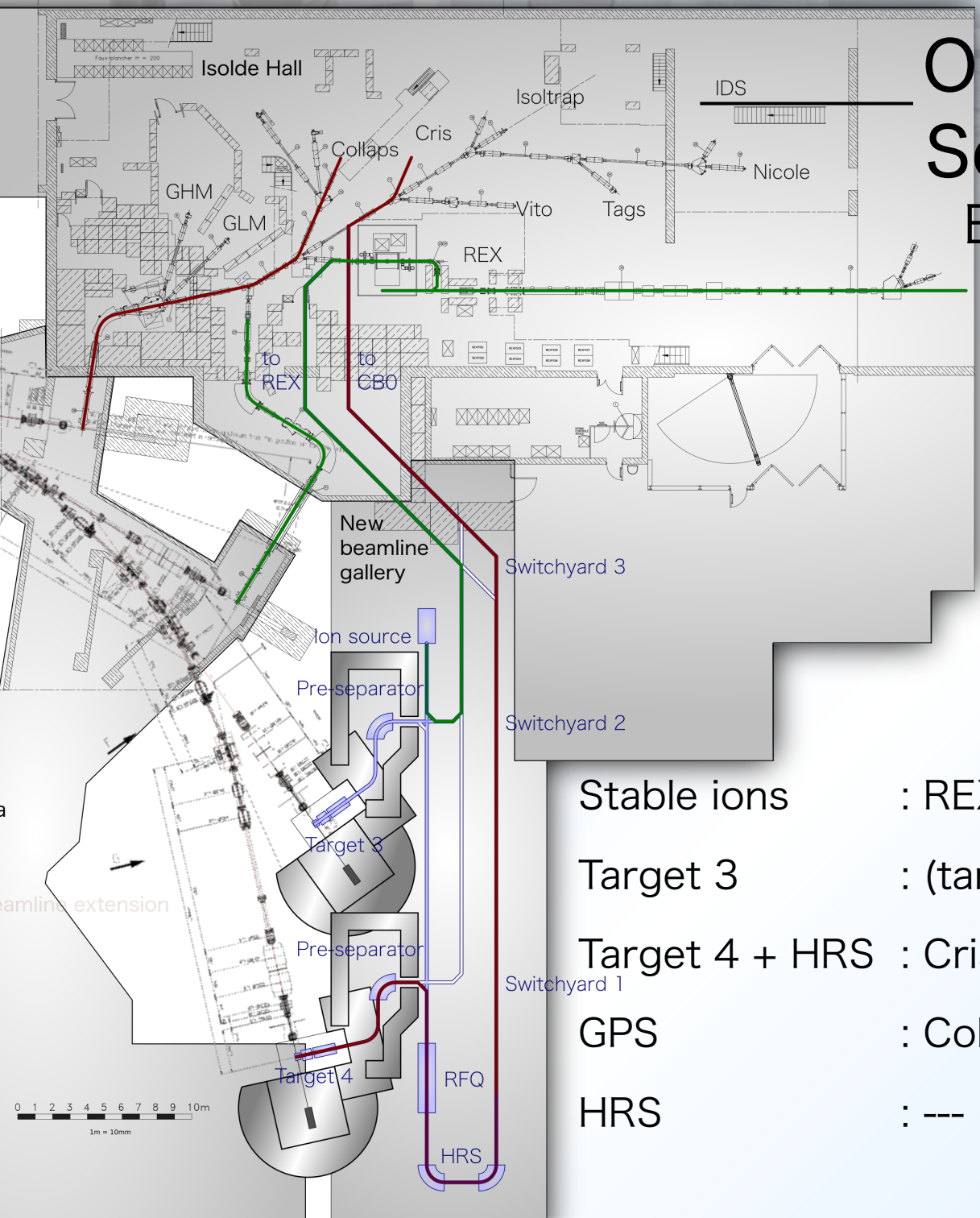
Example 2



Target 3 + HRS	: REX	: radioactive setup
Target 4	: IDS	: high-intensity
GPS	: GLM	: stable-beam
HRS	: Collaps	: radioactive running

Operating Scenarios

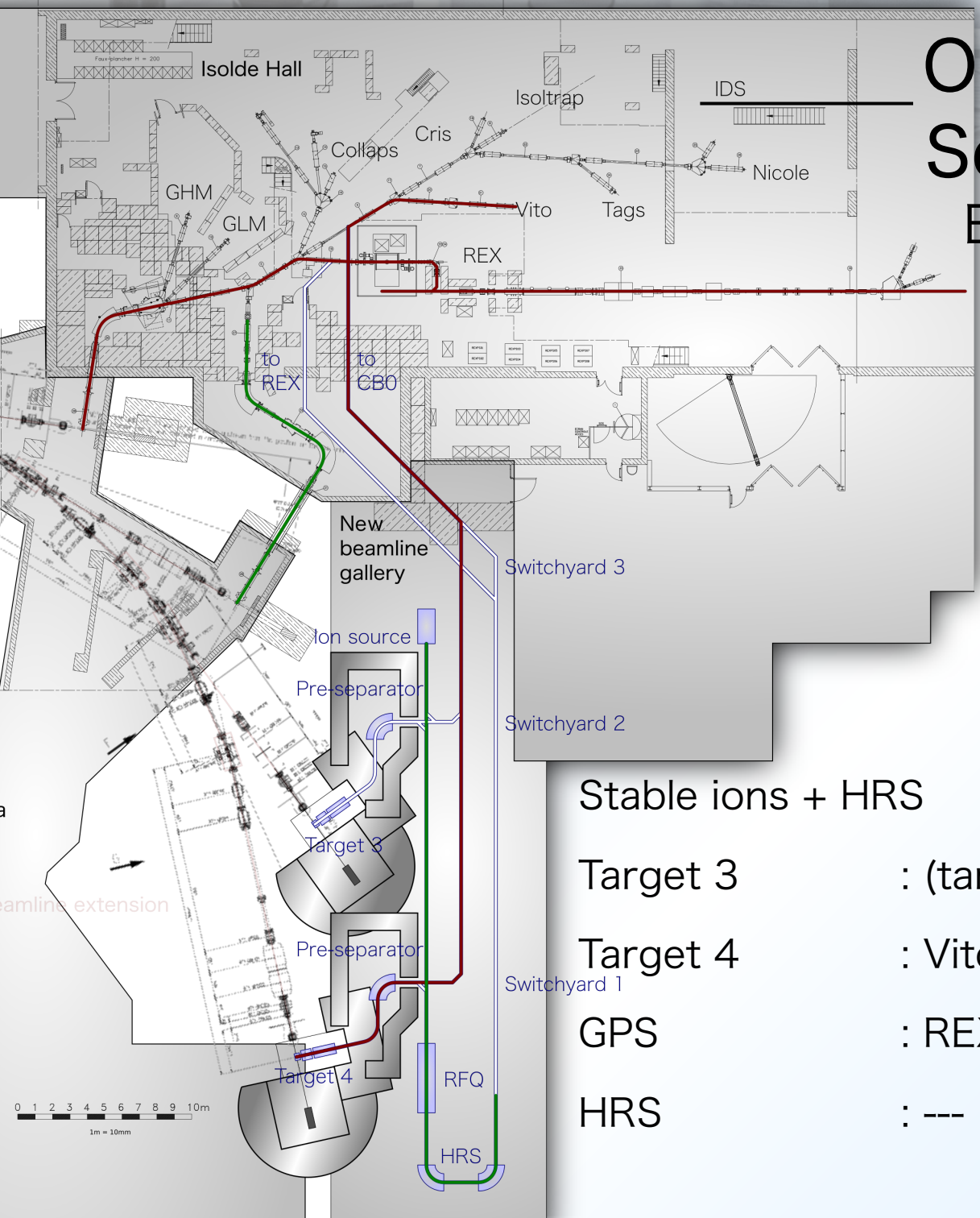
Example 3



Stable ions	: REX	: stable beam
Target 3	: (target-change)	
Target 4 + HRS	: Cris	: high-intensity
GPS	: Collaps	: radioactive running
HRS	: ---	: stable setup

Operating Scenarios

Example 4



Stable ions + HRS : beam development

Target 3 : (target-change)

Target 4 : Vito : high-intensity

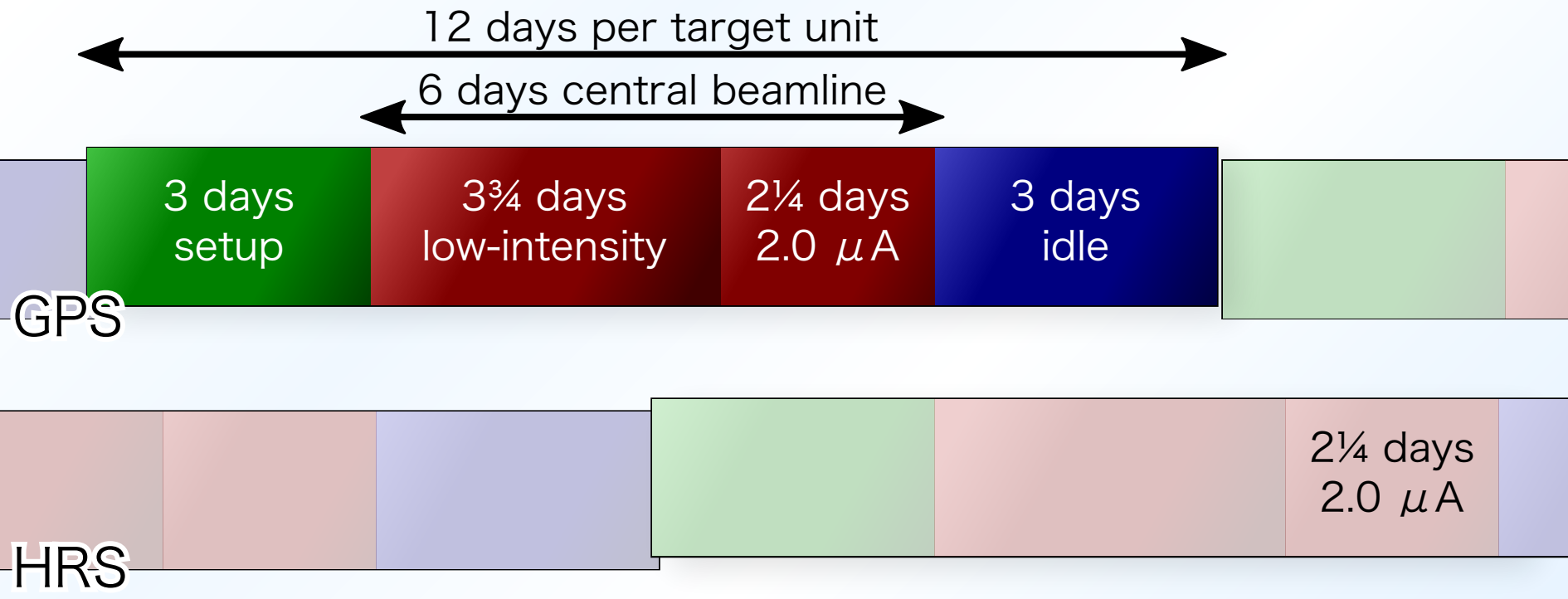
GPS : REX : radioactive running

HRS : --- : stable setup

— Performance estimates —

Proton Consumption

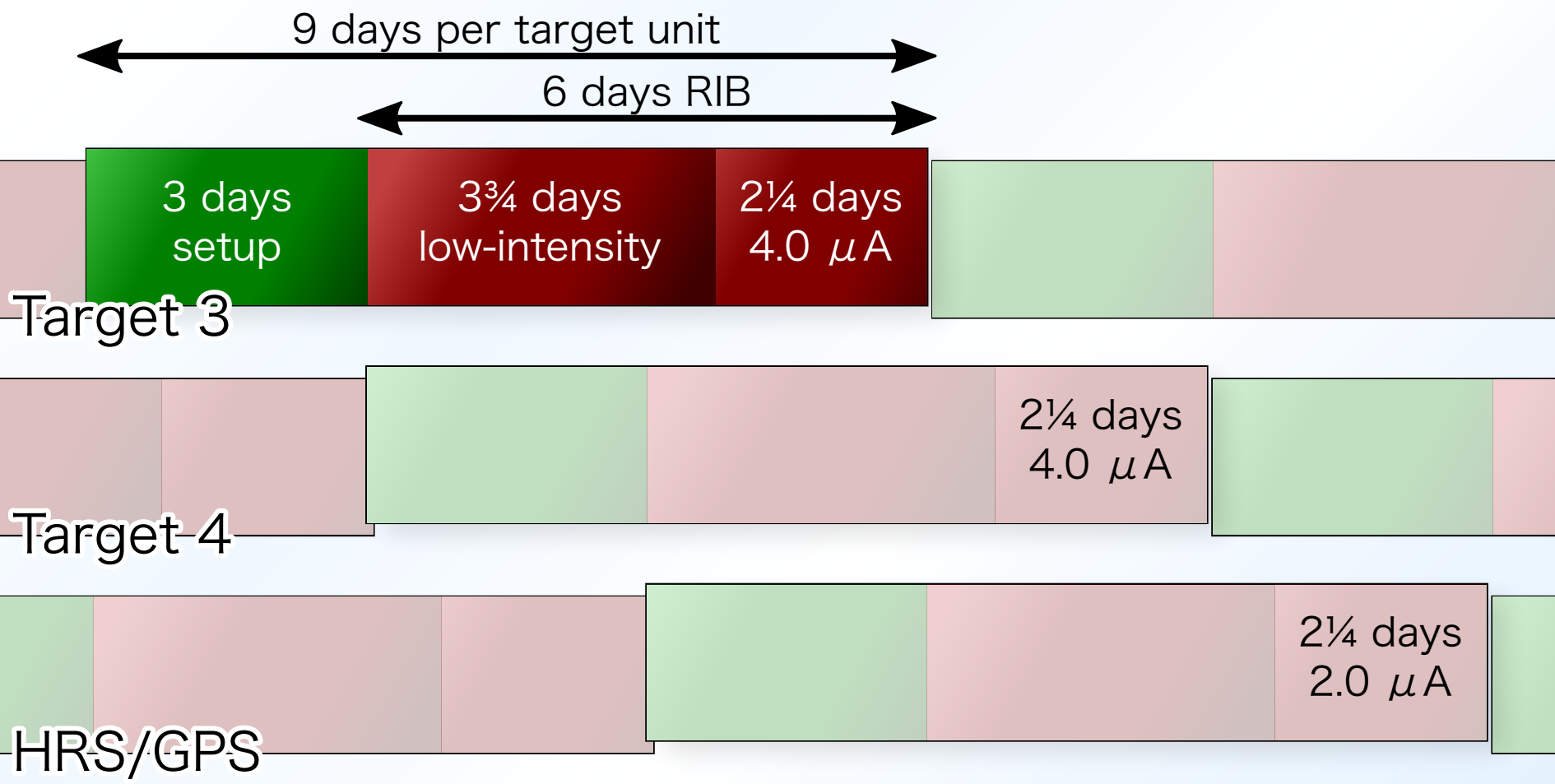
Target life-cycle, existing Isolde:



Protons used per target	4.5 μA.days
Average proton beam	0.75 μA

Proton Consumption

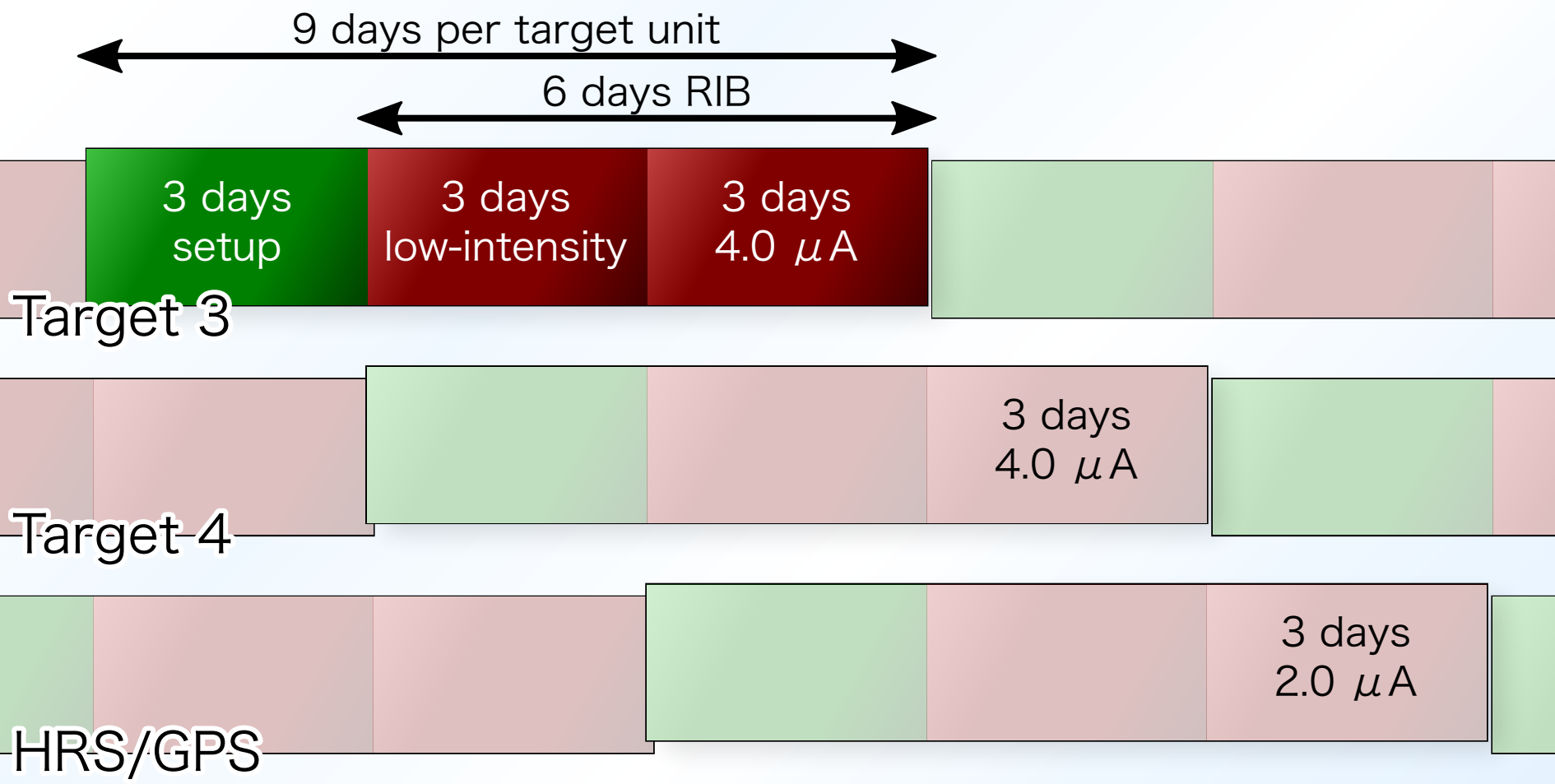
Target life-cycle, with Isolde V:



Average proton beam 2.5 μA (3.3x increase)

Proton Consumption

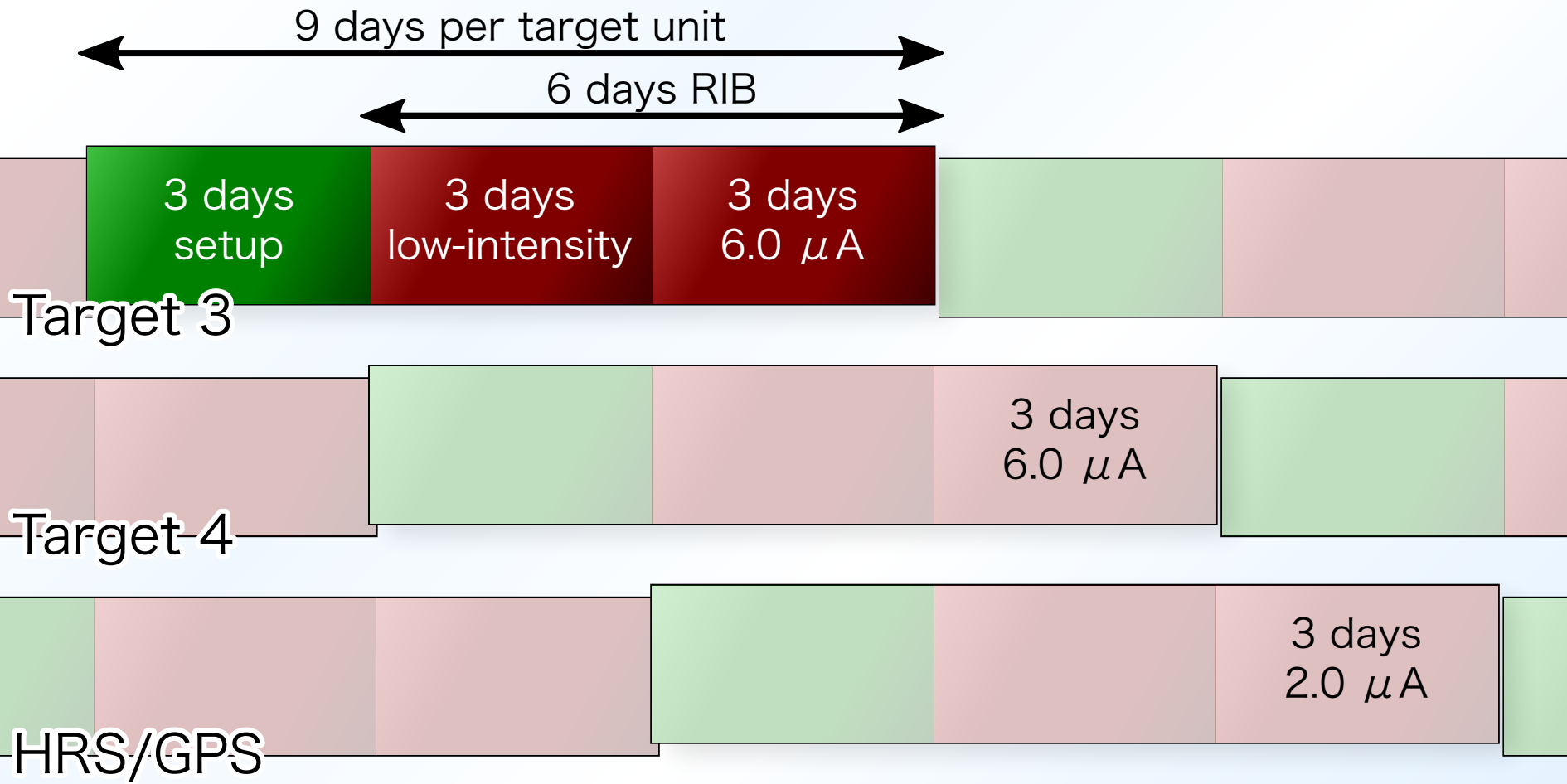
Target life-cycle, with Isolde V:



Average proton beam 3.3 μA (4.4x increase)

Proton Consumption

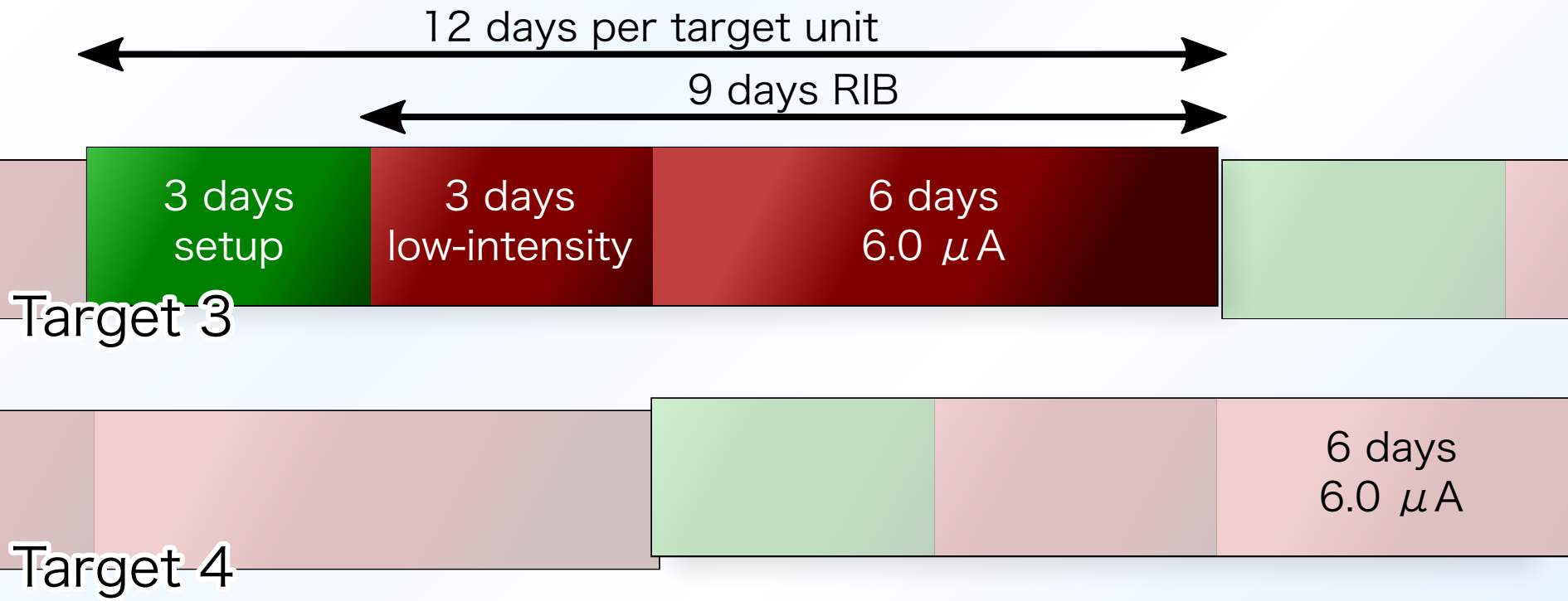
Target life-cycle, with Isolde V:



Average proton beam 4.7 μA (6.2x increase)

Proton Consumption

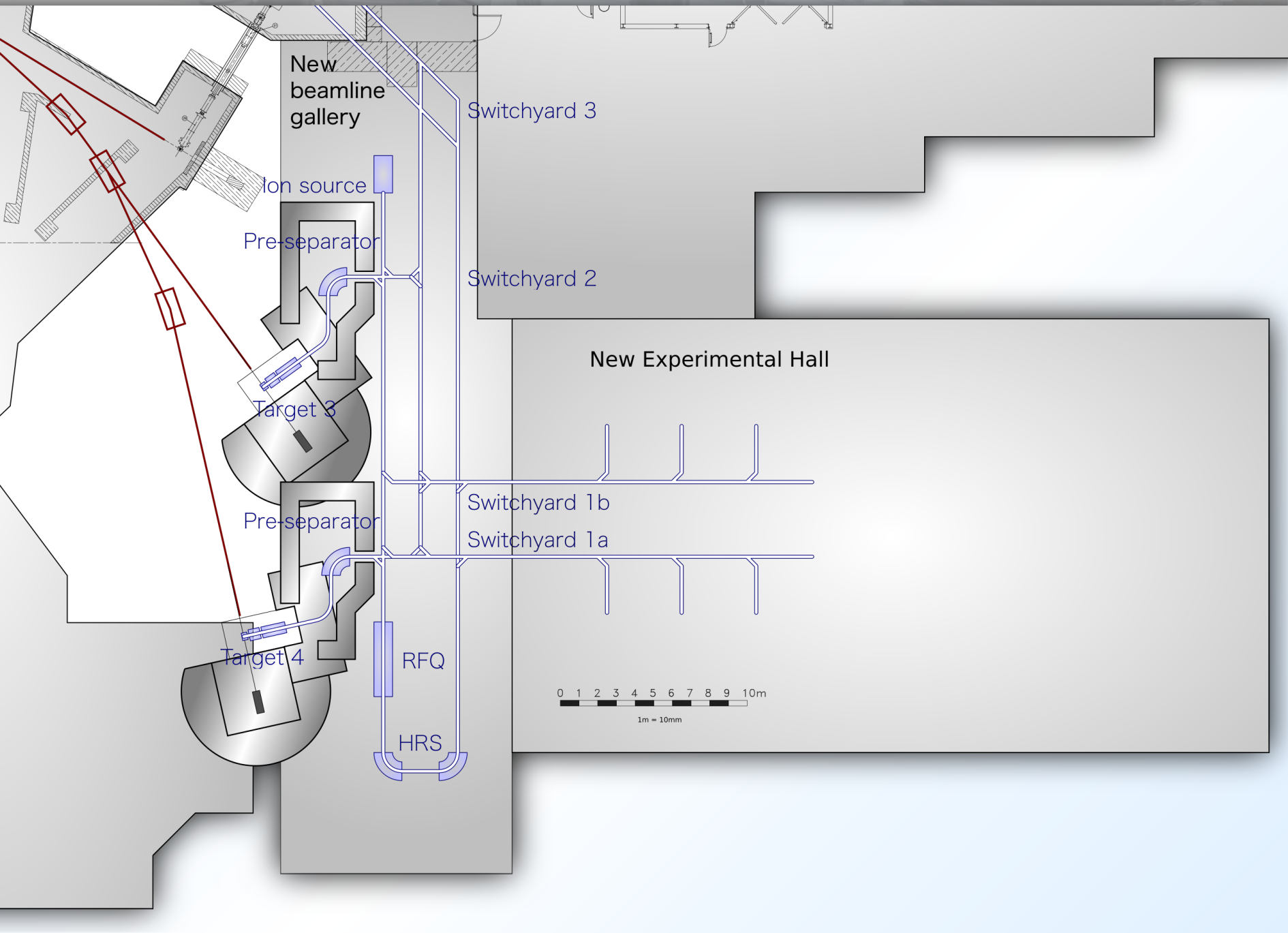
Target life-cycle, with Isolde V:



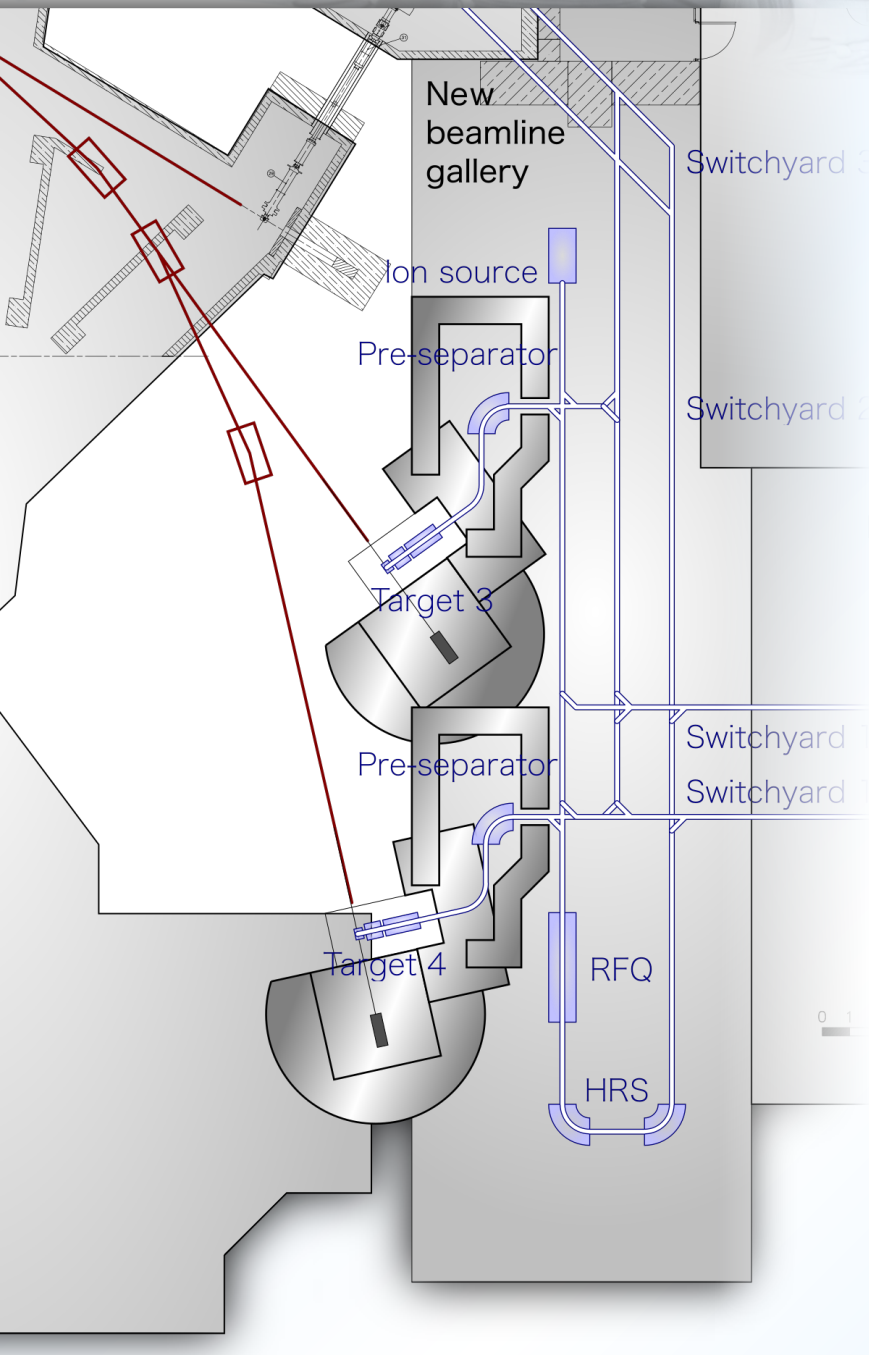
Protons used per target 36 μA.days (5e19)

Average proton beam 6 μA (8x increase)

Expansion


New beamline gallery
Switchyard 3
Ion source
Pre-separator
Switchyard 2
New Experimental Hall
Target 3
Switchyard 1b
Pre-separator
Switchyard 1a
Target 4
RFQ
HRS
0 1 2 3 4 5 6 7 8 9 10m
1m = 10mm

Isolde V



2 GeV proton beam

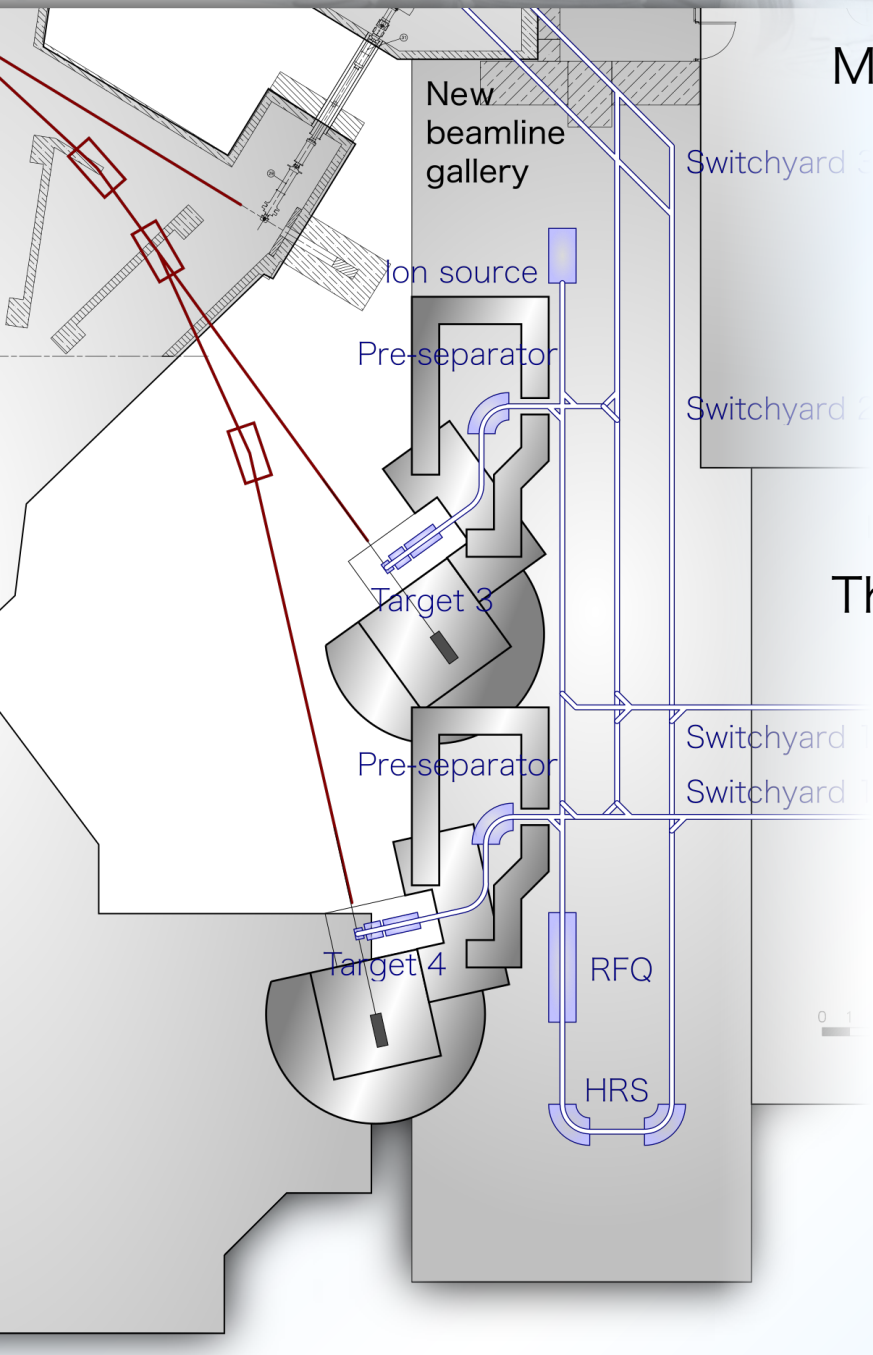
- RIB output increase 4-8x
- Beamtime increase 2-3x

New features :

- Flexible beam handling
- High-performance separator
- Stable beams

Old Isolde remains intact

Isolde V



Maintain Isolde as state-of-the-art facility :

- Make best use of driver accelerators, experimental infrastructure and expertise accumulated over 50 years
- High value, high feasibility

The next steps :

- Exchange with Triumf-Ariel
- Collect input from user community
- Input from machine-physics community
- Launch design study...