Supplier Opportunities at Diamond

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Diamond-II | Advancing Science

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- The UK's national synchrotron radiation facility and largest particle accelerator.
- A major piece of UK Research Infrastructure:
- - has served over 14,000 scientists from academia and industry
- - has hosted over 220 companies paying for proprietorial access, across multiple sectors
- - provided training for 8,000 PhD students
- - hosts over 6,000 visitors each year.

LEAPS INNOVATION

Diamond-II

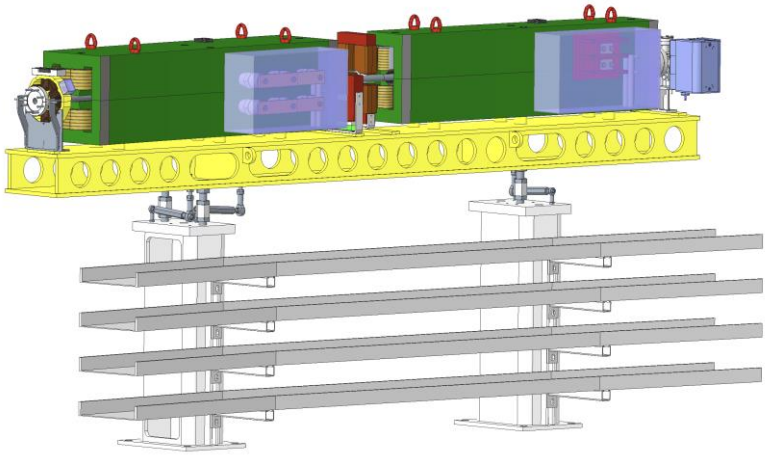
- A major upgrade to the facility with total project cost of £519.4m.
- Approval announced 5th Sep. 2023 by the Secretary of State for Science & Industry.
- Project consists of:
- - replacement of the 168 m circumference booster synchrotron and the 560 m storage ring (£125m).
- - 3 new ‘flagship’ X-ray beamlines and upgrades to many other beamlines (£45m).
- - software, controls and computing upgrades (£10m).
- - a new building, temporary on-site and off-site storage and some upgrades to services (£33m).
- Procurement is underway, targeting long delivery items first, with a careful eye on the fixed spend profile.
- We have to be ready for shutdown of Diamond for removal, followed by installation of Diamond-II, starting Dec. 2027.

What we will be buying for Diamond-II

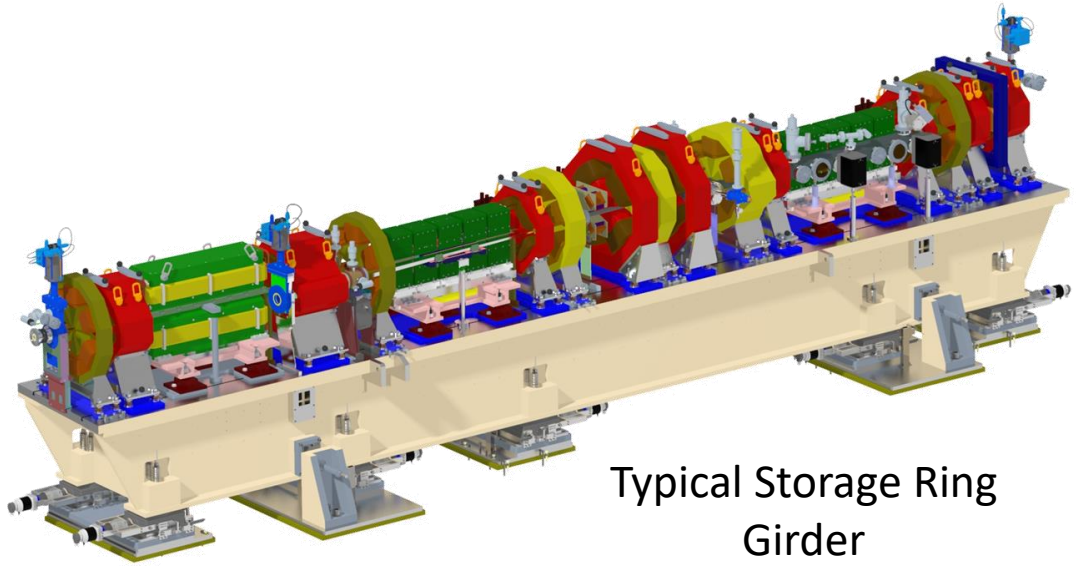
- Procurement and installation of the machine upgrade
- Delivery of critical changes to the beamlines
- Design and procurement of new beamlines
- Data and computational requirements
- Design and delivery of a new building

Machine

- Machine is comprised of 3 Accelerators
  - LINAC
  - ***Booster***
  - ***Storage Ring***
- Booster
  - Made up of 50 girders of 8 types
  - Intention is for single tender for whole booster
  - Various ancillary equipment will be ordered/tendered separately
- Storage Ring
  - Made up of 48 Girders or 4 types + 4 Spares
    - Steel fabrications supporting electro-magnets and vacuum vessels
    - Mounted on an adjustable support system to position the girder
  - Several tenders and many individual orders
  - 48 Straights

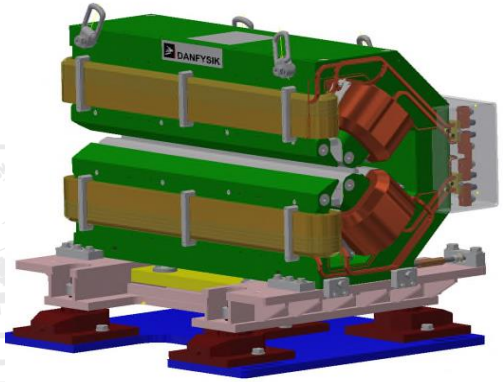


Booster girder type 1

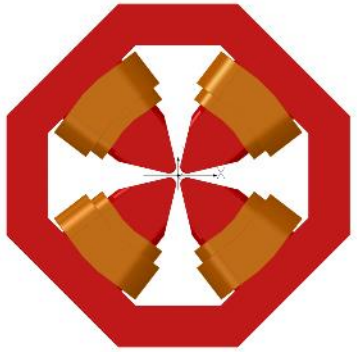


Typical Storage Ring Girder

Electromagnets



x 55



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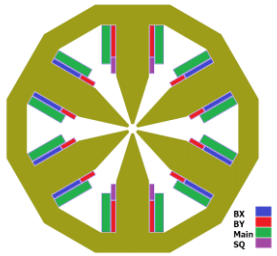

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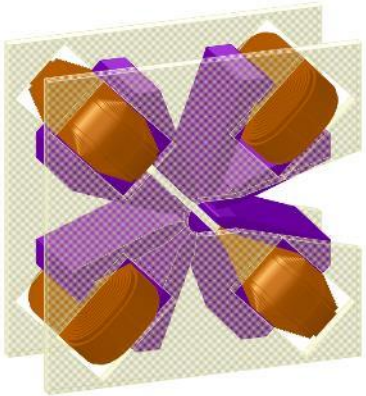

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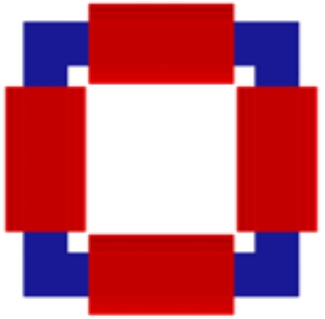
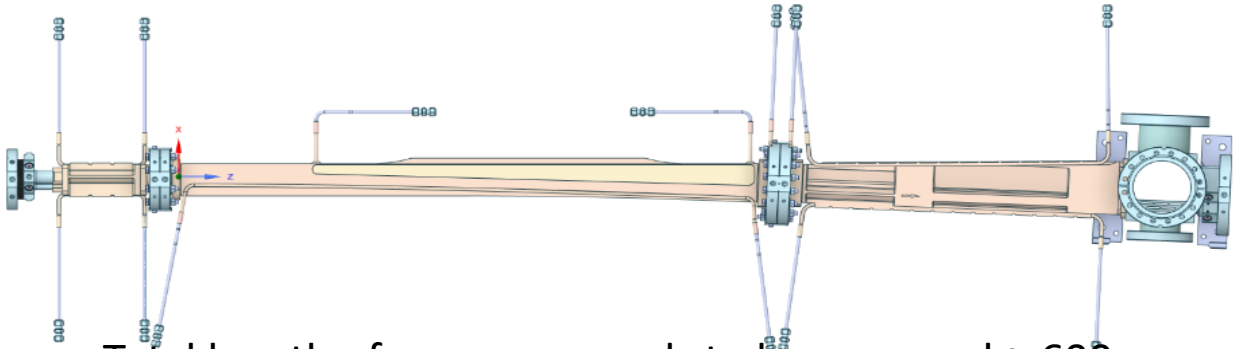
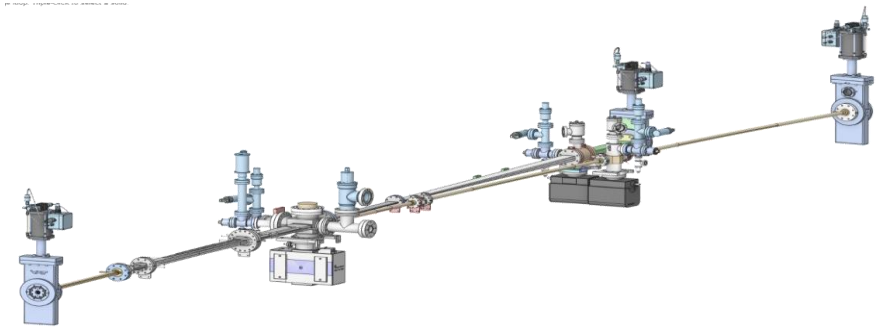


x 159

- Some laminated, some solid, high permeability low carbon magnet steel.
- Precise machining: ~ 20-30 μm pole profile tolerance.
- Epoxy impregnated coils with hollow copper conductor, water cooled.
- Diamond provides the specification and reference design.
- Supplier does detailed manufacturing design and construction.
- Factory Acceptance Tests include dimensional tests and magnetic measurements.
- .

Vacuum vessels

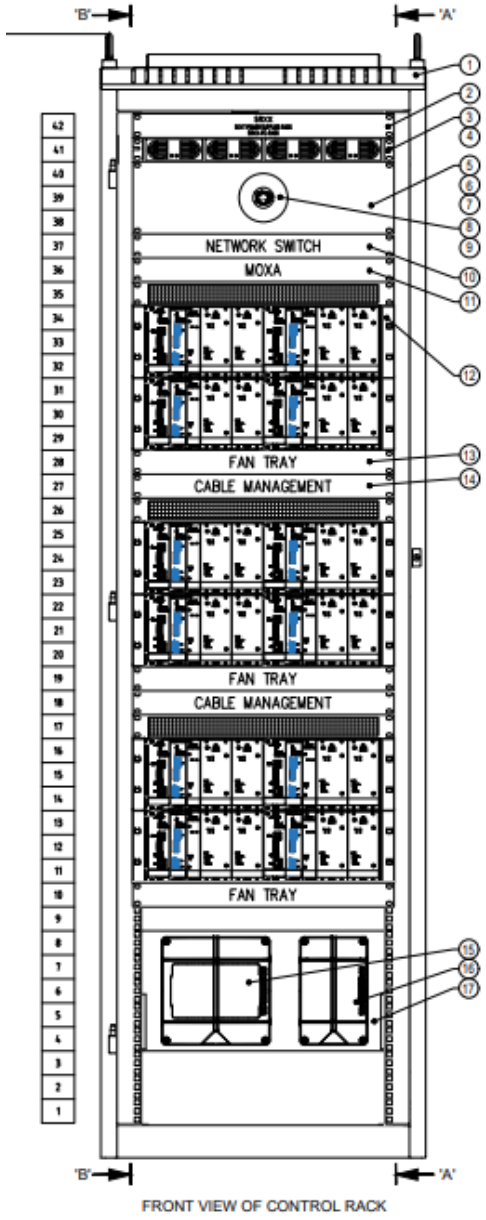




- Total length of vacuum vessels to be procured ~ 600m.
- Ultra-High Vacuum(UHV) compatible (10^{-10} mbar).
- Precise machining.
- Machined copper and stainless steel (316LN), extruded aluminium.
- Most vessels need to be NEG (Non-Evaporable Getter) coated.
- Supplied after Factory Acceptance Tests that include dimensional and vacuum tests

Others

- Power supplies / Racks to Diamond's design
  - 48 racks built to Diamond's design
  - Another 131 racks for components
- Water Cooling Services
  - 48x8m Stainless steel manifolds
  - 3,000 flexible hoses
  - 72 pairs of flow and return pipes
- Cables
  - Around 300km



FRONT VIEW OF CONTROL RACK

LEAPS INNOVATION

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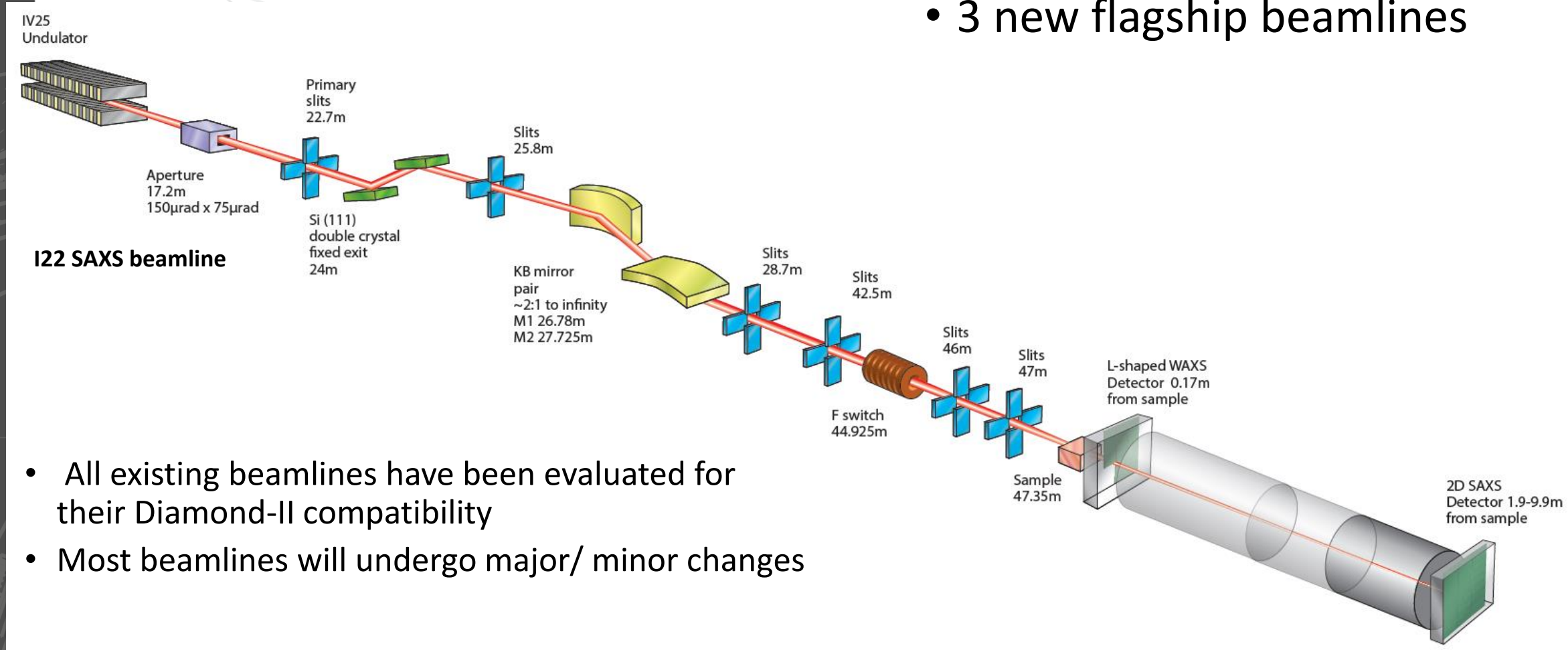
Beamlines at Diamond

- 33 beamlines in operation
- 3 new flagship beamlines

Example of a beamline



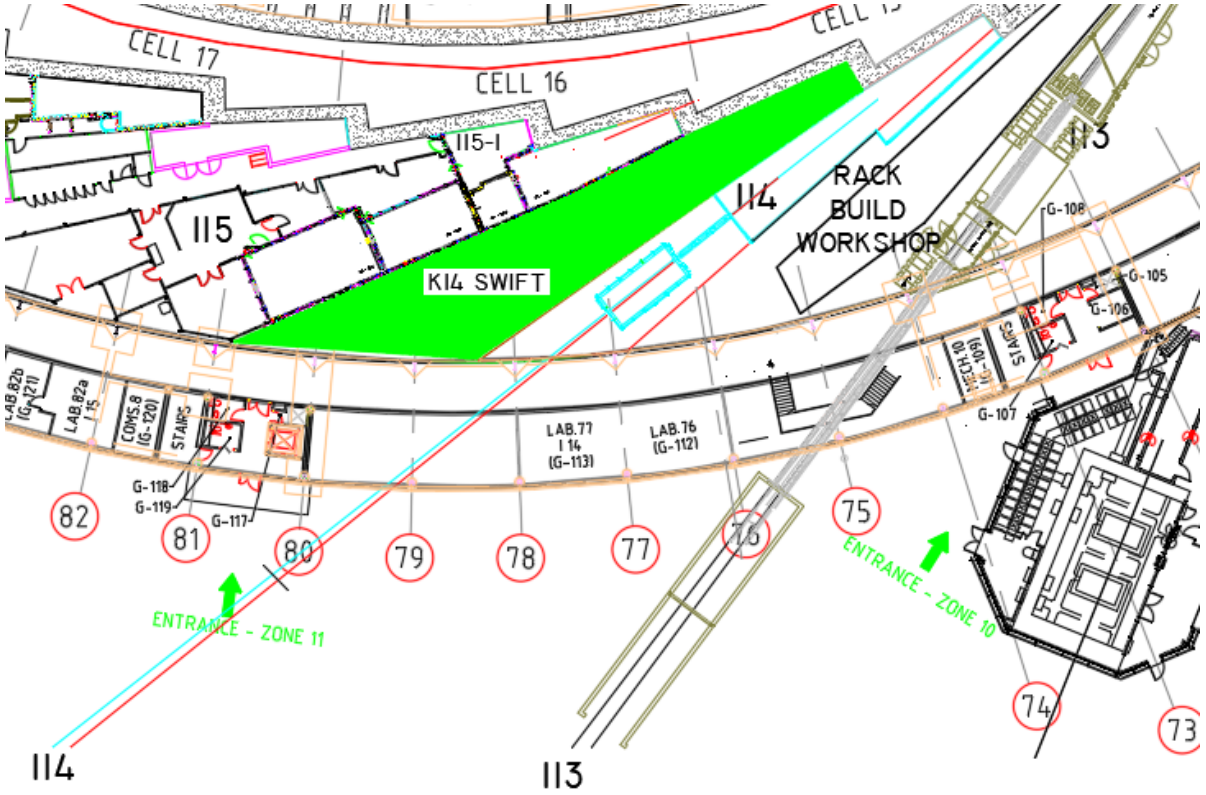
I22 SAXS beamline

- All existing beamlines have been evaluated for their Diamond-II compatibility
- Most beamlines will undergo major/ minor changes

Flagship Beamlines

SWIFT – Key Beamline Components

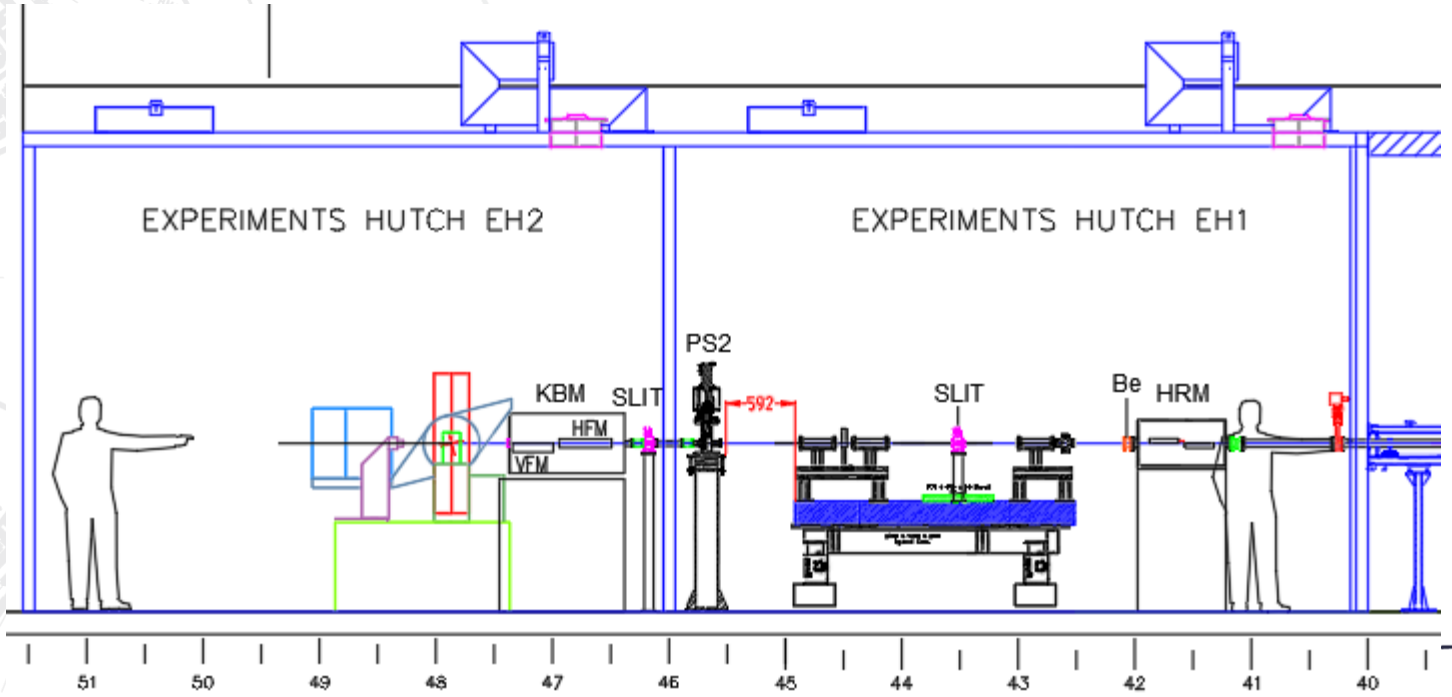
- **2 x Mirror Systems** – collimating / toroidal
- **3 x "Modules"** DLS designed vessels comprising bought in items e.g.
  - Slit bodies
  - Diagnostics / Fluorescent screens
  - Tungsten collimator blocks
  - Vacuum brazed absorbers etc.
- **Standard DCM** – possibly DLS / bought in
- **Fast Scanning DCM** – most likely DLS design
- **Photon Shutter** (monochromatic)
- **HR Mirror System** – likely DLS design
- **KB Mirror System** – bought in
- **2 x Cryocoolers**



Flagship Beamlines

SWIFT – End Stations

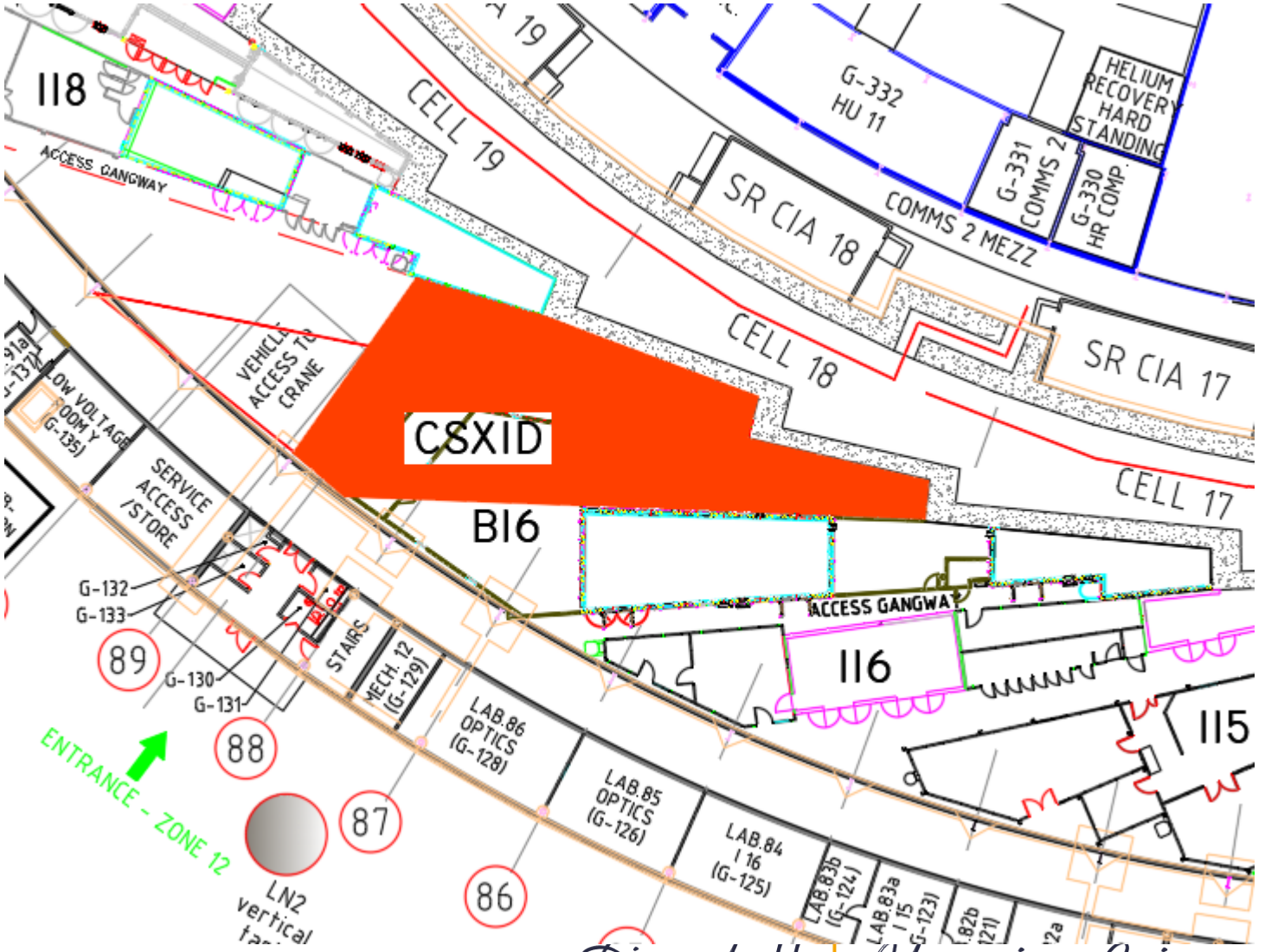
- 2 End Stations
- Motorised translation tables
  -Likely DLS designed & configured
- Detectors
- Misc. components etc.



Flagship Beamlines

CXID (Soft X Ray)

- 5 x Slits (different types)
- 5 x Mirror systems
- PGM
- Collimators / absorbers
- Photon Shutter
- Multiple diagnostics
- Various vessel assy's
- 2 end stations FMI / NDI



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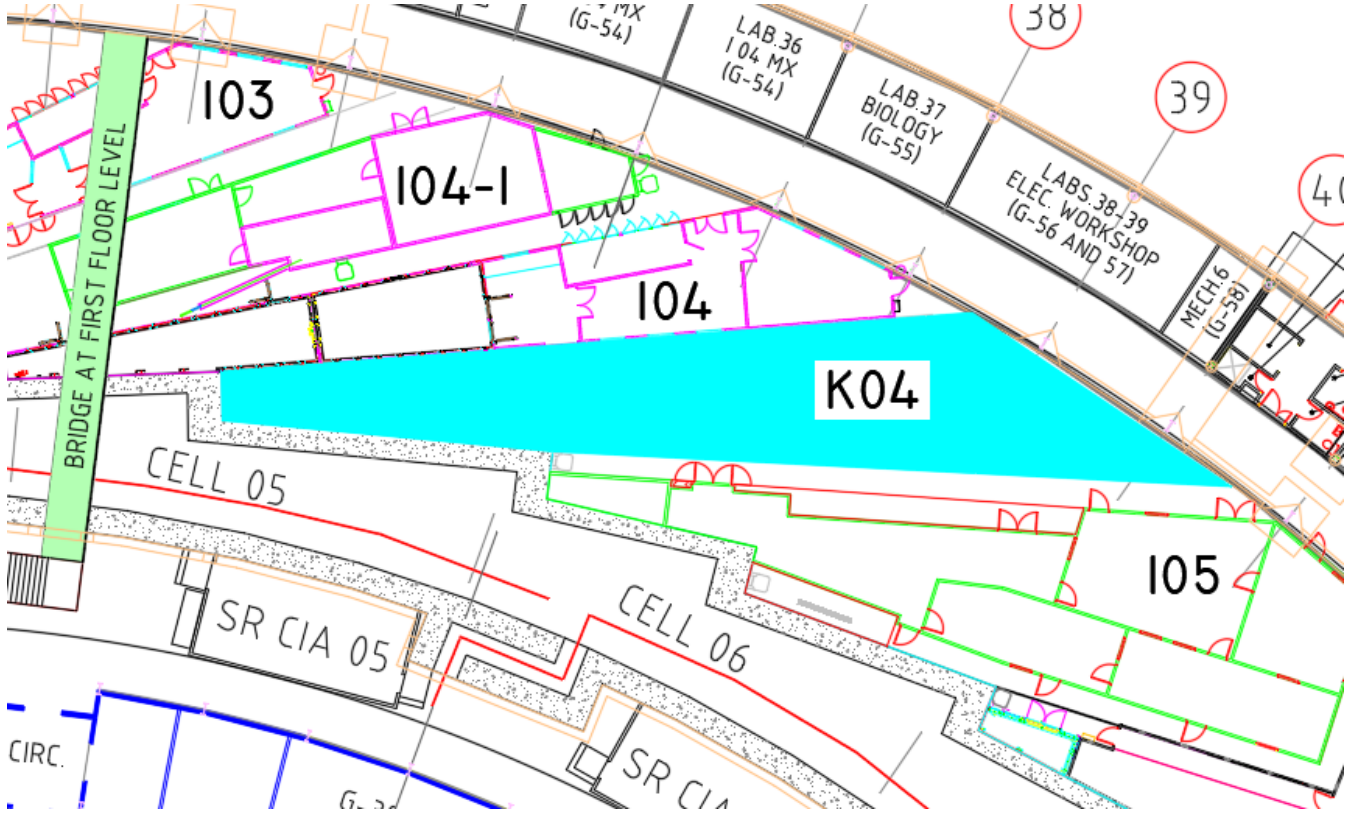
Flagship Beamlines

K04 XChem

Ultra-high throughput MX

- DCM (possibly DLS design)
- Slits x 3
- XBPM x 3
- Apertures
- CRL F Switch

Robotics / lab equipment / automated sample prep.



Main Optics Components

- Mirrors
- Monochromators
- Gratings (and their substrates)
- Crystals
- Channel-cut crystals
- Fresnel Zone Plates
- X-ray Lenses

New optics fabrication building

Critical Beamlines Shopping List

Procurement Timeline

Item	Likely Qty	2023	2024	2025	2026	2027
WB Slits	8					
Exit Slits	2					
Other slits	5					
PGM	1					
FE WB Mirror System	10					
Soft X-Ray WB Mirror System (new/upgrade)	11					
Hard X-Ray Mirror System (new/upgrade)	15					
DCM	10					
DMM /MLM DCM	3					
QCM	1					
Cryo Cooler	7					
GB Collimator	8					
White Beam Fluorescent Screen	1					
Beam Positon Monitor	3					
Absorbers	4					
Beam Shutter	12					
Diagnostics (Various types)	20					
Attenuator	6					
Windows (Various)	14					
WB/GB Stop	7					
Filter/Mask	4					

- Combination of complete / refurbish designs
- Mix of DLS / outside design & procurement

Recycling and Disposal

- We would like to ship existing components directly off site for recycling and disposal, especially the 72 girder assemblies, each 5-6 m long and weighing up to 17 T.

How we Buy

- Used to be OJEU (Office of the Journal of the European Union) but now under UK law
  - Encourages removal of all barriers to the free movement of goods and trade
  - Main principles are non-discrimination and transparency, equal treatment and proportionality
  - To promote competition

Advertise

- Advertise in Find-a-Tender and Contracts Finder
- Thresholds are the same:
  - Goods / Services £177,897 (ex VAT)
  - Works £4,733,252 (ex VAT)
  - Contract opportunities and Prior Information Notices (PIN's) are on our website

Finding Opportunities

https://tenders.diamond.ac.uk/Home.aspx

https://www.gov.uk/find-tender

https://www.gov.uk/contracts-finder

Advertising

1

All above threshold tenders will be published

2

If you are registered against a PIN on Diamond's website, you will be automatically notified

3

You can register for alerts on both Find-a-Tender and Contracts Finder

Before the Tender

The technical team will talk to and may visit suppliers

Test their ideas in the market, are they realistic?

Talk to other Facilities to learn from their experiences

This is where the ideas become more concrete

Tendering - Things to Remember

Note the required timescales for tendering

Once the tender documents have been issued there can be no contact with the technical team

Requests for clarification should be submitted to Procurement

Tender

Submit a tender that essentially fulfils all the requirements

Demonstrate competence

Remember – we're not made of money!

But also, be honest about the cost – we don't like surprises halfway through a contract

If you have ideas to improve quality or reduce cost let us know

Contract Award

- Successful supplier will be notified as ‘preferred supplier’
- Unsuccessful suppliers will be notified with feedback
- 10-day standstill period for over threshold tenders
- Contract awarded
- Details published on the Government websites

Quotations

Many items are bought based on quotations rather than tenders

Become familiar with the various groups at Diamond

Attend the conferences – get your names known

We sometimes have exhibitions in the atrium for new and existing suppliers

Diamond-II Procurement Conference

The really Important Stuff

Meeting (or exceeding) the specification

Reasonable cost

Continuous communication (good or bad)

On-time completion

The next 10 years are going to be really exciting. We already have fantastic suppliers, but we will need more.

Procurement@diamond.ac.uk

Thank you, Questions?