



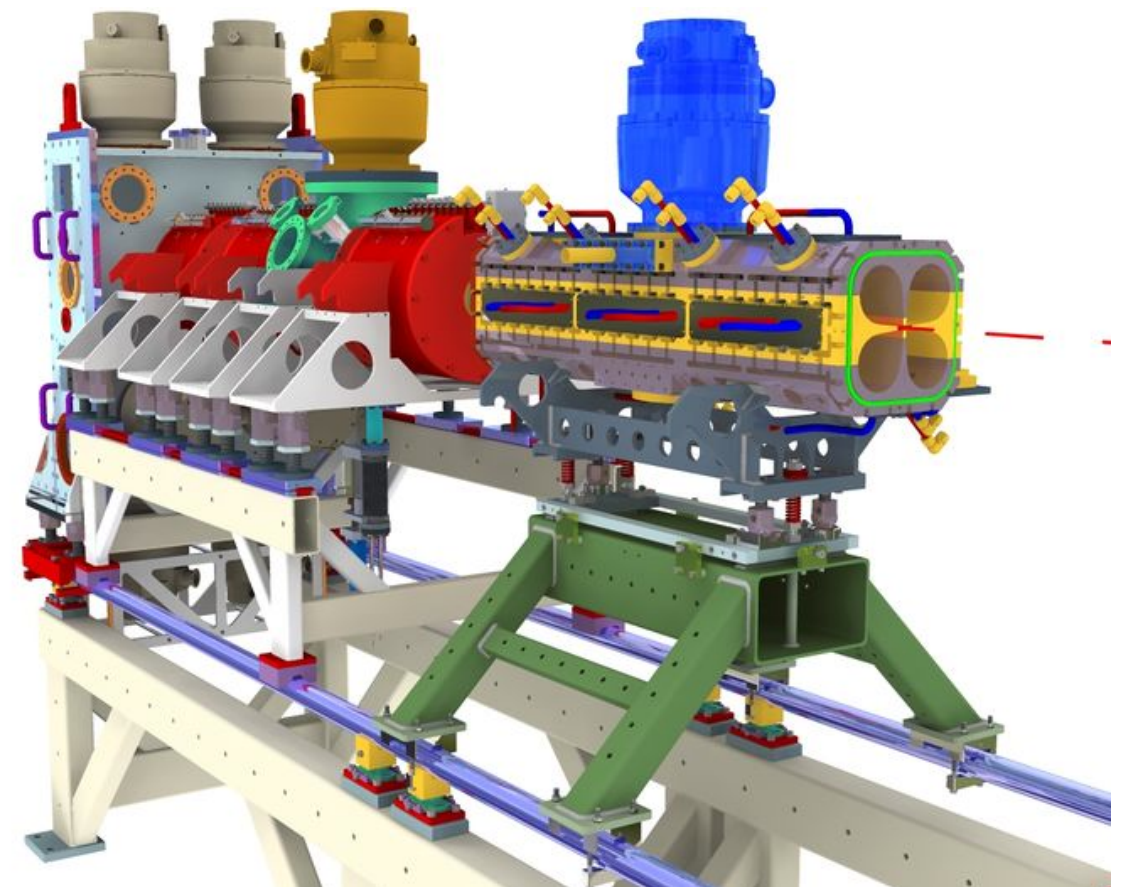
FETS Schedule Update

*Thanks for major contributions from
Pete Savage & Mike Dudman*

*FETS Meeting, RAL
12/11/2014*

Outline

- Overview schedule
- R8 progress this month
- Imminent issues
- Avoiding schedule slippage



Overview schedule developed for FETS extension proposal, with help of Mike and Pete:

■ Critical path highlighted in red:

■ Assumes all RFQ sections assembled and tested by end of March 2015.

■ RFQ integration in R8 in April/May and bead pull tests until July.

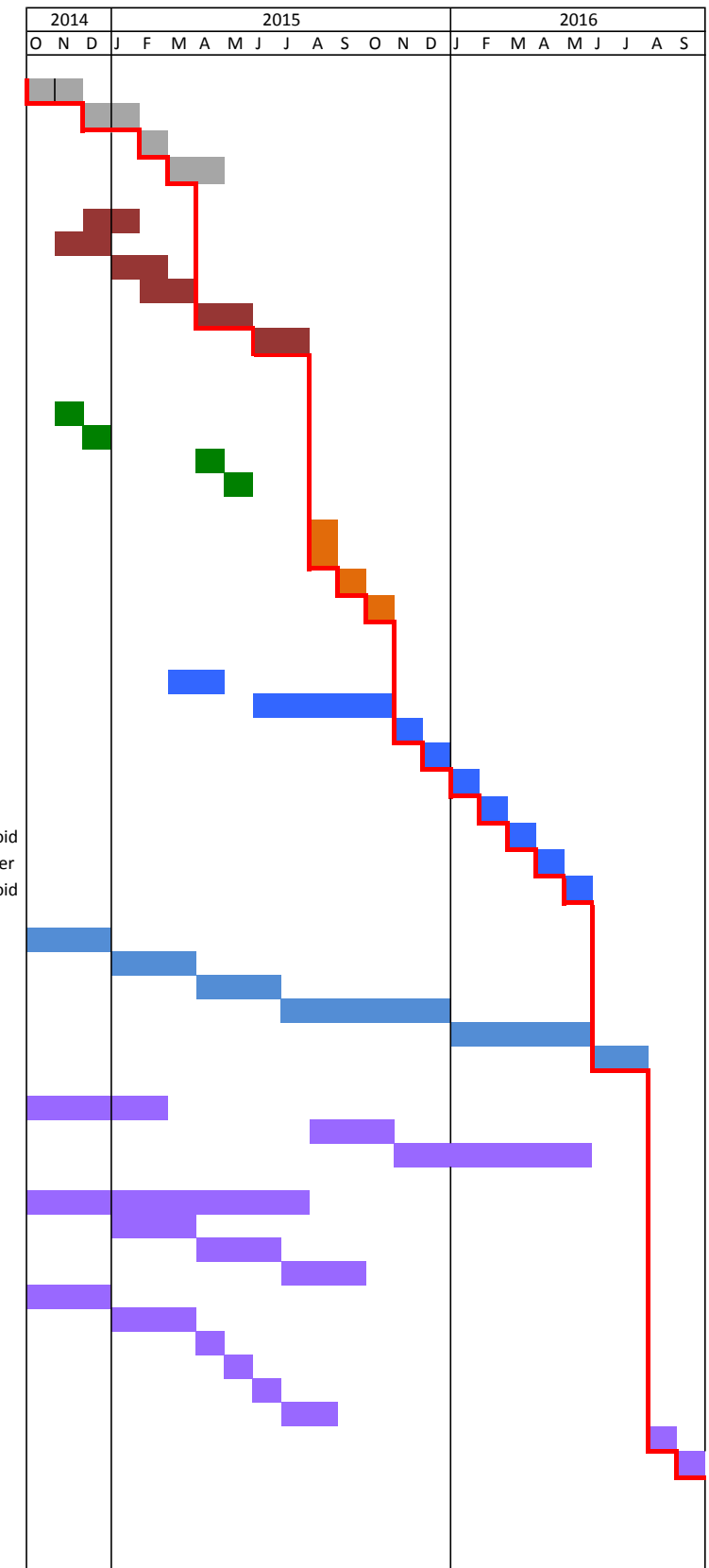
■ RFQ beam tests from August

■ MEBT assembly from November 2015.

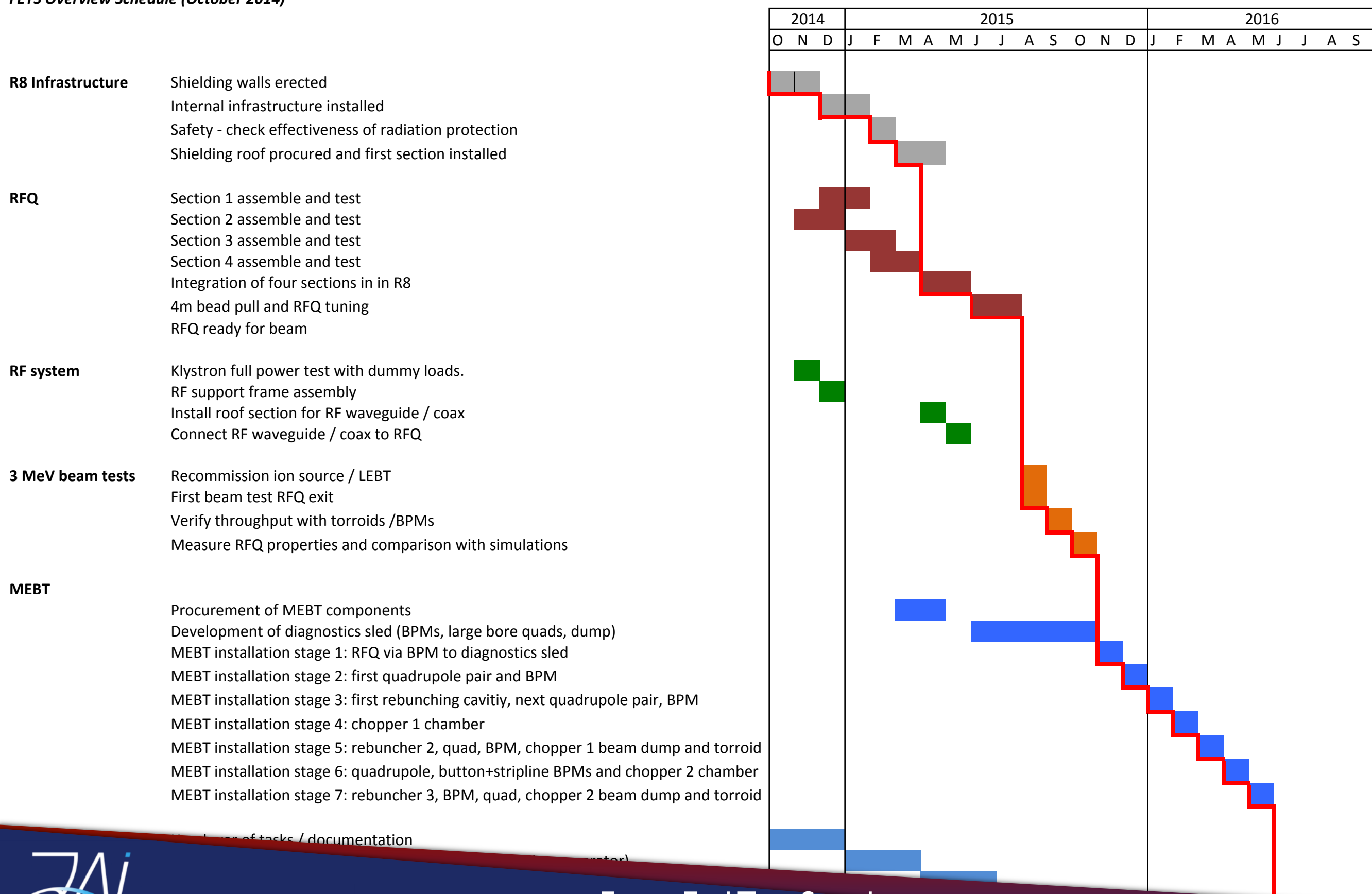
■ Tight for diagnostics tests.

FETS Overview Schedule (October 2014)

R8 Infrastructure	Shielding walls erected Internal infrastructure installed Safety - check effectiveness of radiation protection Shielding roof procured and first section installed
RFQ	Section 1 assemble and test Section 2 assemble and test Section 3 assemble and test Section 4 assemble and test Integration of four sections in R8 4m bead pull and RFQ tuning RFQ ready for beam
RF system	Klystron full power test with dummy loads. RF support frame assembly Install roof section for RF waveguide / coax Connect RF waveguide / coax to RFQ
3 MeV beam tests	Recommission ion source / LEBT First beam test RFQ exit Verify throughput with torroids /BPMs Measure RFQ properties and comparison with simulations
MEBT	Procurement of MEBT components Development of diagnostics sled (BPMs, large bore quads, dump) MEBT installation stage 1: RFQ via BPM to diagnostics sled MEBT installation stage 2: first quadrupole pair and BPM MEBT installation stage 3: first rebunching cavity, next quadrupole pair, BPM MEBT installation stage 4: chopper 1 chamber MEBT installation stage 5: rebuncher 2, quad, BPM, chopper 1 beam dump and torroid MEBT installation stage 6: quadrupole, button+stripline BPMs and chopper 2 chamber MEBT installation stage 7: rebuncher 3, BPM, quad, chopper 2 beam dump and torroid
Chopper	Handover of tasks / documentation Fast chopper: electrical (fast pulse generator and timing generator) Fast chopper: mechanical designs and helical / planar prototypes Slow chopper: electrical (slow pulse generator) Slow chopper: mechanical (beamline structure) Chopper installation and beam test
Diagnostics	BPM production and calibration, electronic MEBT diagnostic sled installation and commissioning Diagnostics readout during MEBT installation Dipole design and procurement Laserwire interaction chamber development and manufacture Detector system development Beam dumps Proof of principle laserwire tests at CERN Linac4 (12 MeV) Laser room preparation at RAL Laser returned and installed at RAL Fibre beam delivery system installed Interlock safety system installed and approved Laser system commissioning Laserwire 1D-transverse beam profile measurements at FETS First laserwire emittance measurements at FETS



FETS Overview Schedule (October 2014)



MEBT

Procurement of MEBT components
 Development of diagnostics sled (BPMs, large bore quads, dump)
 MEBT installation stage 1: RFQ via BPM to diagnostics sled
 MEBT installation stage 2: first quadrupole pair and BPM
 MEBT installation stage 3: first rebunching cavity, next quadrupole pair, BPM
 MEBT installation stage 4: chopper 1 chamber
 MEBT installation stage 5: rebuncher 2, quad, BPM, chopper 1 beam dump and torroid
 MEBT installation stage 6: quadrupole, button+stripline BPMs and chopper 2 chamber
 MEBT installation stage 7: rebuncher 3, BPM, quad, chopper 2 beam dump and torroid

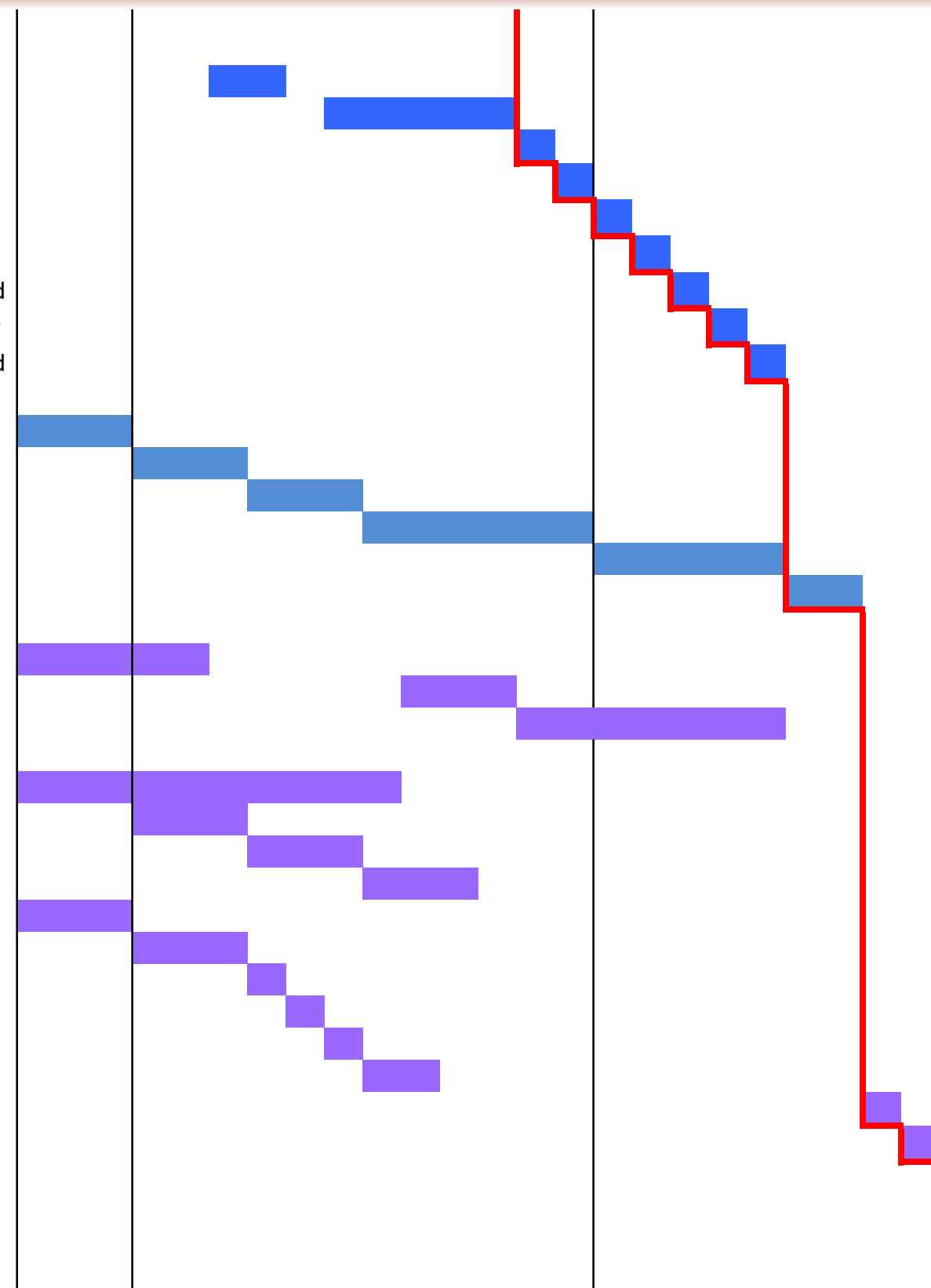
Chopper

Handover of tasks / documentation
 Fast chopper: electrical (fast pulse generator and timing generator)
 Fast chopper: mechanical designs and helical / planar prototypes
 Slow chopper: electrical (slow pulse generator)
 Slow chopper: mechanical (beamline structure)
 Chopper installation and beam test

Diagnostics

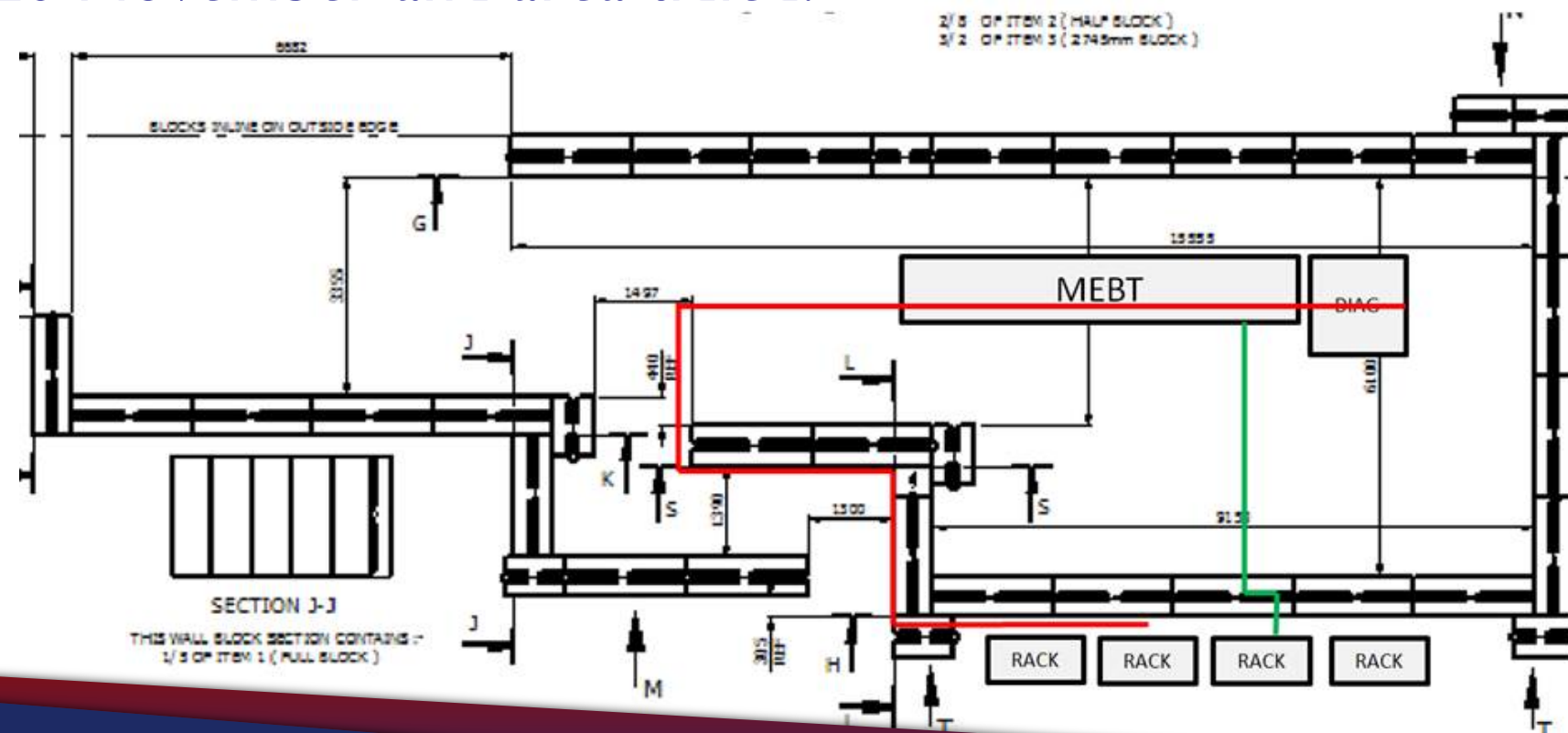
BPM production and calibration, electronic
 MEBT diagnostic sled installation and commissioning
 Diagnostics readout during MEBT installation

 Dipole design and procurement
 Laserwire interaction chamber development and manufacture
 Detector system development
 Beam dumps
 Proof of principle laserwire tests at CERN Linac4 (12 MeV)
 Laser room preparation at RAL
 Laser returned and installed at RAL
 Fibre beam delivery system installed
 Interlock safety system installed and approved
 Laser system commissioning
 Laserwire 1D-transverse beam profile measurements at FETS
 First laserwire emittance measurements at FETS



Shielding

- Good progress was made on North & East walls at last FETS meeting, 15 October.
- The South wall upto the labyrinth entrance was completed as of 20 October.
- Next phase requires cages modifications for escape route (Pete organizing):
- Work planned for 17-21 November:
 - Heavy gang to bring remaining blocks for next phase of the build.
 - Labyrinth: two ends with block tangs to be removed to progress.
- Build to be complete 24 - 26 November and area tidied:
- **Oversight Committee tour on 27 November**



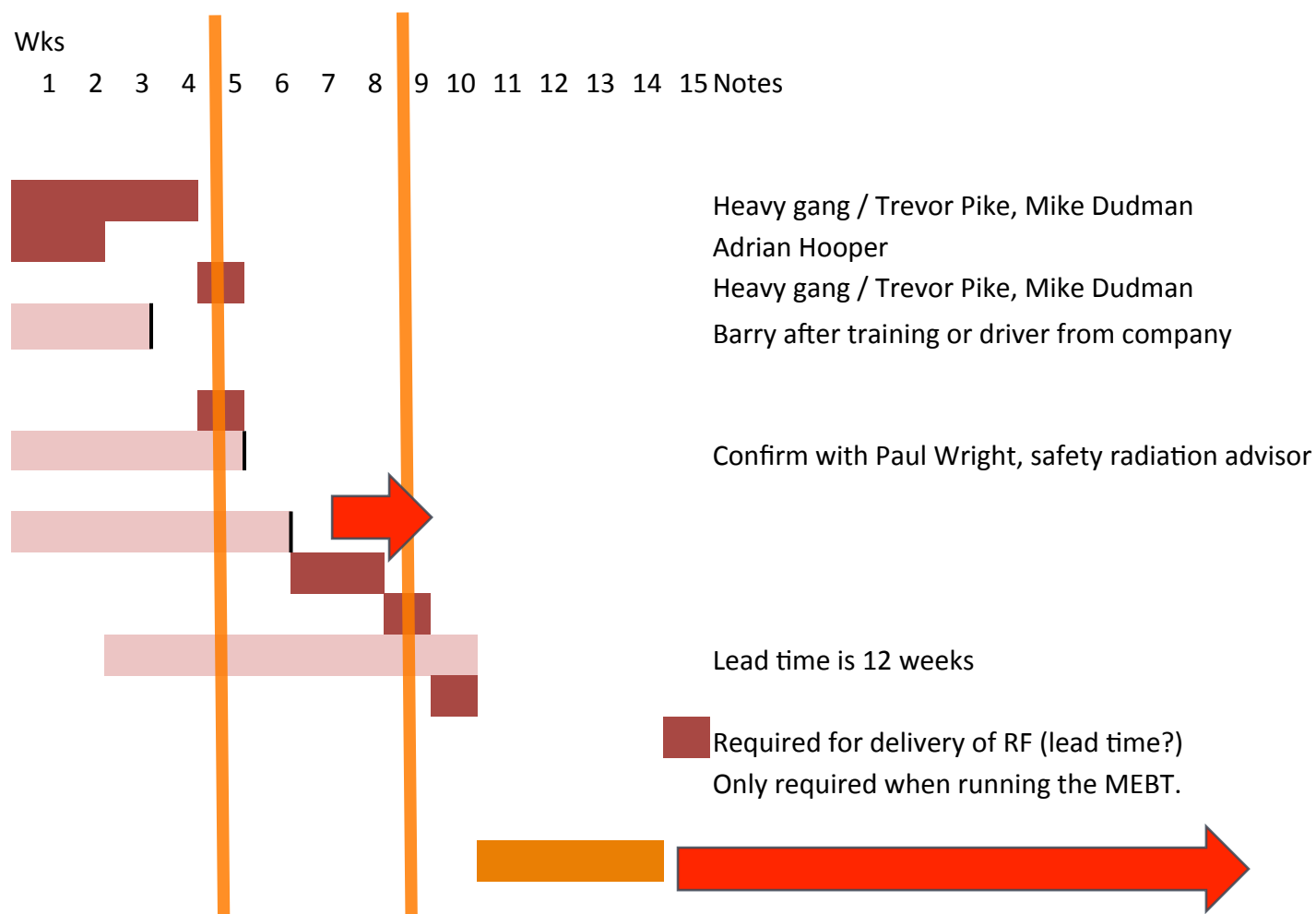
Front End Test Stand

FETS R8 Installation Schedule

Shielding

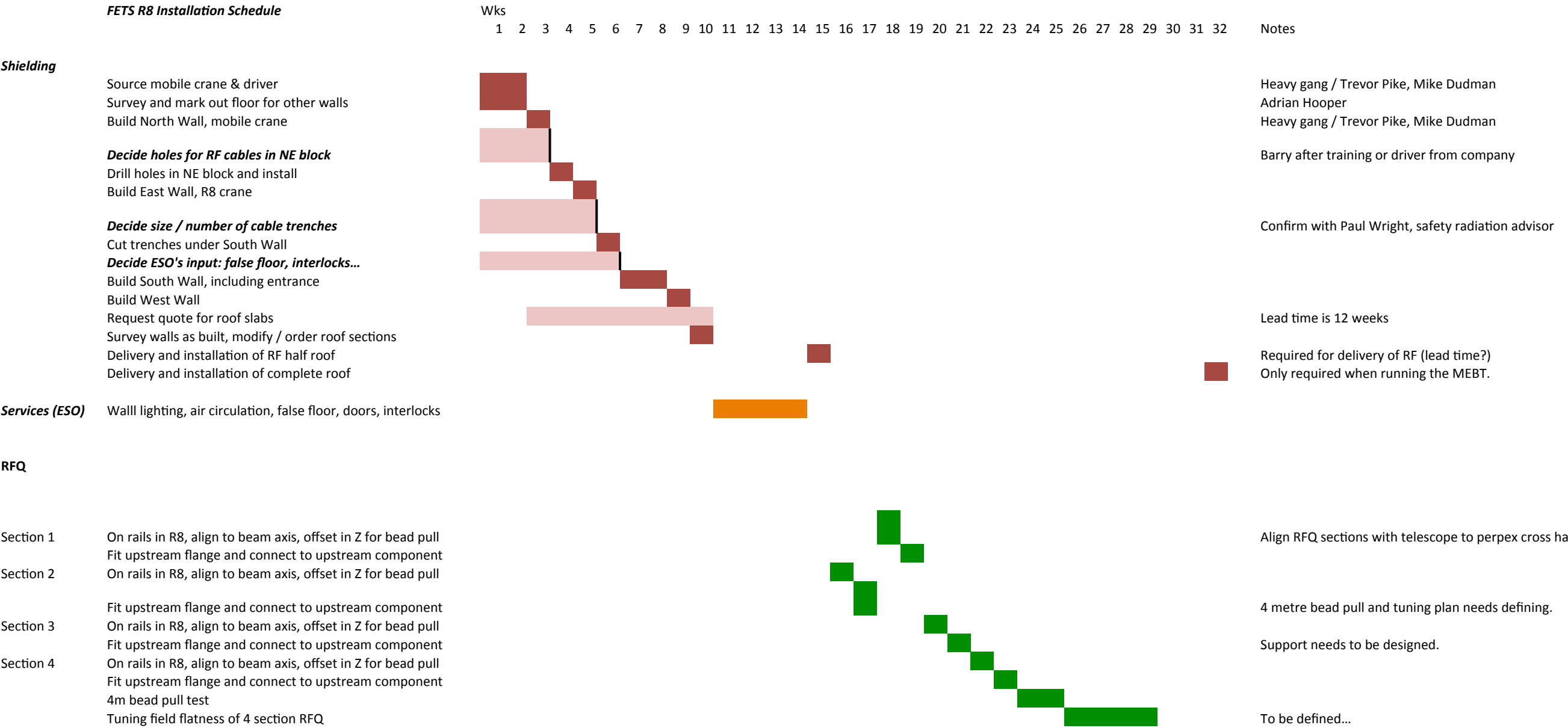
Source mobile crane & driver
 Survey and mark out floor for other walls
 Build North Wall, mobile crane
Decide holes for RF cables in NE block
 Drill holes in NE block and install
 Build East Wall, R8 crane
Decide size / number of cable trenches
 Cut trenches under South Wall
Decide ESO's input: false floor, interlocks...
 Build South Wall, including entrance
 Build West Wall
 Request quote for roof slabs
 Survey walls as built, modify / order roof sections
 Delivery and installation of RF half roof
 Delivery and installation of complete roof

Services (ESO) Wall lighting, air circulation, false floor, doors, interlocks



Key meetings last month/ decisions needed:

- Meeting with ESSO on 5 November: see report and actions from Mike. FETS to decide on exactly what is required from ESSO. Interlock standards (P. Barnes).
- Realistic manufacture to installation in 12-16 weeks: will miss gap in R8 schedule.
- Shielding / cable entry meeting with P. Wright on 7 November: approval pending drawings from FETS (Mike).



FETS Development Schedule

RFQ
Section 1*Status: Machined incorrectly - to be remachined*

Return RFQ1 to NAB in wooden crate

CAD work to define section 1 remachining

Remachined at NAB

Assemble, inspect, test frequency and machine grooves, retest

Redelivered to RAL

Crate returned to NAB

Section 1 reinspection

Assemble 4 vanes

Bead pull test

Populate with O-ring, tuners, pick-ups, vacuum ports, cooling manifolds

Vacuum test

Cooling leak test

Section 2

NAB Machined internally, due at RAL in 2wks, box returned

Delivered to RAL

Crate returned to NAB

Section 2 inspection

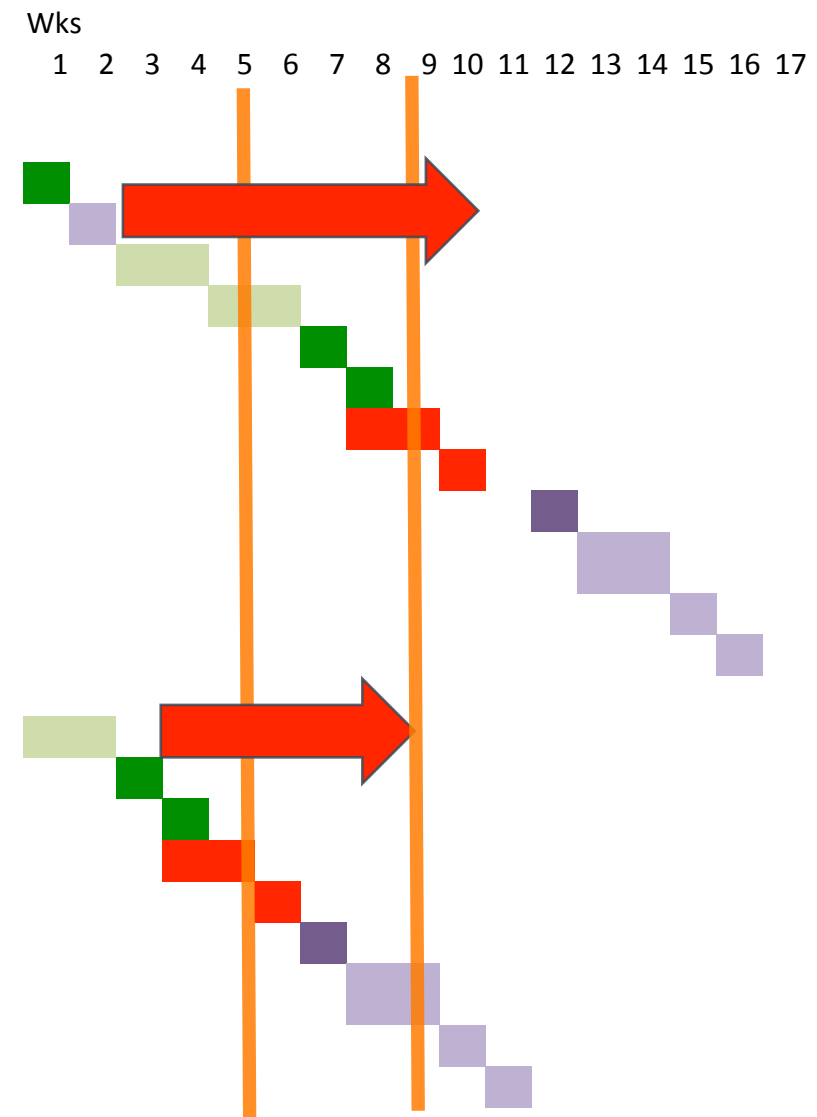
Assemble 4 vanes

Bead pull test

Populate with O-ring, tuners, pick-ups, vacuum ports, cooling manifolds

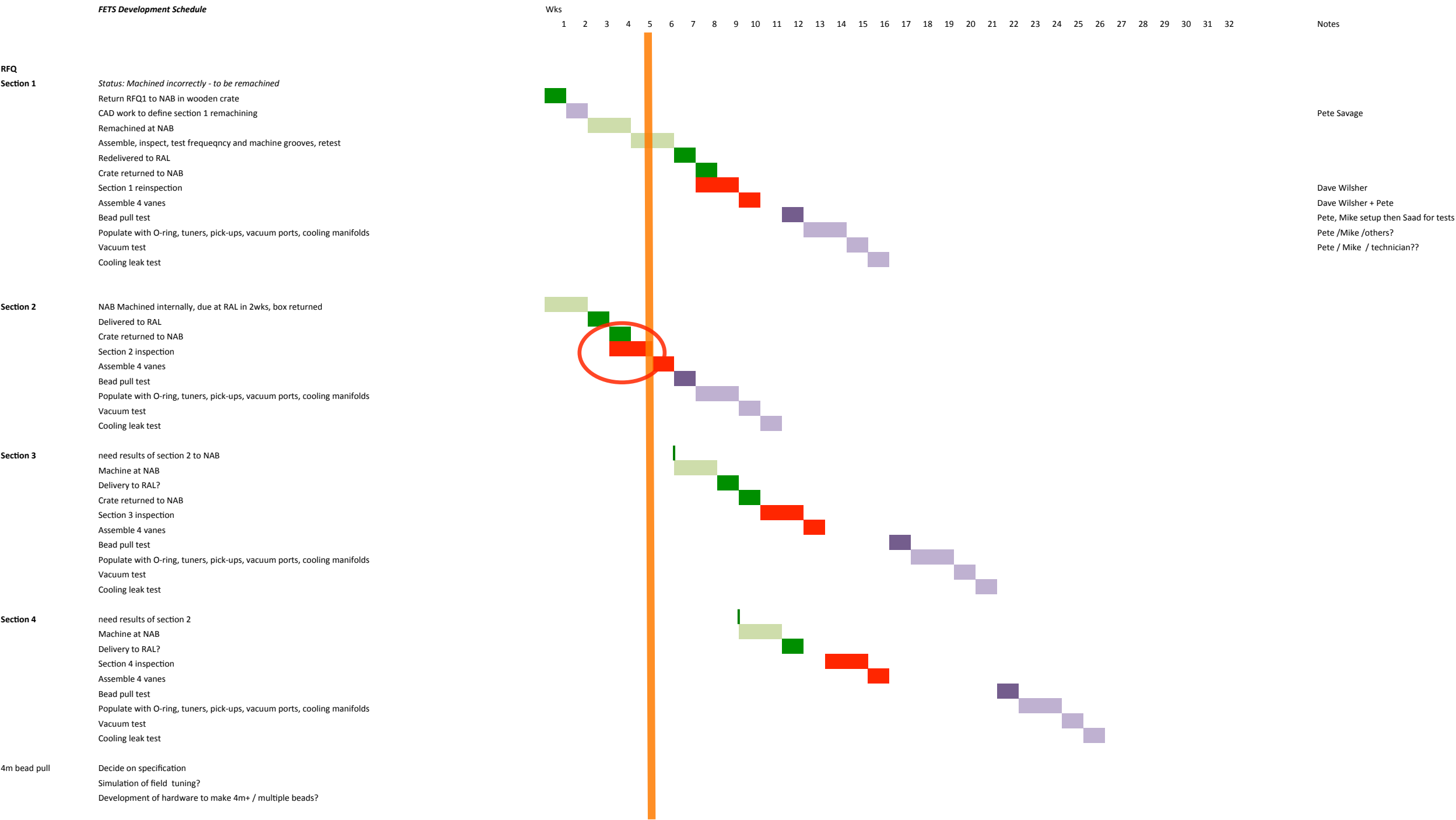
Vacuum test

Cooling leak test



■ RFQ inspection:

- **Dave Wilsher** started inspection RFQ section 2 this week on 3 November. (delays the schedule by 5 weeks). Pete to report on progress later today...
- Can we recover lost time for other sections? Is RAL's RFQ 2 inspection consistent with measurements at NAB. RFQ 1 awaiting results to proceed with machining.





John Adams Institute for Accelerator Science