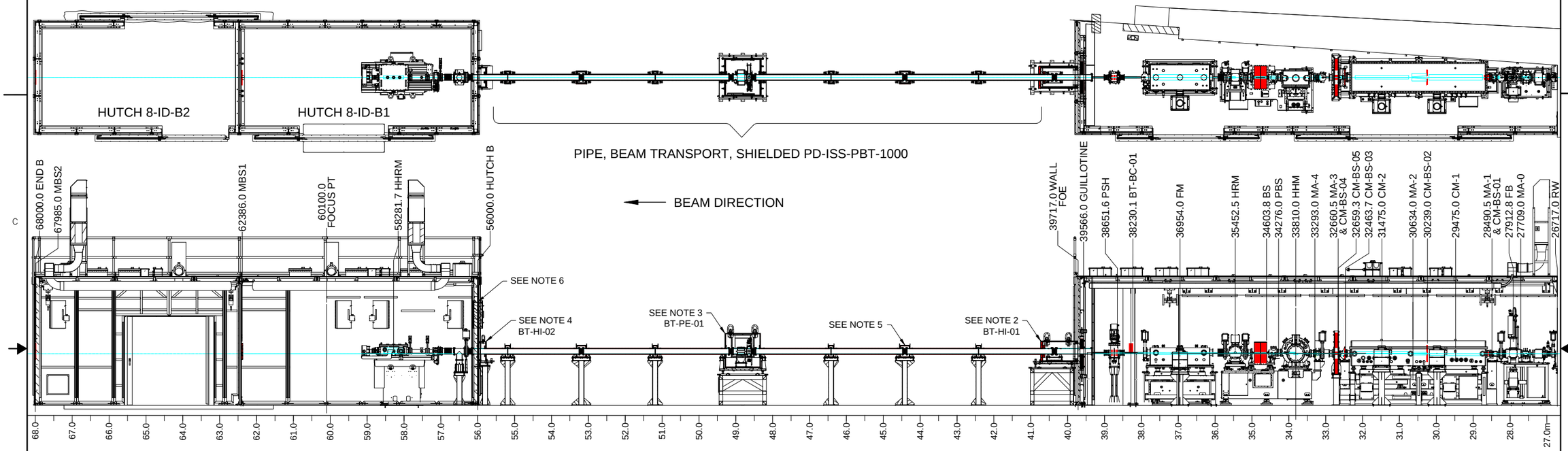
NOTES:

1. ALL ORDINATE DIMENSIONS ARE TAKEN FROM THE CENTER OF THE LONG STRAIGHT, UNLESS OTHERWISE SPECIFIED.
2. ENCLOSURE LEAD THICKNESS, 50mm DOWNSTREAM WALL, 20mm SIDES.
3. ENCLOSURE LEAD THICKNESS, 12mm ALL AROUND.
4. ENCLOSURE LEAD THICKNESS, 12mm UPSTREAM WALL, 6mm SIDES.
5. 6X COVERS LEAD THICKNESS, >6mm, TYPICALLY 12mm.
6. HUTCH 8-ID-B LEAD THICKNESS, 4mm WALLS AND 3 mm CEILING.
7. LEAD IN FOE WALLS (50mm) IS NOT SHOWN IN THIS DOCUMENT, PER STANDARD PRACTICE.

REVISION HISTORY

REV	DESCRIPTION	DATE	DESIGNER	CHECKED BY	ENGINEER
A	RELEASE PER ECO-002611	2/2016	C. LONGO	C. STELMACH	A. PRICE



ABBREVIATIONS:

BC - BREMSSTRAHLUNG COLLIMATOR
BPM - BEAM POSITION MONITOR
BS - BREMSSTRAHLUNG STOP
BT - BEAM TRANSPORT
CM - COLLIMATING MIRROR
DS - DOWNSTREAM
FB - FILTER BOX
FM - FOCUSING MIRROR
FOE - FIRST OPTICAL ENCLOSURE
HHM - HIGH HEAT MONOCHROMATOR
HHRM - HIGH HARMONIC REJECTION MIRROR
HRM - HIGH RESOLUTION MONOCHROMATOR
IB - INBOARD
LCO - LEAD COLLIMATOR
MA - MASK
MBS - MONOCHROMATIC BEAM STOP
OB - OUTBOARD
PBS - PINK BEAM STOP
PSH - PHOTON SHUTTER
RCO - RATCHET WALL COLLIMATOR
RW - RATCHET WALL
US - UPSTREAM

SPECIFICATIONS		SPEC REFERENCE
Project Name	NEXT	NX-C-XFD-RSI-001
Source	DAMPING WIGGLER (DW100)	NX-C-XFD-RSI-001
Beam Line Name	INNER SHELL SPECTROSCOPY	NX-C-XFD-RSI-001
Abbreviation	ISS	NX-C-XFD-RSI-001
Period of insertion device	100	NX-C-XFD-RSI-001
Long / Short Straight / Cell	LONG / 08-ID	NX-C-XFD-RSI-001
Canting Angle	NONE	NX-C-XFD-RSI-001
Length of Source	2X 3400 mm	NX-C-XFD-RSI-001
Location of Center of Source 1	-1890.5 mm	NX-C-XFD-RSI-001
Location of Center of Source 2	1890.5 mm	NX-C-XFD-RSI-001
Ray Tracing Procedure		PS-C-XFD-PRC-008 (Ver 2)
Front End Ray Tracing Drawing		SR-FE-DW08-1001 (Rev B)

BEAMLINE LAYOUT, 8-ID

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN BRACKETS (DIMENSIONS IN INCHES)
ARE SHOWN AND ARE FOR REFERENCE ONLY
INTERPRET DRAWING AS PER ANSI Y14.5-1994 OR Y32.3-1975

DIMENSIONAL TOLERANCING: X. ± 1.5, .X ± 0.75, .XX ± 0.40, .XXX ± 0.120
ANGULAR TOLERANCE: ± .5°
FINISH: 125
BREAK EDGES & SHARP CORNERS 0.005 MIN. TO 0.030 MAX.

NEXT ASSY:
PROJECT: ISS BEAMLINE
THIRD ANGLE PROJECTION
SCALE: NOTED

BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN SCIENCE ASSOCIATES
UPTON, NEW YORK 11973
Exploring Life's Mysteries, Protecting its Future

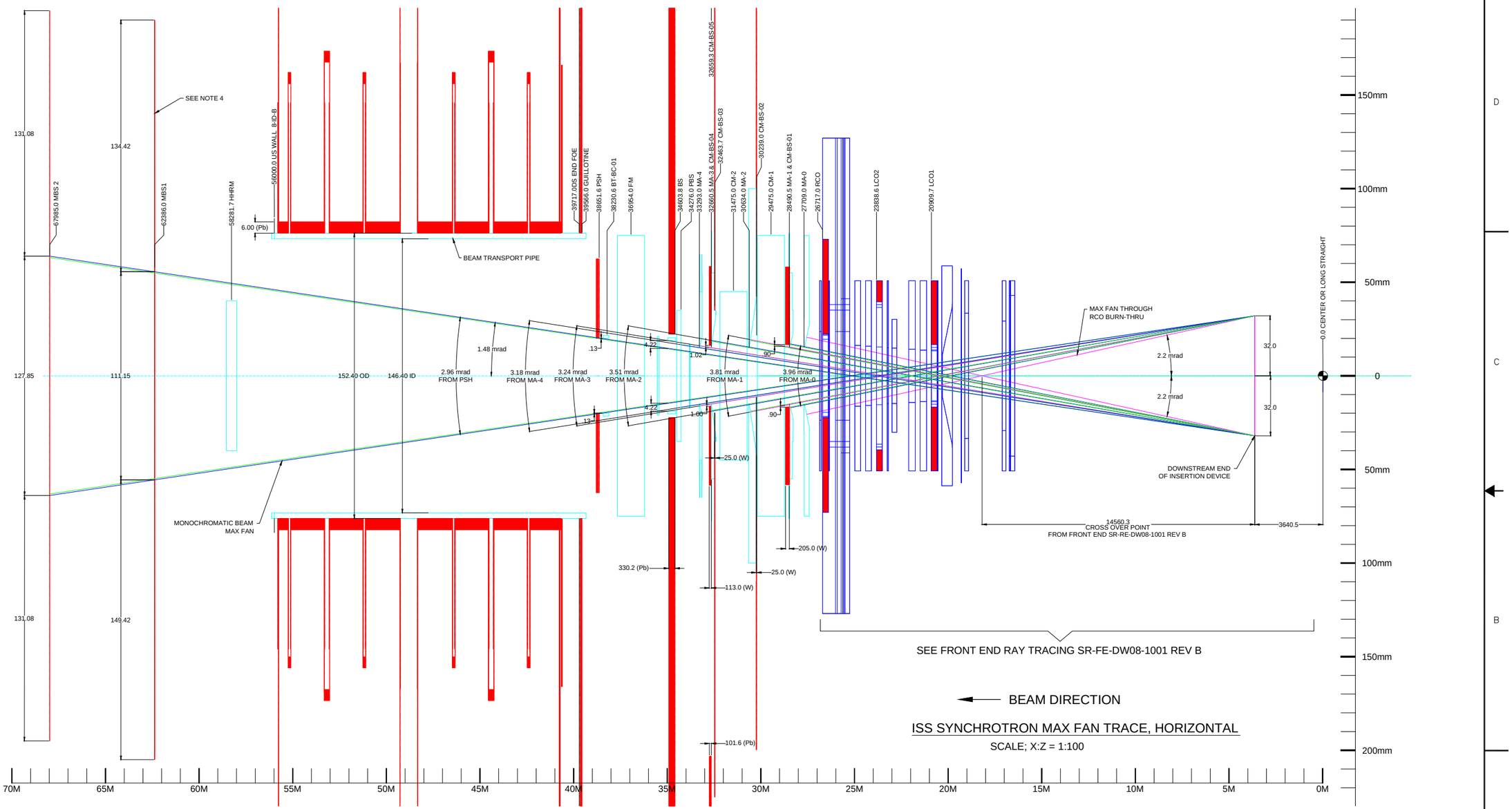
NSLSII NATIONAL SYNCHROTRON LIGHT SOURCE II

DRAWN BY	C. LONGO	5/3/2013
CHECKED BY	C. STELMACH	2/2016
VACUUM APPROVAL		
ENGINEER APPROVAL	A. PRICE	2/2016
SUPERVISOR APPROVAL	ATTENKOFER	2/2016
ES&H APPROVAL	L. STIEGLER	2/2016
QA APPROVAL	J. ZIPPER	2/2016

PHOTON DIVISION
ISS BEAMLINE
RAY TRACING LAYOUT

SHEET SIZE: D
DRAWING/PART NUMBER: PD-ISS-RAYT-0001
REVISION: A
WBS# 2.08.02
ESH&Q RISK LEVEL: A1
SHEET 1 OF 9

RELEASED – EFFECTIVE



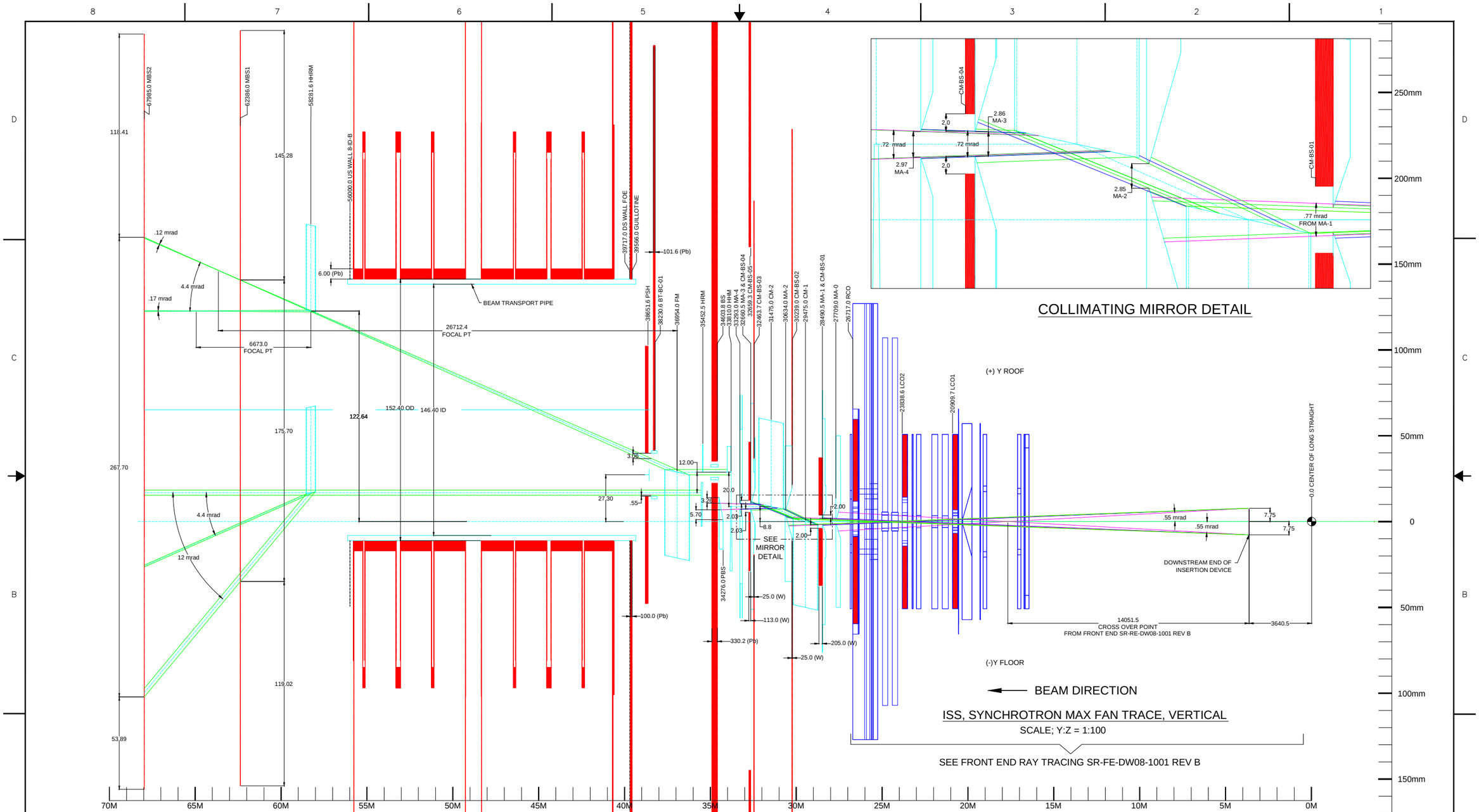
DESCRIPTION	U/S APERTURE	D/S APERTURE	POSITIONAL TOL	MANUFACTURING TOL	CLEARANCE	SIZE DATA SOURCE
MA-0 (CM-MA0)	54.50	30.39	+/- .220	+/- .180	-	PD-ISS-PCM-2000
MA-1 (CM-MA-01)	45.27	29.90	+/- .220	+/- .180	.90	PD-ISS-PCM-2100
MA-2 (CM-MA-02)	81.65	29.90	+/- .220	+/- .180	-	PD-ISS-PCM-2200
MA-3 (CM-MA-03)	63.57	30.08	+/- .050	+/- .050	1.00 OB/1.02 IB	SEE NOTE 1
MA-4 (HH-MA-02)	41.14	30.12	+/- .050	+/- .050	-	SEE NOTE 2
BS	37.70	37.70	-	-	4.22	PD-ISS-HHM-2000
BT-BC-01	40.00	40.00	-	-	.13	PD-ISS-PBT-2000
PSH	40.00	40.00	+/- .220	+/- .180	-	PD-COM-PSH-1000

NOTES:

1. MASKS SURVEY RESULTS AT 8-ID-ISS-BEAMLINE 2016-01-21.PDF, MASK 3 PRESURVEY RESULT 2016-01-05.PDF AND PD-ISS-PCM-2300.
2. MASKS SURVEY RESULTS AT 8-ID-ISS-BEAMLINE 2016-01-21.PDF, MASK 4 PRESURVEY RESULT 2016-01-06.PDF AND PD-ISS-HHM-2100.
3. SEE DOCUMENT ISS Ray Tracing Tolerance Analysis 2016-01-29.docx FOR THE DERIVATION OF THE TOLERANCES LISTED HERE.
4. BEAMLINE CAN BE OPERATED WITH EITHER MBS1 OR MBS2 INSTALLED, PPS INTERLOCKED TO PREVENT OPERATION IN 8-ID-B1 WITHOUT MSB1 INSTALLED..

D	PD-ISS-RAYT-0001	A
SHEET SIZE	DRAWING/PART NUMBER	REVISION
ESH&Q RISK LEVEL A1	SHEET 2 OF 9	

RELEASED – EFFECTIVE



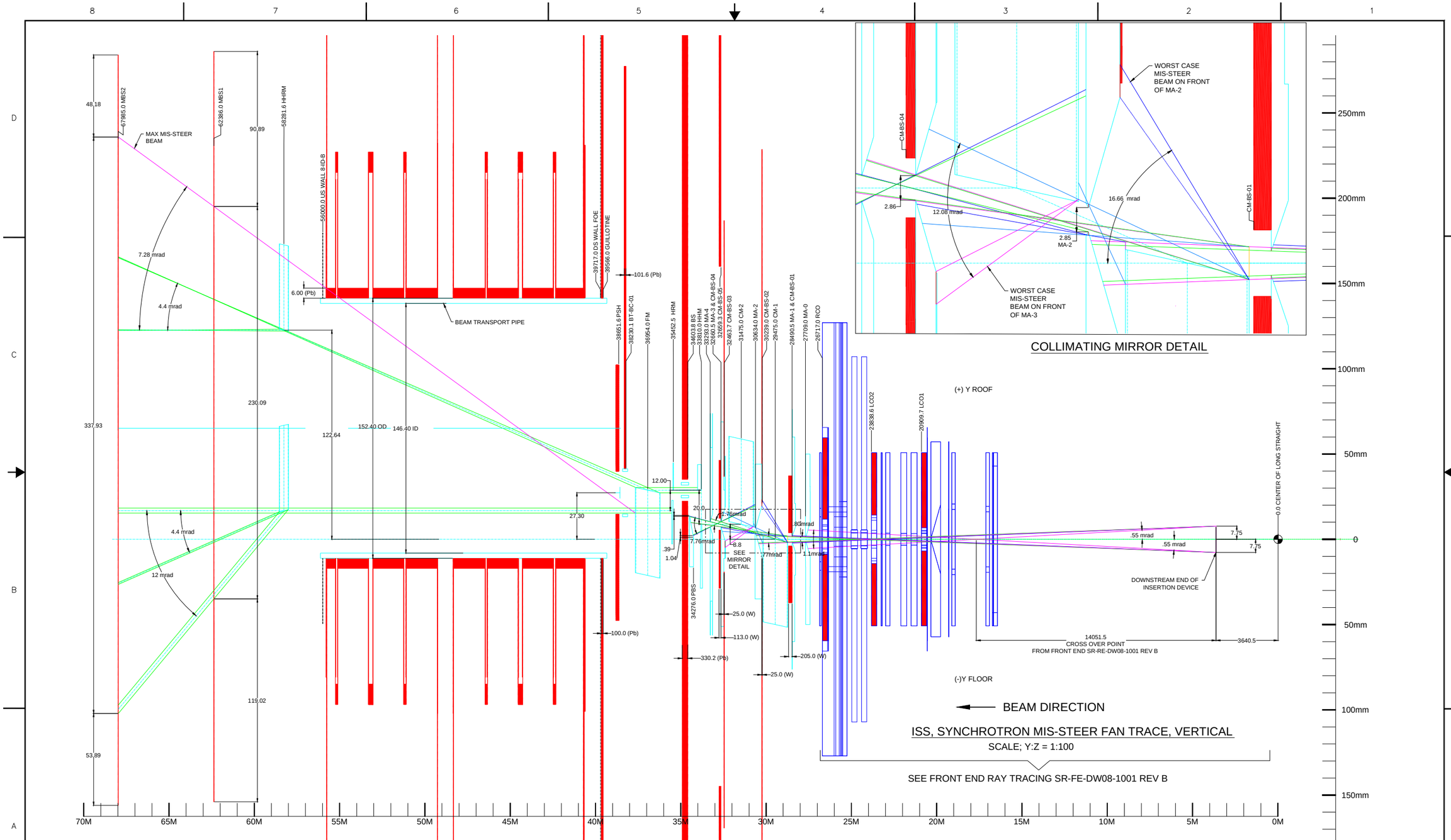
DESCRIPTION	U/S APERTURE	D/S APERTURE	POSITIONAL TOL	MANUFACTURING TOL	CLEARANCE	SIZE DATA SOURCE
MA-0 (CM-MA0)	20.50	2.90	+/- .220	+/- .180	-	PD-ISS-PCM-2000
MA-1 (CM-MA-01)	14.72	2.85	+/- .220	+/- .180	2.0	PD-ISS-PCM-2100
MA-2 (CM-MA-02)	28.69	2.85	+/- .220	+/- .180	-	PD-ISS-PCM-2200
MA-3 (CM-MA-03)	19.70	2.86	+/- .050	+/- .050	2.03	SEE NOTE 1
MA-4 (HH-MA-02)	12.11	2.97	+/- .050	+/- .050	-	SEE NOTE 2
PBS (HH-MA-01)	EDGE @ Y = 1.144	EDGE @ Y = 13.976	+/- .050	+/- .050	3.26 DS/5.70 US APER	SEE NOTE 3
BS	6.00	6.00	-	-	-	PD-ISS-HHM-2000
BT-BC-01	25.00	25.00	-	-	3.06 IB/.55 OB	PD-ISS-PBT-2000
PSH	25.00	25.00	+/- .220	+/- .180	-	PD-COM-PSH-1000

NOTES:

1. MASKS SURVEY RESULTS AT 8-ID-ISS-BEAMLINE 2016-01-21.PDF, MASK 3 PRESURVEY RESULT 2016-01-05.PDF AND PD-ISS-PCM-2300.
2. MASKS SURVEY RESULTS AT 8-ID-ISS-BEAMLINE 2016-01-21.PDF, MASK 4 PRESURVEY RESULT 2016-01-06.PDF AND PD-ISS-HHM-2100.
3. THE PINK BEAM STOP AND COLLIMATOR ASSEMBLY SURVEY RESULT_12-15-15.PDF AND PD-ISS-HHM-1000.
4. SEE DOCUMENT ISS Ray Tracing Tolerance Analysis 2016-01-29.docx FOR THE DERIVATION OF THE TOLERANCES LISTED HERE.

D (SHEET SIZE)	PD-ISS-RAYT-0001 (DRAWING/PART NUMBER)	A (REVISION)
ESH&Q RISK LEVEL A1	SHEET 3 OF 9	

RELEASED – EFFECTIVE

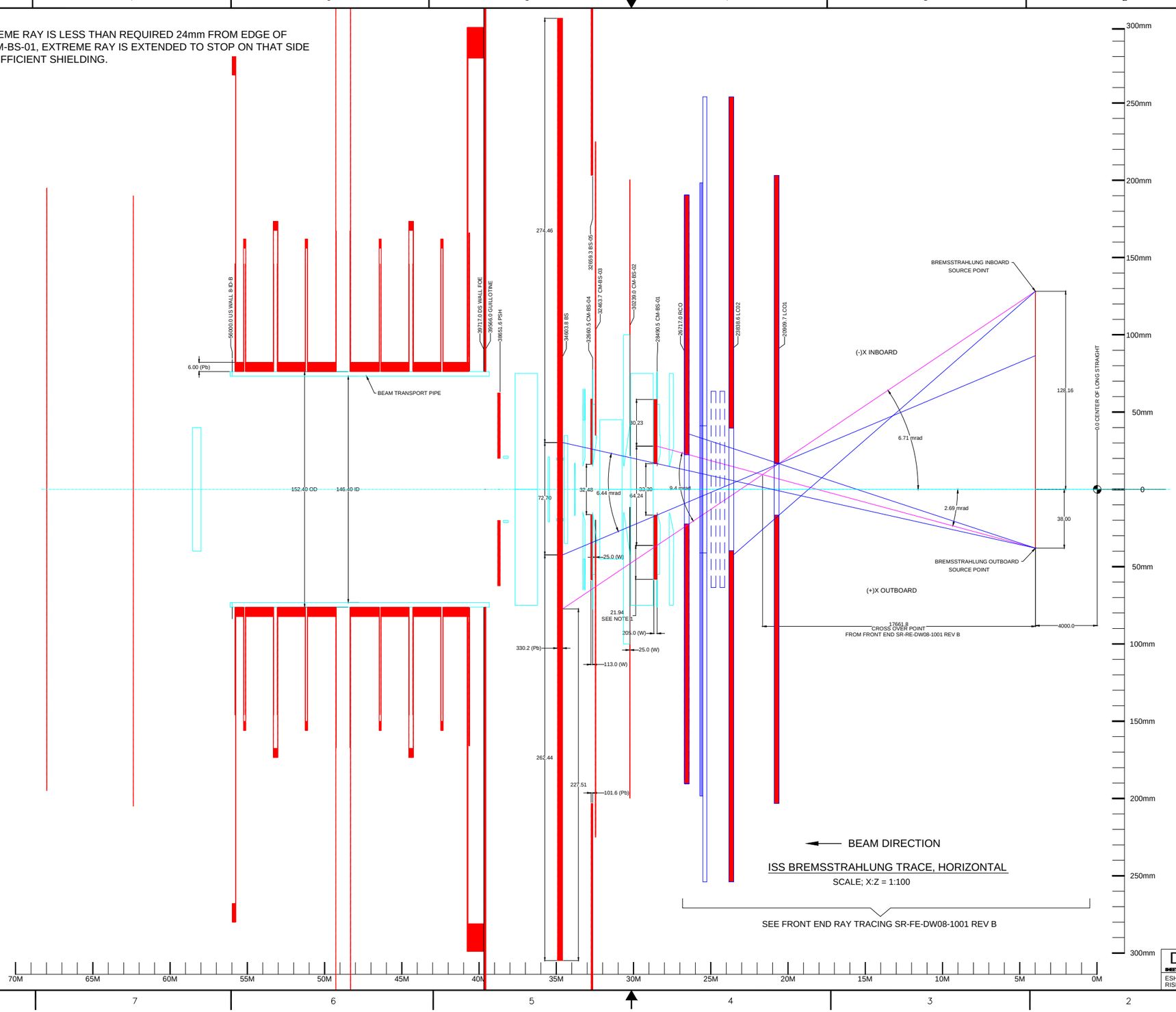


D	PD-ISS-RAYT-0001	A
SHEET SIZE	DRAWING/PART NUMBER	REVISION
ESH&Q RISK LEVEL A1	SHEET 4 OF 9	

RELEASED – EFFECTIVE

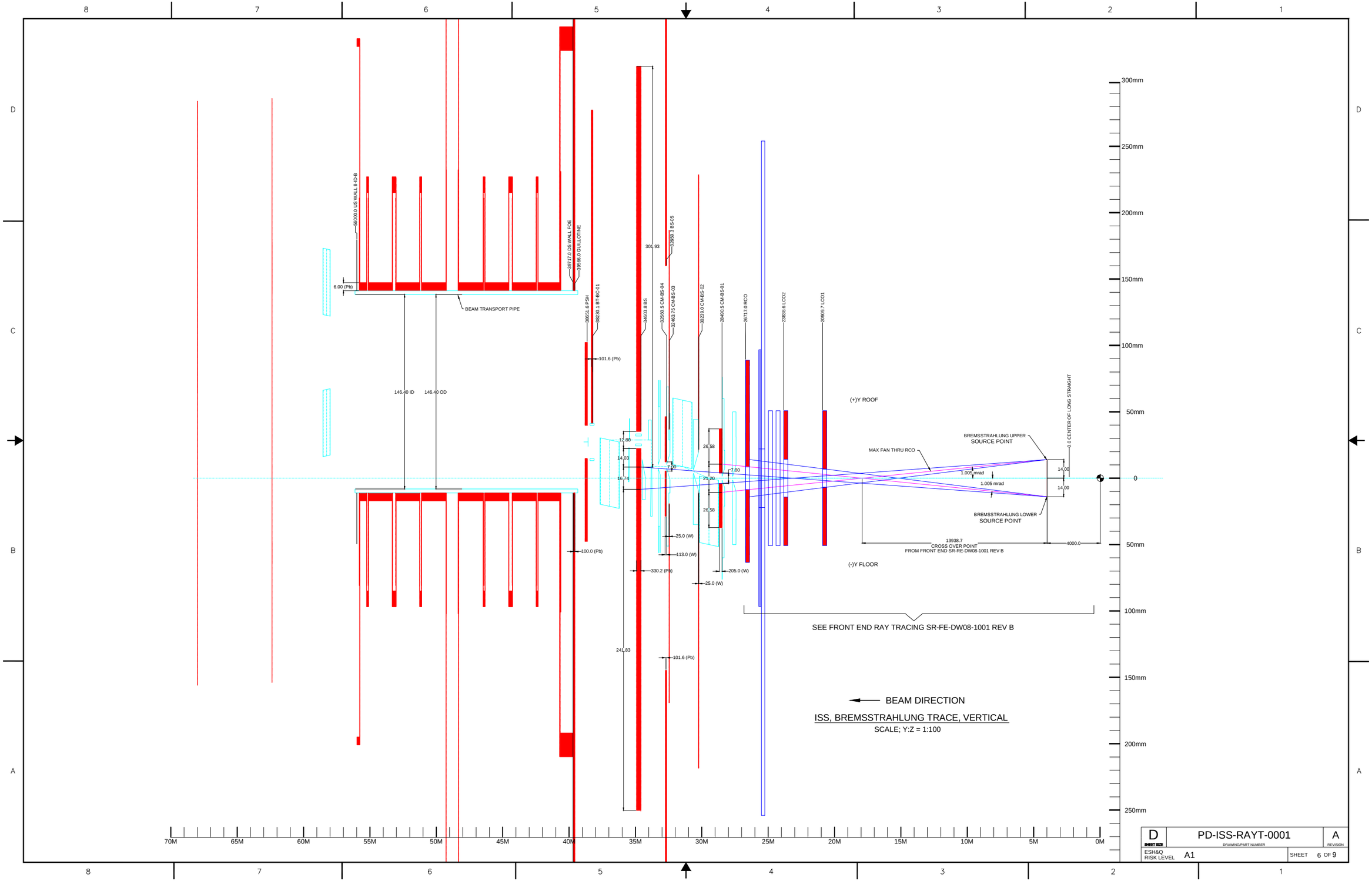
NOTES:

1. BECAUSE EXTREME RAY IS LESS THAN REQUIRED 24mm FROM EDGE OF COLLIMATOR CM-BS-01, EXTREME RAY IS EXTENDED TO STOP ON THAT SIDE TO CONFIRM SUFFICIENT SHIELDING.

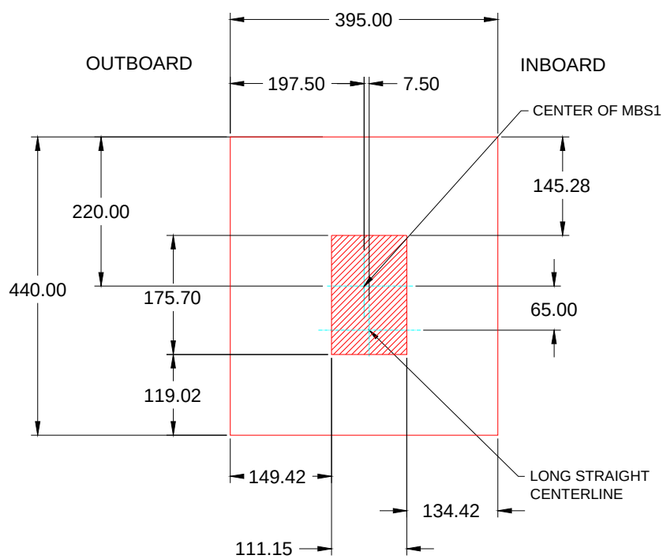


D (SHEET SIZE)	PD-ISS-RAYT-0001 (DRAWING/PART NUMBER)	A (REVISION)
ESH&Q RISK LEVEL A1	SHEET 5 OF 9	

RELEASED – EFFECTIVE

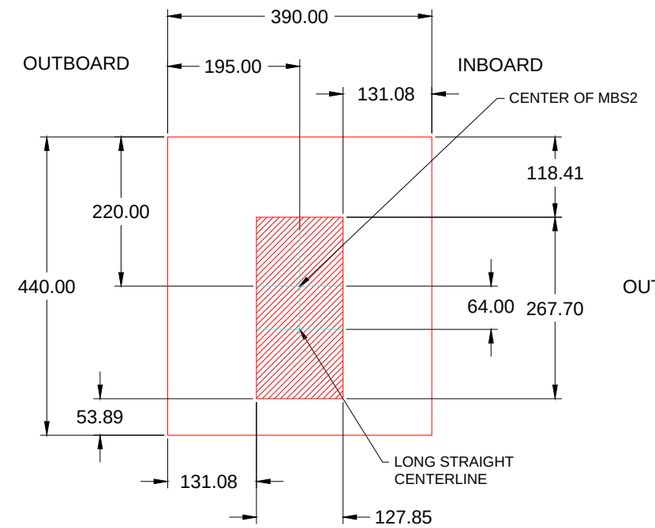


RELEASED – EFFECTIVE



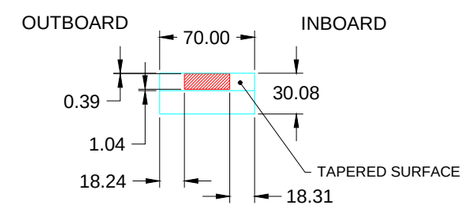
MBS 1

(LEAD, 10 mm THK)
REF: PD-ISS-HU-1100
(LOOKING DOWNSTREAM)
SCALE 1/4
SEE NOTE 1



MBS 2

(LEAD, 10 mm THK)
REF: PD-ISS-HU-1100
(LOOKING DOWNSTREAM)
SCALE 1/4



PBS

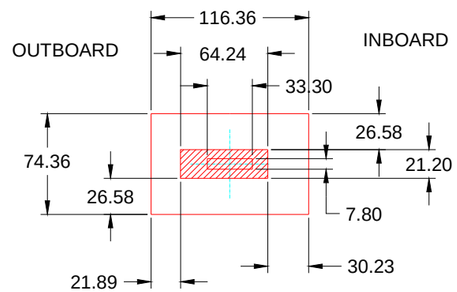
(GLIDCOP, 230 mm THK)
(LOOKING DOWNSTREAM)
SCALE 1/2

NOTES:
1. BEAMLINE CAN BE OPERATED WITH EITHER MBS1 OR MBS2 INSTALLED, PPS INTERLOCKED TO PREVENT OPERATION IN 8-ID-B1 WITHOUT MSB1 INSTALLED.

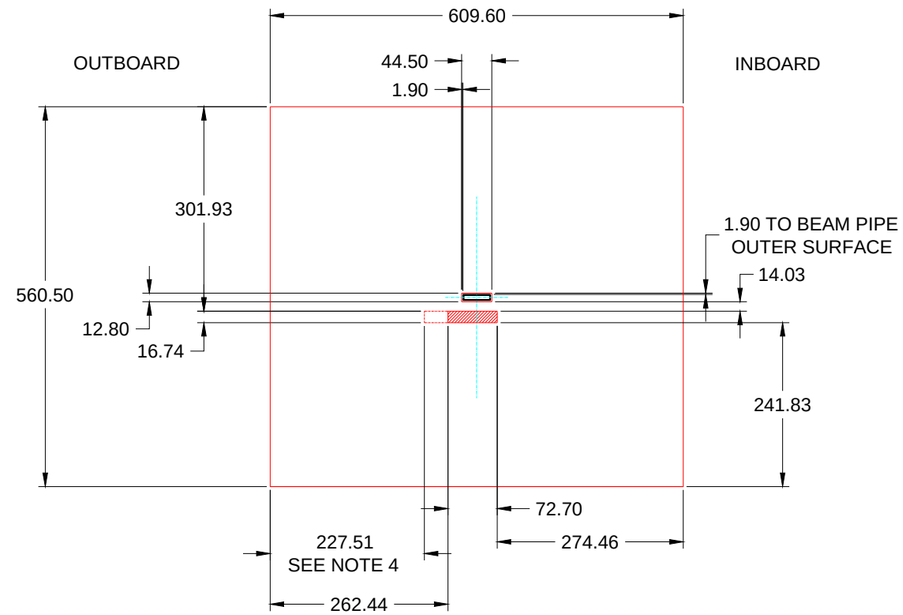
SYNCHROTRON BEAM STOP DETAILS

D (SHEET SIZE)	PD-ISS-RAYT-0001 (DRAWING/PART NUMBER)	A (REVISION)
ESH&Q RISK LEVEL A1		SHEET 7 OF 9

RELEASED – EFFECTIVE



COLLIMATOR CM-BS-01
(TUNGSTEN, 205 mm THK)
(LOOKING DOWNSTREAM)
SCALE 1/2



BREMSSTRAHLUNG STOP (BS)
(LEAD, 330 mm THK)
(LOOKING DOWNSTREAM)
SCALE 1/4

BREMSSTRAHLUNG COLLIMATOR AND STOP DETAILS

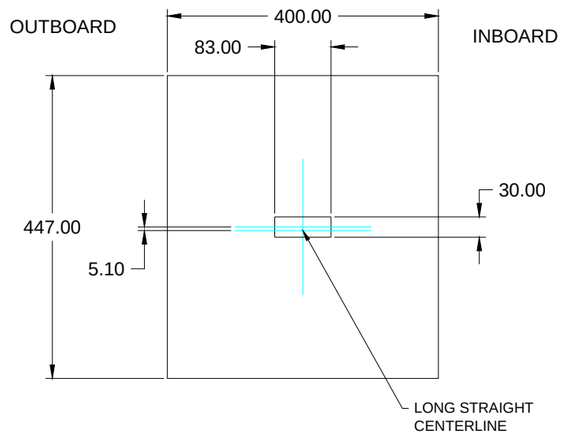
NOTES:

1. EDGE: SURVEY REPORT: LEAD SHIELD AROUND COLLIMATOR SURVEY RESULT 2015-12-18.PDF
   APERTURE: PD-ISS-HHM-2000.
2. APERTURE DIMENSIONS ON THIS SHEET INCLUDE TOLERANCES, SHOWING LEAST MATERIAL CONDITION.
3. SEE DOCUMENT ISS Ray Tracing Tolerance Analysis 2016-01-29.docx FOR THE DERIVATION OF THE TOLERANCES LISTED HERE.
4. BECAUSE EXTREME RAY IS LESS THAN REQUIRED 24mm FROM EDGE OF COLLIMATOR, EXTREME RAY IS EXTENDED TO STOP ON THAT SIDE TO CONFIRM SUFFICIENT SHIELDING.

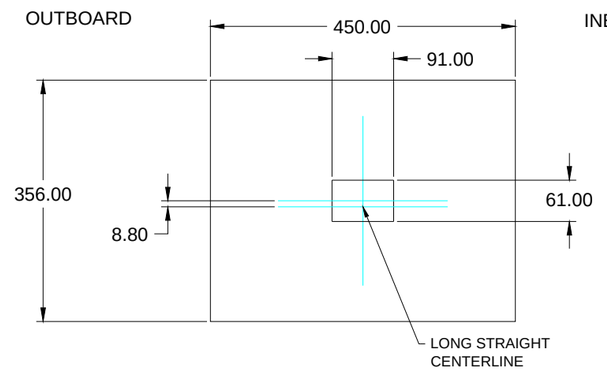
COMPONENT	APERTURE SIZE TOL	APERTURE POS TOL	EDGE SIZE TOL	EDGE POS TOL	SIZE DATA SOURCE
COLLIMATOR CM-BS-01	.180	.220	.180 (STD TOL)	.140 (STD RELATIVE TOL)	PD-ISS-PCM-2100
BREMSSRAHLUNG STOP	.180 (STD TOL)	.220 (STD TOL)	N/A	.050 (MEASUREMENT ACCURACY)	SEE NOTE 1

D (SHEET SIZE)	PD-ISS-RAYT-0001 (DRAWING/PART NUMBER)	A (REVISION)
ESH&Q RISK LEVEL A1	SHEET 8 OF 9	

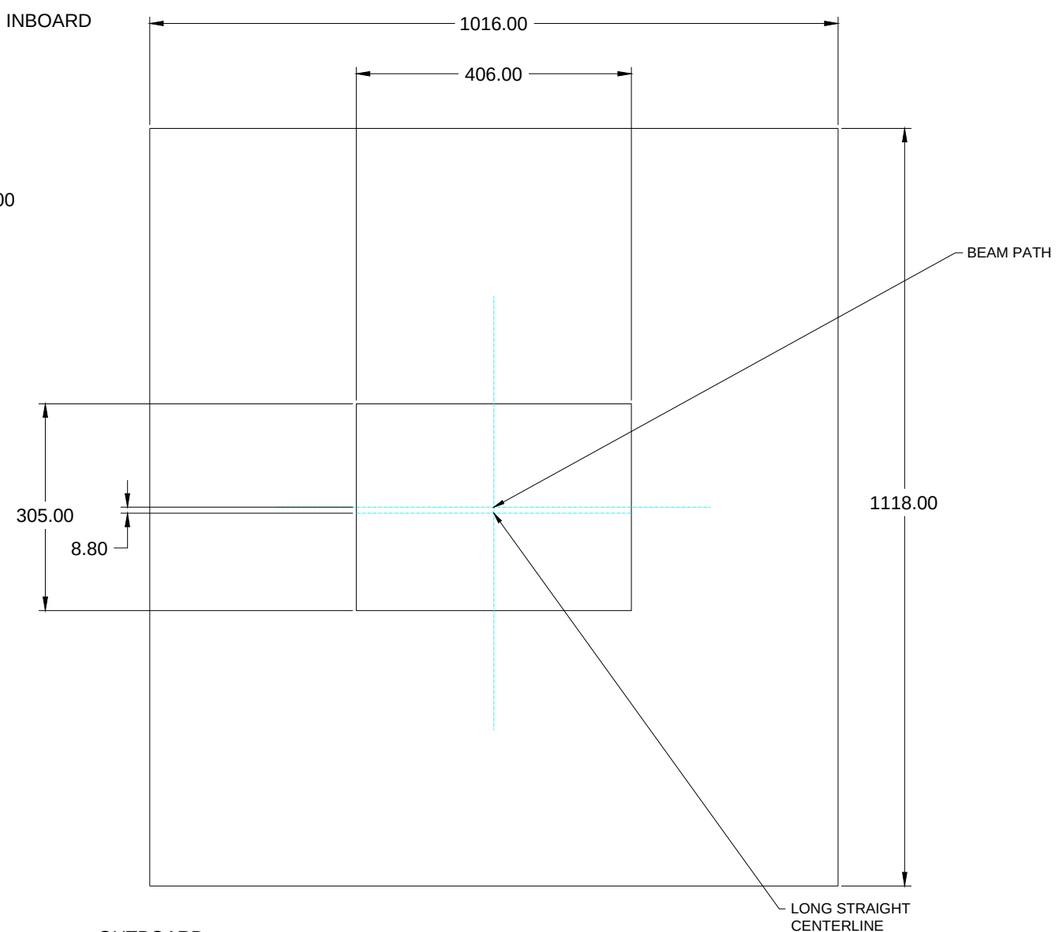
RELEASED – EFFECTIVE



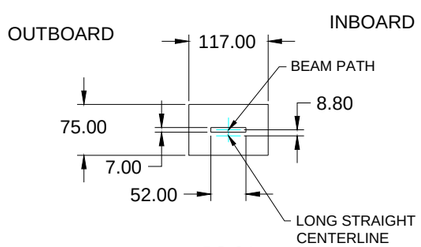
BS-02
REF: PD-ISS-PCM-2200
(TUNGSTEN 25 THK)
(LOOKING DOWNSTREAM)



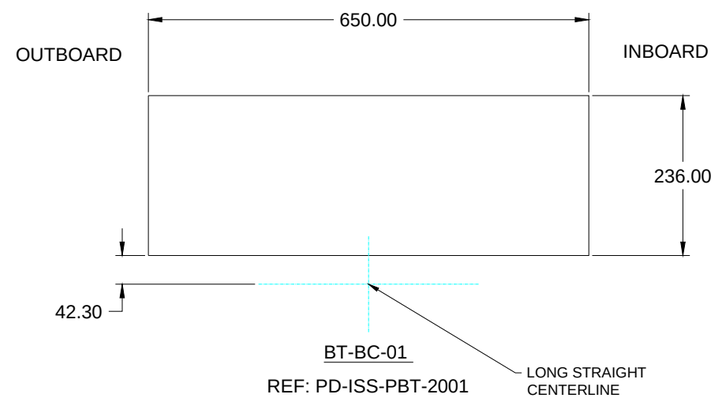
BS-03
REF: PD-ISS-PCM-2300
(TUNGSTEN 25 THK)
(LOOKING DOWNSTREAM)



BS-05
REF: PD-ISS-PCM-2410
(LEAD 101.6 mm THK)
(LOOKING DOWNSTREAM)
SCALE 1/4



BS-04
REF: PD-ISS-PCM-2300
(TUNGSTEN 113 mm THK)
(LOOKING DOWNSTREAM)
SCALE 1/2



BT-BC-01
REF: PD-ISS-PBT-2001
(LEAD 101.6 mm THK)
(LOOKING DOWNSTREAM)
SCALE 1/4

SECONDARY BREMSSTRAHLUNG SHIELD DETAILS

D (SHEET SIZE)	PD-ISS-RAYT-0001 (DRAWING/PART NUMBER)	A (REVISION)
ESH&Q RISK LEVEL A1		SHEET 9 OF 9

RELEASED – EFFECTIVE