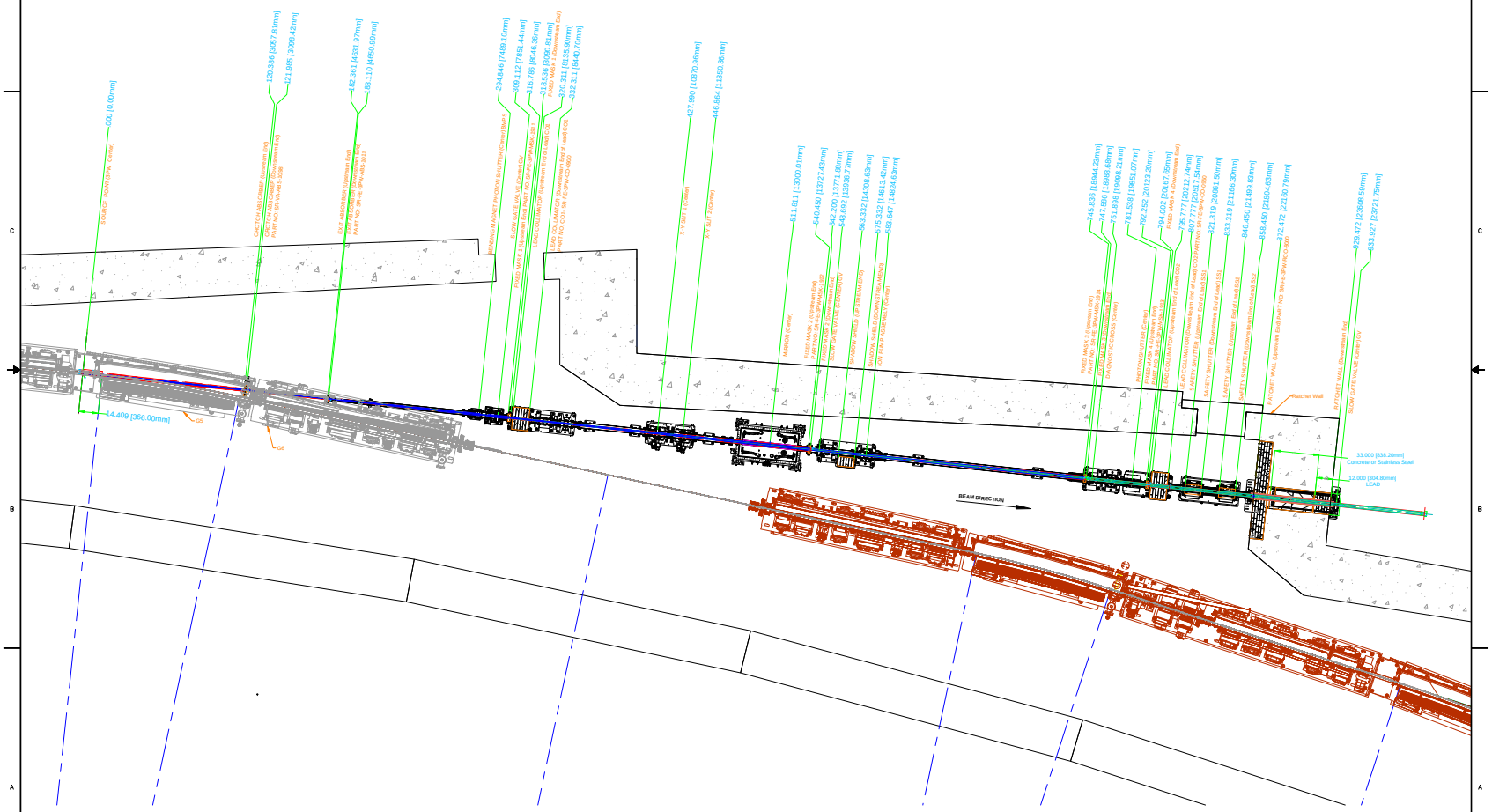
REVISION HISTORY					
REV	DESCRIPTION	DATE	DESIGNER	CHECKED BY	ENGINEER
A	RELEASE PER ECO-003842	8/2015	J.FABIANIC	C.STELMACH	F.DEPOALA
B	REVISED PER ECO-003950	12/2015	J.FABIANIC	C.A. / C.S.	C.AMUNDSEN
C	REVISED PER ECO-005898	9/2016	J.FABIANIC	C.A. / C.S.	G.BROOS



PLAN VIEW
SCALE: 1:25

BMM, CELL 6 BM, COMPONENT LAYOUT

HATCH LEGEND	
	Lead
	Concrete or Stainless Steel
	Lead (SS)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS ARE FOR REFERENCE ONLY
DIMENSIONS, TOLERANCES AND SPECIFICATIONS MUST BE VERIFIED BY THE USER

DIMENSIONAL TOLERANCES: X ± 0.030, X.X ± 0.015, X.XX ± 0.005
DO NOT SCALE DRAWING
SHEET SIZE: 34 x 22
DRAWN IN ACCORDANCE WITH ASME Y14.5M-1994
THIRD ANGLE PROJECTION

NEXT ASSY: N/A
PROJECT: NSLS-II
SCALE: SEE DWG View
WBS# 7.03.05.01

Brookhaven National Laboratory
Managed by Brookhaven Science Associates, LLC
Operated for the U.S. Department of Energy
Drawing and Specification Tree

Drawn by	J.FABIANIC	8/2015
Checked by	C.STELMACH	8/2015
Design Verifier	C.ZHONG	8/2015
Cognizant Engineer	F.DEPOALA	8/2015
Cognizant Scientist	G.SHARMAN	8/2015
Approved by		
Approved by		
Approved by		

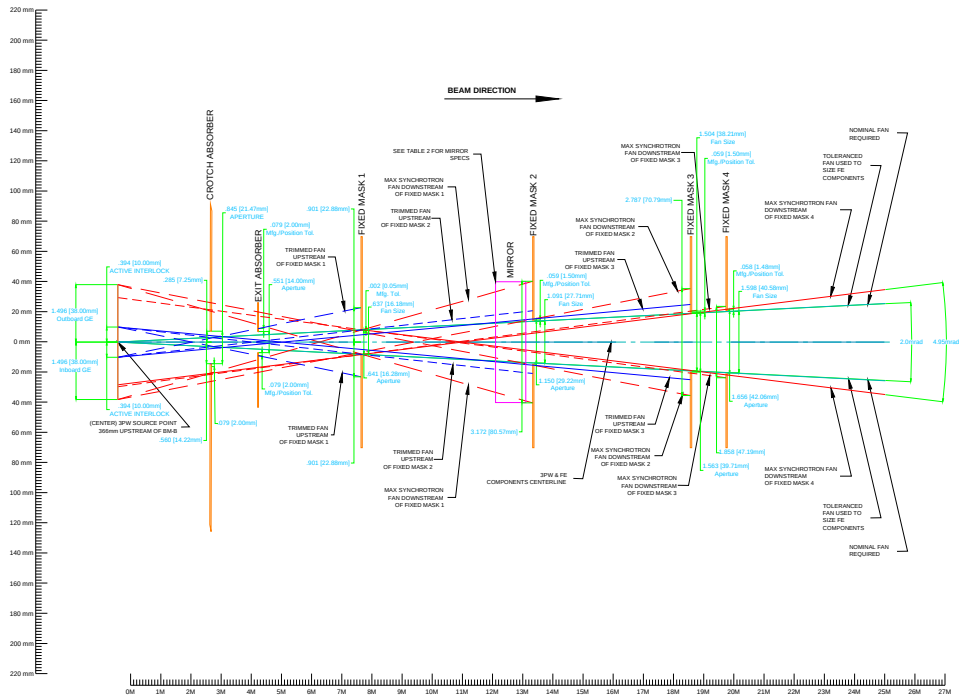
ESH&Q Risk Level: A-1

STORAGE RING
FRONT END, BMM, CELL 6
RAY TRACING

E — SR-FE-3PW-8001 — C
DOCUMENT NUMBER — REVISION

SHEET 1 OF 7

RELEASED – EFFECTIVE



HORIZONTAL
SCALE: X:Z = 1:50

TABLE 1

BMM FRONT END RAYTRACE TOLERANCE

	STANDARD TOLERANCE				
	mm		inches		Comments
	+	-	+	-	
Crotch Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
Exit Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
FM at C01	0.1	0.0	0.004	0.000	Manufacturing
FM 2 Vertical	.65	.65	0.026	0.026	Manufacturing & Position
FM 4 Horizontal	.74	.74	0.029	0.029	Manufacturing & Position
FM	.75	.75	0.030	0.030	Manufacturing & Position
CO tube	1.5	1.5	0.059	0.059	Manufacturing & Position
Collimator lead Horizontal	1.5	0.0	0.059	0.000	Manufacturing & Assembly
Collimator lead Vertical	2.5	0.0	0.098	0.000	Manufacturing, Assembly, Heater tape & Heater Tape Clearance
Shadow Shield	3.0	3.0	0.118	0.118	Manufacturing & Position
RCO upstream lead Horizontal	7.85	0.0	.309	0.000	Clearance, Mfg & Position
RCO upstream lead Vertical	8.85	0.0	.348	0.000	Clearance, Mfg & Position
RCO tube (minimum)	4.0	-	0.157	-	Manufacturing & Position

TABLE 2

BMM BEAMLINE FE MIRROR SPECIFICATIONS

Mirror system length, between flanges	1190 mm
Length of mirror substrate	1000 mm
Orientation	Bounce up
Material	Silicon
Mirror figure	Paraboloidal
Beam incidence angle	3.5mrad
Mirror acceptance (H/V)	2.1 mrad (H) x 0.24 mrad (V)
Mirror system center position	13m from source
Mirror operating limits (max incidence angle *):	5 mrad
Water flow rate for the mirror	Ideally 1.5 gpm (6 l/min). First component in any cooling chain; followed by slits, mask, PSH.

* See NSLS-II Controlled Document: PS-C-XFD-RSI-SST-BMM-001 / RSI for the Sources and Front-Ends for the SST1&2 and BMM Beamlines (NIST)

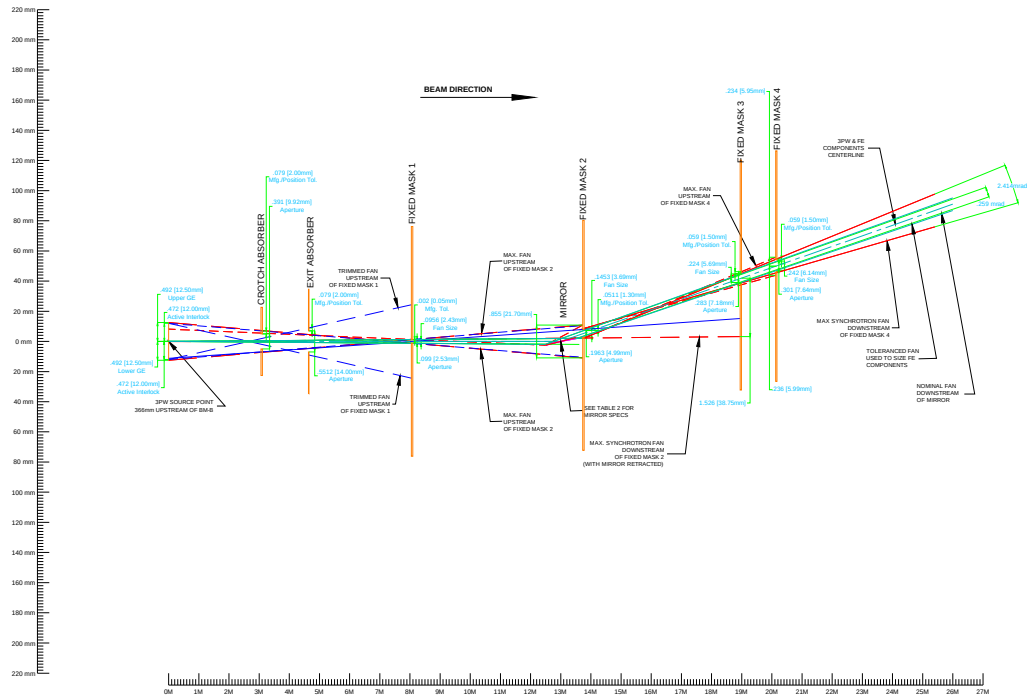
NOTE:

1. 3PW SOURCE POINT (ORIGIN) IS 366mm UPSTREAM OF BM-B.
2. MAX SYNCHROTRON FAN USES GEOMETRIC ENVELOPE AS ITS SOURCE AND IS INTERCEPTED ONLY BY AIR COOLED FIXED MASKS.
3. TRIMMED SYNCHROTRON FAN USES ACTIVE INTERLOCK ENVELOPE AS ITS SOURCE AND IS INTERCEPTED BY CROTCH ABSORBER, EXIT ABSORBER AND FIXED MASKS.
4. ALL MASK APERTURES SHOWN ARE NOMINAL VALUES WITH TOLERANCES SHOWN.
5. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

BMM, CELL 6 BM, SYNCHROTRON RAY TRACING HORIZONTAL

E	SR-FE-3PW-8001	C
SCHAD, RISK LEVEL A-1	SHEET 2 OF 7	

RELEASED – EFFECTIVE



VERTICAL
SCALE: Y:Z = 1:50

TABLE 1

BMM FRONT END RAYTRACE TOLERANCE

	STANDARD TOLERANCE				
	mm		inches		Comments
	+	-	+	-	
Crotch Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
Exit Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
FM at C01	0.1	0.0	0.004	0.000	Manufacturing
FM 2 Vertical	±5	±5	0.026	0.026	Manufacturing & Position
FM 4 Horizontal	.74	.74	0.029	0.029	Manufacturing & Position
FM	.75	.75	0.030	0.030	Manufacturing & Position
CO tube	1.5	1.5	0.059	0.059	Manufacturing & Position
Collimator lead Horizontal	1.5	0.0	0.059	0.000	Manufacturing & Assembly
Collimator lead Vertical	2.5	0.0	0.098	0.000	Manufacturing, Assembly, Heater tape & Heater Tape Clearance
Shadow Shield	3.0	3.0	0.118	0.118	Manufacturing & Position
RCO upstream lead Horizontal	7.85	0.0	.309	0.000	Clearance, Mfg & Position
RCO upstream lead Vertical	8.85	0.0	.348	0.000	Clearance, Mfg & Position
RCO tube (minimum)	4.0	-	0.157	-	Manufacturing & Position

TABLE 2

BMM BEAMLINE FE MIRROR SPECIFICATIONS

Mirror system length, between flanges	1190 mm
Length of mirror substrate	1000 mm
Orientation	Bounce up
Material	Silicon
Mirror figure	Paraboloidal
Beam incidence angle	3.5mrad
Mirror acceptance (H/V)	2.1 mrad (H) x 0.24 mrad (V)
Mirror system center position	13m from source
Mirror operating limits (max incidence angle *).	5 mrad
Water flow rate for the mirror	Ideally 1.5 gpm (6 l/min). First component in any cooling chain; followed by slits, mask, PSH.

* See NSLS-II Controlled Document: PS-C-XFD-RSI-SST-BMM-001 / RSI for the Sources and Front-Ends for the SST1&2 and BMM Beamlines (NIST)

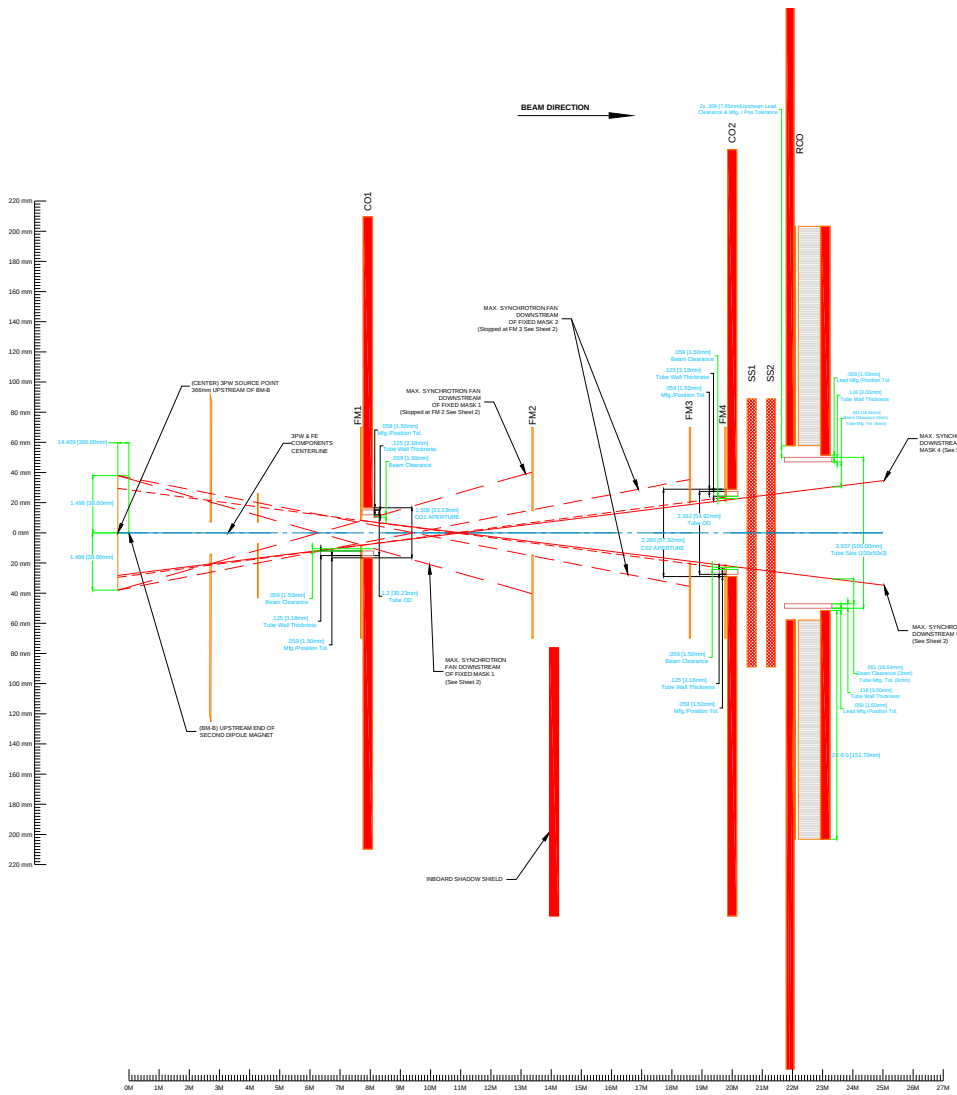
NOTE:

1. 3PW SOURCE POINT (ORIGIN) IS 366mm UPSTREAM OF BM-B.
2. MAX SYNCHROTRON FAN USES GEOMETRIC ENVELOPE AS ITS SOURCE AND IS INTERCEPTED ONLY BY AIR COOLED FIXED MASKS.
3. TRIMMED SYNCHROTRON FAN USES ACTIVE INTERLOCK ENVELOPE AS ITS SOURCE AND IS INTERCEPTED BY CROTCH ABSORBER, EXIT ABSORBER AND FIXED MASKS.
4. ALL MASK APERTURES SHOWN ARE NOMINAL VALUES WITH TOLERANCES SHOWN.
5. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

BMM, CELL 6 BM, SYNCHROTRON RAY TRACING VERTICAL

E	SR-FE-3PW-8001	C
SIZE	DOCUMENT NUMBER	REVISION
SIMAC RISK LEVEL A-1	SHEET 3 OF 7	

RELEASED – EFFECTIVE



NOTE:

1. BREMSSTRAHLUNG SOURCE POINT (ORIGIN) IS UPSTREAM END OF BM-B.
2. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

HORIZONTAL
SCALE: X:Z = 1:50

TABLE 1

BMM FRONT END RAYTRACE TOLERANCE

	STANDARD TOLERANCE				
	mm		inches		Comments
	+	-	+	-	
Crotch Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
Exit Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
FM at CO1	0.1	0.0	0.004	0.000	Manufacturing
FM 2 Vertical	.65	.65	0.026	0.026	Manufacturing & Position
FM 4 Horizontal	.74	.74	0.029	0.029	Manufacturing & Position
FM	.75	.75	0.030	0.030	Manufacturing & Position
CO tube	1.5	1.5	0.059	0.059	Manufacturing & Position
Collimator lead Horizontal	1.5	0.0	0.059	0.000	Manufacturing & Assembly
Collimator lead Vertical	2.5	0.0	0.098	0.000	Manufacturing, Assembly, Heater tape & Heater Tape Clearance
Shadow Shield	3.0	3.0	0.118	0.118	Manufacturing & Position
RCO upstream lead Horizontal	7.85	0.0	.309	0.000	Clearance, Mfg & Position
RCO upstream lead Vertical	8.85	0.0	.348	0.000	Clearance, Mfg & Position
RCO tube (minimum)	4.0	-	0.157	-	Manufacturing & Position

TABLE 2

BMM BEAMLINE FE MIRROR SPECIFICATIONS

Mirror system length, between flanges	1190 mm
Length of mirror substrate	1000 mm
Orientation	Bounce up
Material	Silicon
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Mirror acceptance (H/V)	2.1 mrad (H) x 0.24 mrad (V)
Mirror system center position	13m from source
Mirror operating limits (max incidence angle *).	5 mrad
Water flow rate for the mirror	Ideally 1.5 gpm (6 l/min). First component in any cooling chain; followed by slits, mask, PSH.

* See NSLS-II Controlled Document: PS-C-XFD-RSI-SST-BMM-001 / RSI for the Sources and Front-Ends for the SST1&2 and BMM Beamlines (NIST)

BMM, CELL 6 BM, MAX SYNCHROTRON COLLIMATOR LAYOUT HORIZONTAL

E	SR-FE-3PW-8001	C
SIZE	DRAWING/PART NUMBER	REVISION
ESHAQ RISK LEVEL A-1	SHEET 4	OF 7

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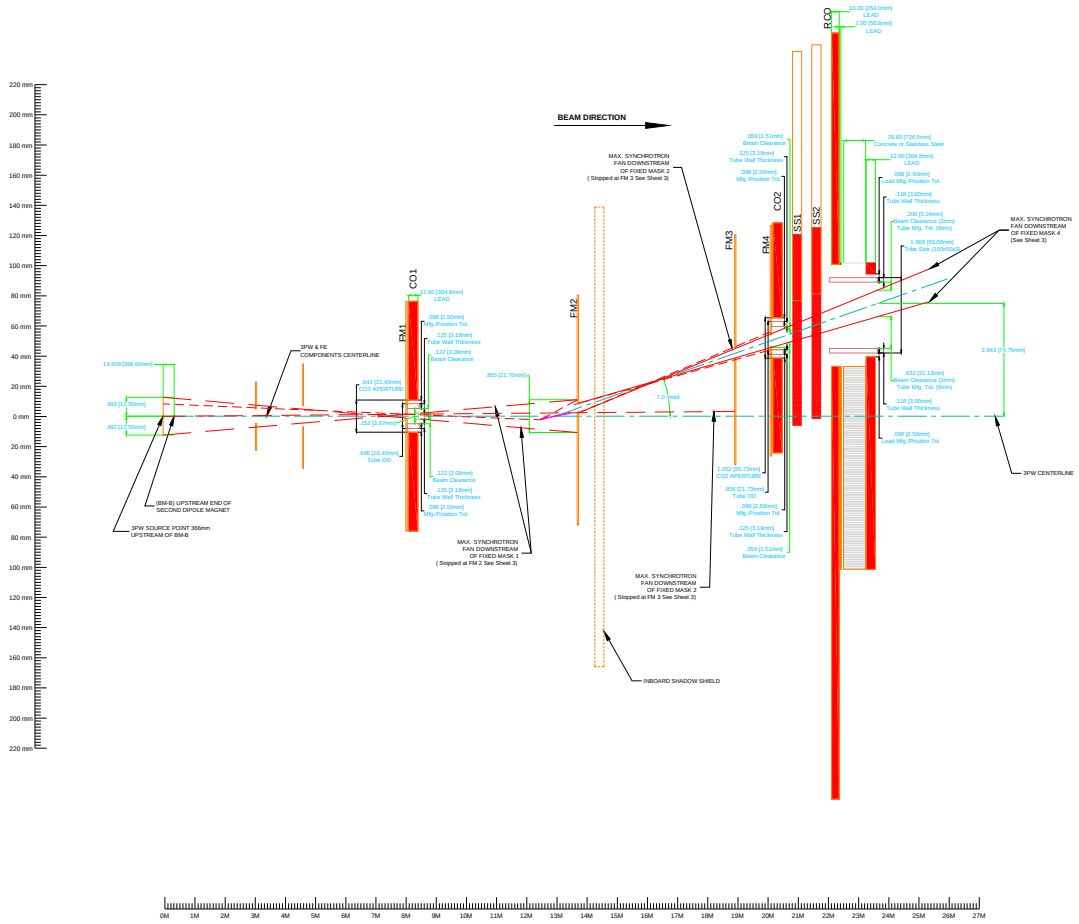

VERTICAL
SCALE: X:Z = 1:50

TABLE 1

BMM FRONT END RAYTRACE TOLERANCE

	STANDARD TOLERANCE				
	mm		inches		Comments
	+	-	+	-	
Crotch Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
Exit Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
FM at C01	0.1	0.0	0.004	0.000	Manufacturing
FM 2 Vertical	.65	.65	0.026	0.026	Manufacturing & Position
FM 4 Horizontal	.74	.74	0.029	0.029	Manufacturing & Position
FM	.75	.75	0.030	0.030	Manufacturing & Position
CO tube	1.5	1.5	0.059	0.059	Manufacturing & Position
Collimator lead Horizontal	1.5	0.0	0.059	0.000	Manufacturing & Assembly
Collimator lead Vertical	2.5	0.0	0.098	0.000	Manufacturing, Assembly, Heater tape & Heater Tape Clearance
Shadow Shield	3.0	3.0	0.118	0.118	Manufacturing & Position
RCO upstream lead Horizontal	7.85	0.0	309	0.000	Clearance, Mfg & Position
RCO upstream lead Vertical	8.85	0.0	348	0.000	Clearance, Mfg & Position
RCO tube (minimum)	4.0	-	0.157	-	Manufacturing & Position

TABLE 2

BMM BEAMLINE FE MIRROR SPECIFICATIONS

Mirror system length, between flanges	1190 mm
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NOTE:

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BMM, CELL 6 BM, MAX SYNCHROTRON COLLIMATOR LAYOUT VERTICAL

E	SR-FE-3PW-8001	C
CONTROL DOCUMENT NUMBER		REVISION
ESHAQ RISK LEVEL A-1		SHEET 5 OF 7

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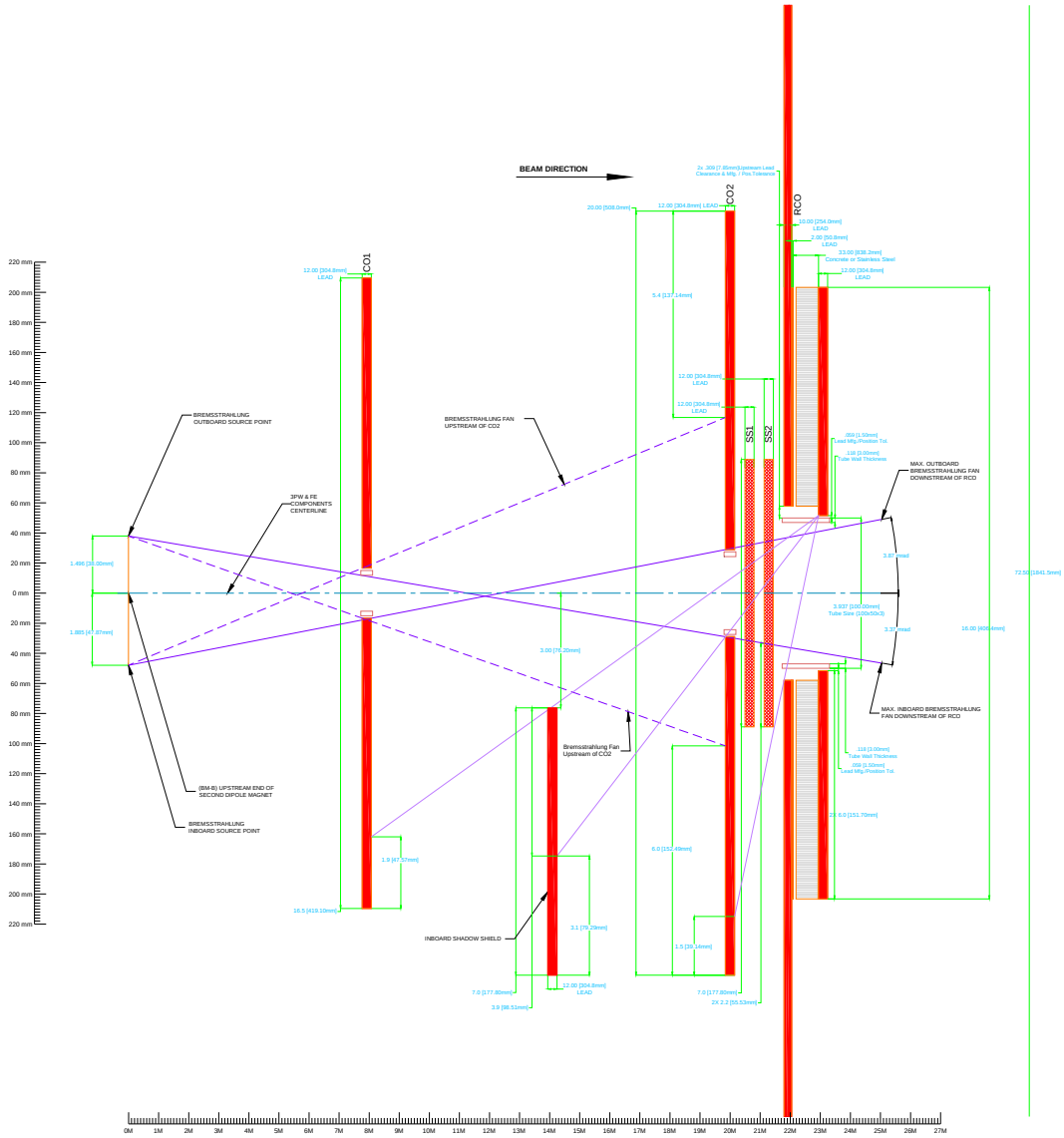

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	mm		inches		Comments
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Exit Absorber	2.0	2.0	0.079	0.079	Manufacturing & Position
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Collimator lead Horizontal	1.5	0.0	0.059	0.000	Manufacturing & Assembly
Collimator lead Vertical	2.5	0.0	0.098	0.000	Manufacturing, Assembly, Heater tape & Heater Tape Clearance
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RCO upstream lead Horizontal	7.85	0.0	.309	0.000	Clearance, Mfg & Position
RCO upstream lead Vertical	8.85	0.0	.348	0.000	Clearance, Mfg & Position
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TABLE 2

BMM BEAMLINE FE MIRROR SPECIFICATIONS

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HORIZONTAL
SCALE: X:Z = 1:50

BMM, CELL 6 BM, BREMSSTRAHLUNG RAY TRACING HORIZONTAL

E	SR-FE-3PW-8001	C
SIZE	DOCUMENT NUMBER	REVISION
53842 RISK LEVEL A-1	SHEET 6	OF 7

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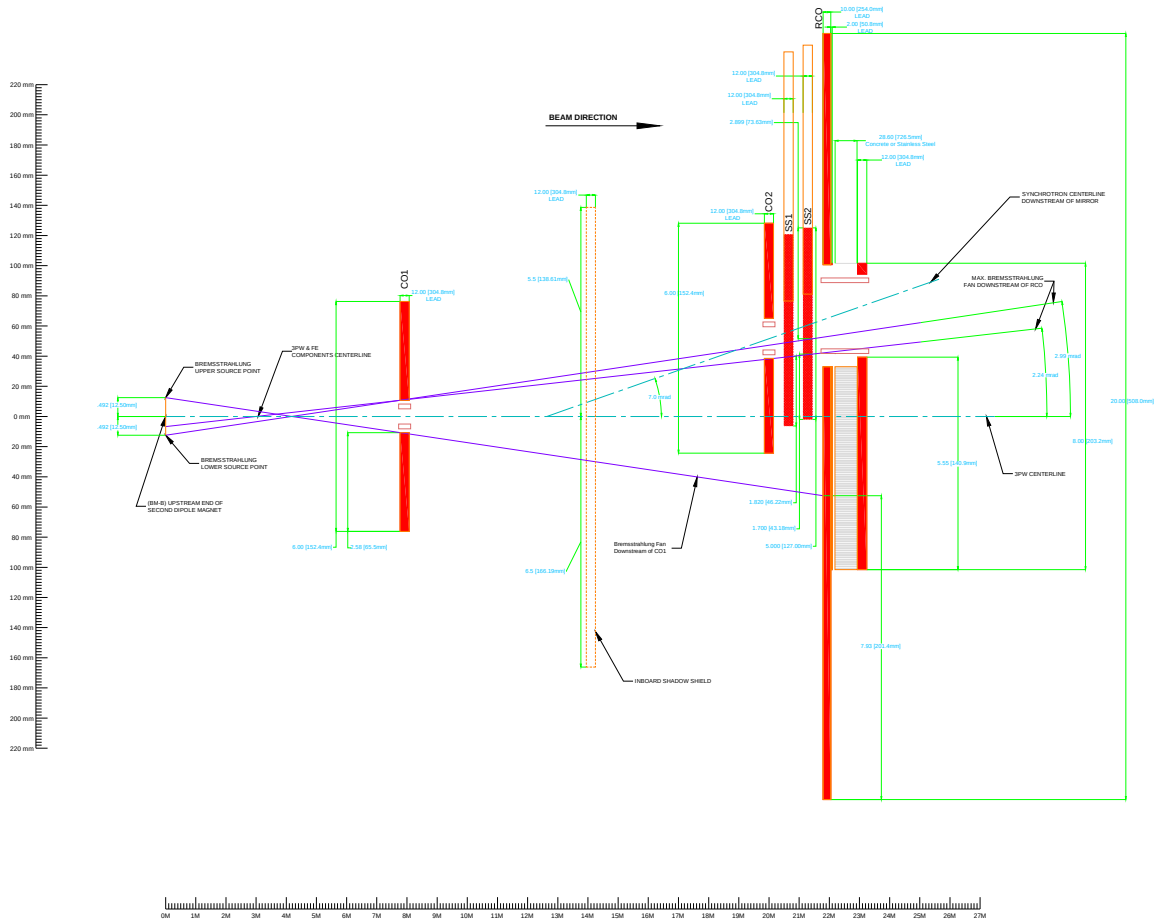

VERTICAL
SCALE: X:Z = 1:50

TABLE 1

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	mm		inches		Comments
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FM 2 Vertical	.65	.65	0.026	0.026	Manufacturing & Position
FM 4 Horizontal	.74	.74	0.029	0.029	Manufacturing & Position
FM	.75	.75	0.030	0.030	Manufacturing & Position
CO tube	1.5	1.5	0.059	0.059	Manufacturing & Position
Collimator lead Horizontal	1.5	0.0	0.059	0.000	Manufacturing & Assembly
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Shadow Shield	3.0	3.0	0.118	0.118	Manufacturing & Position
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RCO upstream lead Vertical	8.85	0.0	.348	0.000	Clearance, Mfg & Position
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TABLE 2

BMM BEAMLINE FE MIRROR SPECIFICATIONS

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Orientation	Bounce up
Material	Silicon
Mirror figure	Paraboloidal
Beam incidence angle	3.5mrad
Mirror acceptance (H/V)	2.1 mrad (H) x 0.24 mrad (V)
Mirror system center position	13m from source
Mirror operating limits (max incidence angle *):	5 mrad
Water flow rate for the mirror	Ideally 1.5 gpm (6 l/min). First component in any cooling chain, followed by slits, mask, PSH.

* See NSLS-II Controlled Document: PS-C-XFD-RSI-SST-BMM-001 / RSI for the Sources and Front-Ends for the SST1&2 and BMM Beamlines (NIST)

NOTE:

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BMM, CELL 6 BM, BREMSSTRAHLUNG RAY TRACING VERTICAL

E	SR-FE-3PW-8001	C
CONTROLLED PLANT DOCUMENTS		REVISION
ESHAQ RISK LEVEL A-1		SHEET 7 OF 7

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