Considering the effect of making the collimator apertures circular.

Ring Collimation Line:

Collimator #1

Elliptical

x radius (mm)	52.0			
y radius (mm)	53.0			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
e_x (p mm mrad)	390 – 304	383 - 302	393 - 309	385 - 300
e_y (p mm mrad)	302 - 324	321 - 349	305 - 326	309 - 325

Circular

x radius (mm)	52.5			
y radius (mm)	52.5			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
e_x (p mm mrad)	397 - 310	390 - 308	400 - 316	392 - 306
e_y (p mm mrad)	296 - 318	316 - 343	299 - 319	303 - 318

Collimator #2

Elliptical

x radius (mm)	68			
y radius (mm)	50			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
e_x (p mm mrad)	446 – 295	446 – 299	456 - 305	443 - 291
e_y (p mm mrad)	302 – 335	327 – 370	443 - 291	313 - 335

Circular

x radius (mm)	68			
y radius (mm)	68			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
e_x (p mm mrad)	446 – 295	446 - 299	456 - 305	443 - 291
e_y (p mm mrad)	558 – 620	605 – 685	558 - 613	579 - 620

Collimator #2 Shield

Elliptical

x radius (mm)	75			
y radius (mm)	47			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
e_x (p mm mrad)	358 – 298	363 – 304	371 - 310	355 - 295
e_y (p mm mrad)	296 – 307	327 – 341	293 - 302	313 - 327

Circular

x radius (mm)	74			
y radius (mm)	74			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
e_x (p mm mrad)	349 – 290	354 - 296	361 - 301	345 - 287
e_y (p mm mrad)	734 – 762	811 - 845	726 - 748	775 – 810

Ellip -> Circ

Δ Efficiency	-4.4%	-2.6%	-3.2%	-2.1% (*)

(* = low statistics run.)

Collimators #3 & #4

Elliptical

x radius (mm)	65			
y radius (mm)	60			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
ϵ_x (π mm mrad)	293 – 314	364 – 413	325 - 356	298 - 321
ϵ_y (π mm mrad)	308 - 325	336 – 359	292 - 305	337 - 360

Circular

x radius (mm)	62.5			
y radius (mm)	62.5			
Tunes	(6.23, 6.20)	(6.4, 6.3)	(6.3, 5.8)	(6.23, 5.24)
ϵ_x (π mm mrad)	318 – 341	295 - 449	353 – 387	324 - 348
ϵ_y (π mm mrad)	285 – 300	310 – 331	270 – 283	311 - 332
Δ Efficiency				

Ellip -> Circ

Δ Efficiency	-.004%	.76%	.02%	-.03%

Conclusions:

Possible to make apertures of collimators #'s 1, 3, and 4 circular without affecting collimation efficiency. Apertures for collimator #2 and the associated shielding should remain elliptical.