

Muon Campus Beamline Enclosure

Interface Control Document

October 9, 2014

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1. APPROVALS

Submitted, Accepted, and Approved By:

 10/10/14

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Date

MC Beamline Enclosure GPP Project Manager

Facilities Services Section

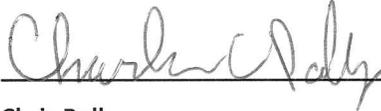
 10/10/14

Jerry Annala

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MC Beamline Enclosure GPP Project Director

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 10/10/2014

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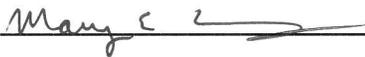
 10/10/14

Ron Ray

Date

Mu2e Project Manager

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Date

Fermilab Muon Campus Program Coordinator

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2. REVISION HISTORY

Revision	Date	Section No.	Revision Description
0	10/9/14	All	Initial Release

3. BEAMLIN ENCLSURE DESCRIPTION

The MC Beamline Enclosure scope of work will consist of the activities required for the construction of a below-grade, cast-in-place and/or precast concrete enclosure to house the programmatic beamline components that will be required to transport beam from the existing Delivery Ring (former antiproton Debuncher) into the Mu2e Detector Hall and Service building and the MC-1 Building.

The Beamline Enclosure will be a 10 feet wide by either eight (8'-0) feet, nine feet six inches (9'-6) or twelve feet (12'-0) high concrete enclosure approximately 700 feet long, running from the existing Delivery Ring enclosure to the Mu2e Detector Enclosure interface. The section of enclosure that receives conduits for beamline cabling from the service building will be nine foot six inches high. The section housing the M5 beamline to transport beam from the Delivery Ring enclosure up to the MC-1 Building as is twelve feet (12'-0) high. The beamline enclosure is designed to support 16 feet of earth and concrete shielding to grade as measured from the M4 beamline and 6 feet of shielding measured from the M5 beamline.

The construction of the Beamline Enclosure will utilize traditional "open cut and cover" methods in which earth material is excavated, the concrete beamline enclosure is constructed and the completed enclosure is covered with the excavated material. This method has been used successfully at Fermilab for the construction of the majority of shielded enclosures on-site.

The interior walls and ceiling of the beamline enclosure will be painted and the exterior concrete surface will be moisture proofed to provide a safe, dry semiconditioned space for personnel and equipment. The enclosure will be flanked with underdrain piping that will negate the hydraulic pressure on the walls and roof of the enclosure. The underdrains will be routed to a duplex sump that will discharge water onto grade and away from the enclosure. The walls and ceiling of the enclosure will be fitted with channel inserts to allow for the support of cable trays, cooling water piping, electrical conduits and fire detection equipment.

Convenience outlets, 120/208VAC, will be provided every sixty feet along the wall on the side of the beamline. Welding outlets, 60 amp / 480V, will be provided at two (2) locations along the enclosure. In addition to required emergency and exit lighting, light fixtures will be provided to supply a minimum of 20 foot-candles. A percentage of these lights will provide

emergency lighting during power failures. Lighting will be controlled by the lighting control panel in the Mu2e Building.

4. INTERFACES

The following table defines the responsibilities for various interfaces between the Beamline Enclosure GPP, g-2, and Mu2e.

Package	Responsibility
Roll up door between DR and M4	Beamline Enclosure GPP
Tunnel sumps and pumps	Beamline Enclosure GPP
Penetrations (MC1)	Beamline Enclosure GPP
Penetrations (Mu2e)	Mu2e
Diagnostic absorber and enclosure	Beamline Enclosure GPP
Air barriers at M4/M5 split	Beamline Enclosure GPP
Scissors lift	Beamline Enclosure GPP
Rail hoist at diagnostic absorber drop	
<i>Hoist beam</i>	Beamline Enclosure GPP
<i>Trolley/hoist</i>	Mu2e
Hatch upstr of diagnostic absorber inclu shield blocks, hatch cover	Beamline Enclosure GPP
<i>Stacking shield blocks</i>	Mu2e
M5 shield wall	g-2
Labyrinth in upstream M4	Mu2e
Labyrinth or wall downstream of diagnostic absorber	Mu2e
Tunnel electrical service	Beamline Enclosure GPP
<i>Wiring from building to tunnel panel</i>	Beamline Enclosure GPP
<i>grounding system</i>	Beamline Enclosure GPP
Tunnel welding outlets	Beamline Enclosure GPP
<i>wiring</i>	Beamline Enclosure GPP
Emergency lighting & exit signs	Beamline Enclosure GPP
<i>UPS for emergency lights</i>	Mu2e
<i>generator</i>	Mu2e
<i>wiring</i>	Beamline Enclosure GPP
Doors & Locks	Beamline Enclosure GPP
Cores & safety equipment (interlocks, etc.)	g-2/Mu2e
Tunnel breakers & panels	Beamline Enclosure GPP
Gates (interior tunnel - not to the outside or buildings)	g-2/Mu2e
Cable tray (From exit of DR tunnel toward experiments)	Beamline Enclosure GPP

	<i>cable tray grounding connections</i>	Beamline Enclosure GPP
	<i>final adjustments during cable installation</i>	g-2/Mu2e
Telephones		g-2/Mu2e
	<i>wiring</i>	g-2/Mu2e
Wireless routers/repeaters		g-2/Mu2e
	<i>wiring</i>	g-2/Mu2e
Speaker (tunnel PA)		g-2/Mu2e
	<i>wiring</i>	g-2/Mu2e
FIRUS wiring		Beamline Enclosure GPP
	<i>duct bank</i>	Mu2e
	<i>sump</i>	Mu2e
	<i>FIRUS panel and connections to building fire panel, etc</i>	Mu2e
	<i>everything else</i>	Beamline Enclosure GPP
Fire detection system		Beamline Enclosure GPP
	<i>pull stations</i>	Beamline Enclosure GPP
	<i>alarm annunciator</i>	Beamline Enclosure GPP
	<i>Line heat detectors</i>	Beamline Enclosure GPP
	<i>wiring into MC1 fire panel</i>	Beamline Enclosure GPP
	<i>Fire extinguishers</i>	Beamline Enclosure GPP
Water pipes		
	<i>From existing CUB line into new tunnel including valve</i>	Beamline Enclosure GPP
	<i>Connection of the existing buried LCW pipes from CUB to the existing Delivery Ring tunnel pipes in the 20 sector</i>	Beamline Enclosure GPP
	<i>Lines down M5 line and into MC1 building</i>	g-2
	<i>Lines through M4 line downstream of the beam line split</i>	Mu2e
	<i>Upstream extraction line (common to g-2 and Mu2e)</i>	g-2
All Chilled water		Beamline Enclosure GPP
Interlocks		g-2/Mu2e
	<i>wiring</i>	g-2/Mu2e

TABLE 1: Interface responsibilities.