

Space Summary Sheet

Majorana Underground Infrastructure

REV 1

Rm	Location	Room																	Services								
		Description	Size (sq ft)	Length (ft)	Width (ft)	Height (ft)	Volume (ft3)	Floor Loading (lb/sq ft)	Wall Covering	Lifting Devices	Doors	Occupancy	CLASS	Lighting	Sound Level	Temp	Humidity	dP	Normal Power	Standby Power	UPS Power	Network	Phone	Rn Free Air	V(Rn Free)	Covergas	Vacuum
101	Detector Hall	Location for detector and data taking	380	20	19	12	4560	++++	Rn Reducing?	maybe	man, equipment	4	100?	bright		21±1	45±5?				X	8	1	1	4560	yes	yes
102	Detector Assembly Rm	Assemble detector monoliths for insertion into detector	332.5	17.5	19	12	3990	+++	Rn Reducing?	yes	man, equipment	4	100?	bright		21±1	45±5?	0.05"wg relative to airlock			X	8	1	1	3990	yes	yes
103	Crystal Prep Rm	Work on bare crystals, assemble into strings.	100	10	10	8	800		Rn Reducing?		man	2	100?	bright		21±1	45±5?			X	4	1	1	800	yes	yes	
104	Detector Area Airlock	Transition from common facility space to Detector Assembly	100	10	10	8	800		Rn Reducing?		man, equipment	2		normal		21±1	45±5?	0.05"wg relative to exterior						1	800		
105	Detector Area Change Rm	Change from regular facility clothing into class 100 cleanroom clothing	75	10	7.5	8	600				man	4	2000	normal													
106	Control Rm	Operate and monitor detector	196	14	14	9	1764				man	6	2000	normal	office level					X	16	1					
107	Electronics Rm	DAQ electronics and computers. Underground data storage.									man, equipment	3	2000	normal		21±1	45±5		50kW?		X	8	1				
108	Electroforming Lab	Electroform copper parts for the detector.	293.37	26.67	11	10	2933.7		Rn Reducing?	yes	man, equipment	2	100?	bright		21±1	45±5?	0.05"wg relative to airlock	50kW?		X	4	1	1	2933.7	yes	yes
109	Electroforming Machine Shop	Machine the electroformed parts.	413.07	21	19.67	10	4130.7		Rn Reducing?	yes	man, equipment	2	2000?	bright				0.05"wg relative to airlock				2	1	1	4130.7	yes	
110	Rn Free Component Storage	Storage of the cleaned detector components under cover gas or vacuum prior to detector assembly.	116.7	10	11.67	8	933.6		Rn Reducing?	maybe	man, equipment	2	100?	normal		21±1	45±5?			X	2	1	1	933.6	yes	yes	
111	Electroforming Airlock	Transition from common facility space to Electroforming lab and machine shop. May be the same airlock as for the detector assembly.	100	10	10	8	800		Rn Reducing?		man, equipment	2		normal				0.05"wg relative to exterior						1	800		
112	Electroforming Change Room	Change from regular facility clothing into class 100 cleanroom clothing. May be the same change room as for the detector area.	75	10	7.5	8	600				man	2	2000	normal													
113	Low Background Counting	For any site necessary Low Background Counting for final assembly or as part of the Majorana screening effort.	100	10	10	10	1000	++++	Rn Reducing?	maybe	man, equipment	2	100?	normal						X?	2	1				yes	
114	Facility Clean Storage	Storage in the facility area for Majorana equipment that does not require Rn free storage.	200	20	10	10	2000				man, equipment		2000	normal													
115	Office										man	2	2000	normal	office level							4	1				
116	Utility Rm	Contains Rn Scrubbing system. Majorana LN2 system. Possibly the HVAC systems for the cleanrooms. Possibly the UPS for Majorana.						++		maybe	man, equipment	4	2000?	normal	high	?	?		200 kW?								
117	Facility Dirty Storage?	Possible storage outside the facility in uncontrolled, dirty, dusty space.									man, equipment		N/A	minimal													

2481.64

24912

18948 ft³
315.8 CFM (1 air change/h)

Majorana Surface Infrastructure

201	Staging		400	20	20	15	6000	++++		yes	man, equipment		2000?	normal	office level	21±1	45±5			yes	X?	8	1			yes	yes
202	Control Rm		108	12	9	8	864					4								X	16	2					
203	IT																			X	many						
204	Office		108	12	9	8	864					4															

Space Summary Sheet

Majorana Underground Infrastructure

Rm	Location	Hazards											Monitoring									
		Rn Free Compressed Gas	Domestic Water	UPW	Cryogenics	Chemicals	Fire Suppression	Fire	Oxygen Deficiency	Pb	Explosive Gas	HF and other Hazardous Chemicals	Acid Spill	Temp	Humidity	Pressure	dP	O2/CO/NO	Rn	Explosive Gas	Particulate (airborne)	Particulate (deposition)
101	Detector Hall				LN2		Residue-less	maybe	med/high	yes				yes	yes	yes		yes	yes		yes	yes
102	Detector Assembly Rm				LN2		Residue-less	maybe	medium	yes				yes	yes	yes		yes	yes		yes	yes
103	Crystal Prep Rm			maybe	LN2	HF + other chemicals for crystal prep		maybe	medium			yes		yes	yes	yes		yes	yes		yes	yes
104	Detector Area Airlock																yes		maybe			
105	Detector Area Change Rm																					
106	Control Rm							maybe						yes				yes				
107	Electronics Rm						maybe residue-less	yes						yes	yes							
108	Electroforming Lab	maybe		yes		acids, electrolytes,...		yes	med/high			yes	yes	yes	yes		yes	yes	yes	yes	yes	yes
109	Electroforming Machine Shop	maybe		yes										yes					yes		yes	yes
110	Rn Free Component Storage			maybe			maybe residue-less		med/high					yes	yes	yes			yes		maybe	yes
111	Electroforming Airlock																yes		maybe			
112	Electroforming Change Room																					
113	Low Background Counting				LN2				medium													
114	Facility Clean Storage							yes		yes												
115	Office																					
116	Utility Rm																					
117	Facility Dirty Storage?																					

r)

Majorana Surface Infrastructure

201	Staging		yes	yes	LN2	acids, electrolytes,...			medium	yes	maybe		yes	yes	yes				yes	maybe	yes	yes
202	Control Rm																					
203	IT																					
204	Office																					

Room Equipment Sheet

Majorana Room Equipment Sheet

Rm	Location	Equipment	Description	make/model	Quantity	Length (in)	Width (in)	Height (in)	Weight (lb)	Electrical Requirements	Power per unit (W)	Heat Load per unit (W)	Unit Cost	Cost Info	Total Cost
Majorana Underground Infrastructure															
101	Detector Hall														
		Detector Multilith	Detector blockhouse		1										0
		Crane	Class 100 cleanroom crane. Capacity to lift the heaviest single component of the detector blockhouse.		1								50000	guess	50000
		track system?	track system for moving monoliths from the multilith		2-4?										0
		radon monitor	only if Rn Reduced Air (RRA) is used.	Durrige Rad7 or equivalent	1								5000		5000
		O2 Monitor	Detect ODH due to leakage of covergas.		2								500	guess	1000
		telephone	Sysco VOIP phone		1								300		300
															0
102	Detector Assembly Rm														
		Crane	Class 100 cleanroom crane. Capacity to lift an entire monolith.		1								50000	guess	50000
		Test Cryostat	Able to hold 1 string?		1										0
		Work Bench			1	72	36	36					200	guess	200
		O2 Monitor	Detect ODH due to leakage of covergas.		2								500	guess	1000
		radon monitor	only if Rn Reduced Air (RRA) is used.		1								5000		5000
		telephone	Sysco VOIP phone		1								300		300
103	Crystal Prep Rm														
		Work Bench			1	72	36	36					200	guess	200
		Baking oven			1										0
		Test Cryostat	Able to hold 1 string?		1										0
		radon monitor	only if Rn Reduced Air (RRA) is used.		1								5000		5000
		O2 Monitor	Detect ODH due to leakage of covergas.		2								500	guess	1000
		telephone	Sysco VOIP phone		1								300		300
															0
104	Detector Area Airlock														
															0
															0
104	Detector Area Change Rm														
		lockers			6								200	guess	1200
		bench			2								100	guess	200
															0
105	Control Rm														
		desk	Desks for computers		3								100	guess	300
		chairs	operator chairs		4								100	guess	400

Room Equipment Sheet

Majorana Room Equipment Sheet

Rm	Location	Equipment	Description	make/model	Quantity	Length (in)	Width (in)	Height (in)	Weight (lb)	Electrical Requirements	Power per unit (W)	Heat Load per unit (W)	Unit Cost	Cost Info	Total Cost
		Computer workstations	for control and monitoring of detector and electroforming		8						500	500	2000	guess	16000
		telephone	Sysco VOIP phone		2								300		600
107	Counting Rm														
		19" Racks			6	36	24	72					1000	guess	6000
		DAQ computers	The DAQ control and data taking computers. Probably 1 control, 1 data taking, and 2 backups		4								2000	guess	8000
		Tape Storage	Underground data storage. Primary and a backup.		2								5000	guess	10000
		telephone	Sysco VOIP phone		1								300		300
108	Electroforming Lab														
		Plating baths			10?	36	24	24							0
		Electrolyte purifier	Purification system for electrolytes		1										
		Work Bench			1	72	36	36					200	guess	200
		O2 Monitor	Detect ODH due to leakage of covergas.		2								500	guess	1000
		Explosive Gas Monitor	Detect build up of H2 gas?		2								1000	guess	2000
		web cameras	cameras to monitor plating baths remotely	Axis model XXX	5								500		2500
		telephone	Sysco VOIP phone		1								300		300
109	Electroforming Machine Shop														
		Lathe			2?										0
		Mill			2?										0
		Drill press	Maybe just use mills?		1										0
		Work Bench	for and tool work.			72	36	36					200	guess	0
		radon monitor	only if Rn Reduced Air (RRA) is used.	Durrige Rad7 or equivalent	1								5000		5000
		O2 Monitor	Detect ODH due to leakage of covergas.		2								500	guess	1000
		telephone	Sysco VOIP phone		1								300		300
110	Rn Free Component Storage														
		Work Bench													0
		Storage Racks	Storage racks for Rn Free Storage boxes.												0
		O2 Monitor	Detect ODH due to leakage of covergas.		2								500	guess	1000
		telephone	Sysco VOIP phone		1								300		300
111	Electroforming Airlock														
															0
															0
															0
112	Electroforming Change Room														
		lockers			6								200	guess	1200

Room Equipment Sheet

Majorana Room Equipment Sheet

Rm	Location	Equipment	Description	make/model	Quantity	Length (in)	Width (in)	Height (in)	Weight (lb)	Electrical Requirements	Power per unit (W)	Heat Load per unit (W)	Unit Cost	Cost Info	Total Cost
		bench			2								100	guess	200
															0
															0
113	Low Background Counting														
		Ge Gamma Counter?													0
		telephone	Sysco VOIP phone		1								300		300
															0
114	Facility Clean Storage														
		LN2 Dewars	Transport dewars. Purchase or rent?		6	30	30	60							0
		Plating acid													0
		Plating chemical stock													0
		Plating copper													
115	Office														
		desk			2								100	guess	200
		chairs			4								100	guess	400
		Computer workstations			2						500	500	2000	guess	4000
		telephone	Sysco VOIP phone		1								300		300
116	Utility Rm														
		Rn Scrubber													0
		LN2 Storage Dewar	1000l? 2000l? storage dewar for LN2 for covergas and coolant		1								50000	guess	50000
		UPW system?	If not provided by site, a UPW system.		1										
		telephone	Sysco VOIP phone		1								300		300
															0
117	Facility Dirty Storage?														
															0
															0

Majorana Surface Infrastructure

201	Staging														
		telephone	Sysco VOIP phone		1								300		300
															0
202	Control Rm														
		desk	Desks for computers		3								100	guess	300
		chairs	operator chairs		4								100	guess	400
		Computer workstations	for control and monitoring of detector and electroforming operations.		8						500	500	2000	guess	16000
		telephone			2										0
															0
203	IT														
		Data Computer	Surface data and tape writing computer		2						500	500	2000	guess	4000
		Disk Array	Disk array for on-site, online data storage.		1								20000	guess	20000

Room Equipment Sheet

Majorana Room Equipment Sheet

Rm	Location	Equipment	Description	make/model	Quantity	Length (in)	Width (in)	Height (in)	Weight (lb)	Electrical Requirements	Power per unit (W)	Heat Load per unit (W)	Unit Cost	Cost Info	Total Cost
		Tape Storage	Underground data storage. Primary and a backup.		2								5000	guess	10000
204	Office														
		desk			2								100	guess	200
		chairs			4								100	guess	400
		Computer workstations			2						500	500	2000	guess	4000
		telephones	Sysco VOIP phone		1								300		300
															0

288700