LCLS Room Data Sheet #	1.9-1022	Near Experimental Hall - Laser Bay	Revision 2

Javier A. Sevilla Owner / Editor		Signature	8/11/05 7/28/05 Date
Jim Welch Conventional Facilities System Physicist		Signature	8/12/05 Date
David Saenz Conventional Facilities System Manager		Signature	8/12/05 Date
Stefan Moeller X-R Endstations WBS Manager		Signature	8/12/05 Date
John Arthur Photon Beam System Manager		Signature	8-12-05 Date
Darren Marsh Quality Assurance Manager		Signature	8/15/05 Date

REVISION INFORMATION

Rev 2. Added figure floor penetrations, data for heat dissipation, voltage for 120 volts outlets

Added power demand diversity, cable trays specifications

LASER BAY (NEH) - ROOM DATA SHEET

Name of Building	Laser Bay (NEH)		
Organization or Department	SLAC, Stanford University		
Net area	148.4 sq. meters		1597 SF
Critical dimensions	**H:**	3.66 m	12'-0"
	W:	9.45 m	31'-0"
	L:	15.7m	51'-6"
Hours of operation	Facility is locked with controlled access		
Users/Occupancy	Laboratory reseachers prepare and run experiments. Occupancy Group "B".		
Building orientation	Laser bay is located on the NEH basement level directly above the 3 experimental hutches (located on the NEH sub-basement level). South side of NEH		

FUNCTIONAL OBJECTIVE	1- Must be able to use laser bay space for at least three separate experimental groups. The implication of this is that lighting, mechanical, electrical and all utilities are to stress flexibility as the layouts of the laser tables and enclosures will always change and adapt to requirements of new experiments.
PLANNING CONSIDERATIONS & CRITICAL FACTORS	1- Each Laser Lab requires two accesses. One access shall be near the elevator for equipment using one pair of 3'x7' doors with key lock. Another access for personnel. Personnel access shall be by means of a labyrinth, or by a double doors system with vestibule. Provide controlled access (card reader) into the Laser Bay. This vestibule should be sized to accommodate as minimum: a bench which a small group of lab personnel can use to don booties safely, a rack or cabinet to place bootie dispensing and bootie disposal recepticles, smock dispensing / storage / disposal, protective eyewear dispensing / storage, a few personal lockers and the clear space between the inner and outer pair of 3'-0" wide access doors. 2- Must be able to physically maneuver horizontally the laser tables from the elevator to the laser lab while on pallet jacks. 3 - Provide six 6" diameter holes with metal sleeves in the concrete floor to the hutches (sub-basement)

FINISHES	Wall	Painted gypsum wall board. No glossy finishes.
	Ceiling	Mylar wrapped acoustic tile panels within suspended Unistrut framing grid capable of supporting experiment specific diagnostic equipment on suspended shelf below the ceiling above eack laser table. Each shelf estimated weight is 500 lbs each.
	Floor	Resilient sheet flooring-concrete floor
	Base	Rubber base
	Doors	Flush hollow metal inner vestibule doors. Doors installed with automatic door bottoms preventing light leak. Outer vestibule doors are locked and openable by key or cardkey.
	Fenestrations	None allowed.
	Acoustical	Typical laboratory decibel level required. NC:35

APPLICABLE STANDARDS	29 CFR Part 1910 Occupational Safety and Health Standards Dept of Labor, 29 CFR Part 1926 Safety and Health Regulations for Constructions Dept of Labor, Uniform Building Code (UBC) 1997 including appendixes, National Electric Code (NEC) 2002, Uniform Mechanical Code (UMC) 2003 including appendixes, Uniform Plumbing Code (UPC) 2003 including appendixes, Uniform Fire Code (UFC) 2003 including appendixes, California Code of Regulations Title 8 Industrial Safety, Title 19 Public Safety, NFPA 70 National Fire Codes, National electrical Safety Code ANSI C2, Occupational Safety and Health Act (OSHA), General Services Administration 41 CFR part 101-19, Environmental Protection Agency 40 CFR Parts 264 and 265, SLAC Environmental Safety & Health Manual, General Industrial Activities Storm Water Permit (SLAC Permit), NFPA 101 life Safety Code, Title 24, DOE standard 10 CFR Part 435, ASHRAE/IES Standards 90.1, NFPA Standard 13 and SLAC Fire Marshal requirements, LCLS Cabling Standard, SLAC LOTO					
BUILT-IN CABINETRY	Upper and Lower cabinets					
VIEWS & SCHEMATICS (N. T. S.)	**See Figure No. 1**					

MECHANICAL REQUIREMENTS	**HVAC**	☒	Heating system	Temp:	☒	Mechanical humidification
	Provide filtered clean air using pre-filters, high efficiency filters and HEPA filters in the air handling unit. 6 FPM average room velocity or less, Not an official "certified" Clean Room but equivalent to a Class 100,000.	☒	Air conditioning	Temp: 72 degrees F± 1 degree F	☒	Direct exhaust system - for laser table experiment enclosures only.
		☐	Direct supply		☐	Positive pressure system
		☐	Indirect supply		☐	Negative pressure system
		☐	Smoke control system		☐	Standard registers
		☒	Temperature sensors connected to DDC system		☒	Requirement for gases
		List of Gases - 1. Provide piping to Laser Bay for N2 gas to be piped from a nirogen boil off station (centralized system), which is located outside outside of NEH in parking lot area near the service dock. 2. <u>Centralized Mechanical Utilities:</u> Clean dry oil-free compressed air 20 SCFM, 100 psig. Provide three locations (along concrete wall) with shut off valve and pressure gauge			1- Low velocity less than 6 FPM. 2- Relative Humidity shall be 45% +/- 10% 3. 200 CFM exhaust ducts (6") for process exhaust at 1.5"W.C. static pressure for Laser Bay 4.- Direct Digital Control for operations and interface w/ SLAC Energy Management System (EMS).	
	Communications	☒	Telephone- 2 phone lines/location		☐	PA speakers
		☒	Dataport- 2 jacks/location		☐	PA station
			Payphone		☐	CCTV camera
		☒	Fire alarm station		☐	CCTV monitor
		☐	Intercom			
		Comments: a) Provide cable trays- Refer to figure No. 1. Cable trays shall be made of galvanized steel, provide with 1# 4/0 bare copper wire as grounding for each cable tray.				

	Plumbing/Fire Protection	☐	Hot water system	☐	Electric watercooler	
		☐	Cold water system	☐	Drinking fountain	
		☒	Process cooling water	☒	Smoke detection system	
		☐	Waste drain	☒	Standard sprinkler heads	
		☒	Floor drain	☐	Eye wash	
		☐	Trench drain			
		Comments: 1- Process Cooling water: 30 GPM, 25 PSi at 68 F in Laser Bay. Refer to LCLS ESD for Water Cooling Specifications. Terminate with shut off valve and pressure gauge. Locate piping on concrete wall				
ELECTRICAL REQUIREMENTS	**Power supply**	☐	208 V 1ph and 208 volts, 3 phase outlets	☐	Uninterrupted power supply	
		☒	110V, 1ph Double duplex outlets, 20 amps locate at 10ft apart on walls.	☒	Special electric	Type:
		☐	Emergency power		Provide three panels, 208 volts, 3 ph-120 volts, (two "clean" and one "dirty" power). Each panel shall have a main breaker. All panels should have 20% spare capacity and additional breaker space. Capacity of each panel: min.**125** amps. Diversity: 60%. **Panel location:** Near to vestibule	
		Comments: 1- Number of circuits: 42 circuits for each panel. 2 - Heat dissipation from equipment for entire room: 15kW				
	Lighting	☒	Light fixtures -	☐	Remote lighting control	
		☐	Fixture type I: Downlight	☒	Light switches	
			Fixture type II: Bollard (exterior)		Lighting level	FC: 100
		☒	Emergency lighting			
		Comments: 1- All conduits are surface mounted. Low profile fixtures preferred. 2- No night lighting desired. 3- Each of the three experimental areas within the Laser Bay is to be separately zoned for lighting control flexibility. 4- Must have the ability to completely darken the room when required by the particular experiment. 5- Lighting level should be higher than normal standard office environment due to the dark laser protective goggles worn by the lab personnel. 6- Light fixtures could be located at the lower unistrut level, placing the fixtures as close to the worksurface as possible.				

RADIATION/SEISMIC/VIBRATIONS ISSUES	**Comments:** 1- All equipment (HVAC, cable trays, panels, etc) and systems are to be seismically braced and restrained per Code. 2- Vibration criteria per LCLS ESD Vibration Specification 3- Vibration generating HVAC equipment, pumps, and any other equipment located adjacent to the Laser Labs are to be mounted on vibration isolating assemblies to mitigate the transmission of vibration into the building structure and affect the experiments.
SPECIAL REQUIREMENTS FOR EQUIPMENT	**Comments:** 1- Laser experimental equipment requires cooling either by providing a centralized system of cooling water supply and return piping or a decentralized system of small remote laboratory chillers located within a small closet. Either way is a closed system. Locate a small closet to accommodate these remote chillers. 2- Experiments require the creation of a vacuum within a vessel. A pump room should be included adjacent to the Laser Labs in a sound isolated room which accommodates a SLAC provided "rough" vacuum pump (Roots blower) and a "high" vacuum pump (turbo pump). 3. Provide six floor penetrations (6" diameter) with metal sleeves into x-ray hutches below (see figure 1). Two penetrations for each hutch for laser beam transport. 4. Provide cable trays (see figure 1 below).

CHEMICALS / GASES

CHEMICALS			SPECIALTY GASES		
#	Chemical Type	Quantity	#	Gas Type	Quantity

Radiation protection is a must for surrounding facilities.

ENVIRONMENTAL NEEDS

1.0

Figure 1

12" double cable tray

12" single cable tray

Fig. Laser bay: NEH Basement