SSC-N-1
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Land and Shielding Requirements for Test Beam Facilities from the HEB: Impact of Conventional Facilities

The RDS provides six long straight sections in the HEB. Five of these are occupied, one is unassigned at 11 o'clock. See RDS Figure 4-9, attached. The obvious place to develop extracted beams for a test beam facility is at this undeveloped location. Doing so, however, would require developing a new complex of heavy utilities, buildings, and security in what is otherwise an undeveloped area. It would also require acquiring land beyond that provided in the site criteria document, since the length to provide beam manipulation and splitting as well the target stations and test beams would extend well over a mile beyond the tangent point, based on the Fermilab. Also, the basic initial cost of each experimental area at Fermilab in 1974 was approximately $26M. Assuming ultimately a test station for each of the collider detector stations, this could become an expensive item.

A more attractive alternative is to extract from the 70 GeV injection point at 5 o'clock back towards the LEB. This makes use of the existing tunnel and facilities between the HEB and the LEB for the required beam manipulation and splitting. There is sufficient length in the tunnel to do this efficiently and cleanly, unlike the Fermilab case where, for historical reasons, the splitting had to be done too close to the machine to allow for proper phase space rotation and manipulation in the splitting sequence. The Lambertson magnets to split the beams (initially four with provision for six) to the targets would be introduced at the tangent to the LEB to utilize the structures and facilities at that point, without putting unnecessary radiation back into the LEB tunnel. The beams would be split and targeted with separations similar to those found within the Proton or revised Meson areas at Fermilab, making a rather compact overall area with each test station having its own independent primary proton beam and target station.

This approach would require a re-arrangement of the south end of the Campus relative to the RDS design. It would have the advantage of placing the test stations close to the center of activity and in an existing utility network. It would also mean that no land would be needed additional to that provided in the site criteria document. Radiation security relative to the general public would be better controlled adjacent to the center of activity rather than in a relatively remote location like 11 o'clock. By proper rearranging of the campus, and shielding of the target stations and beam dumps there would not be any increased radiation hazard for the campus area.

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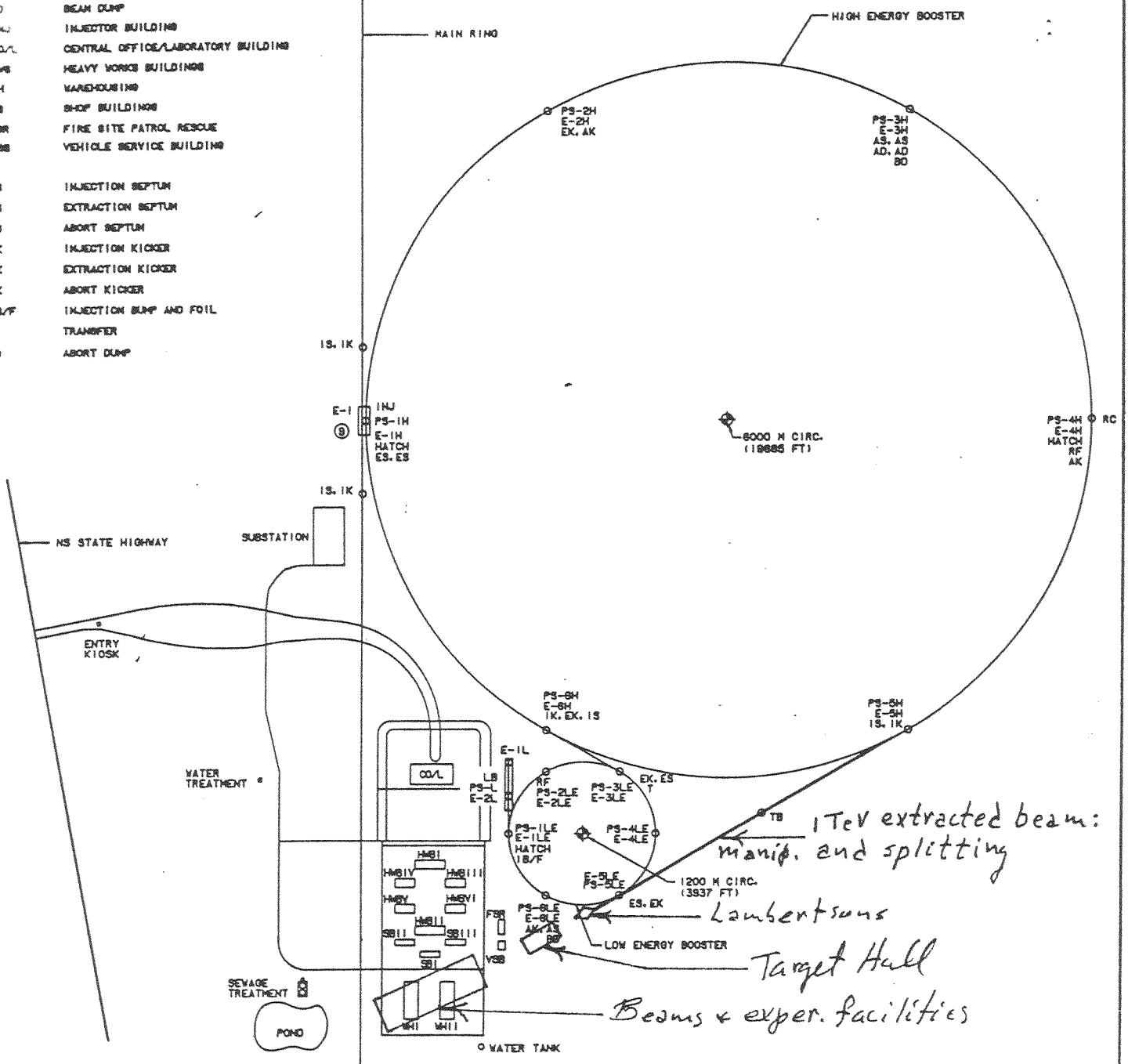
LEGEND

LB	LINAC BUILDING
PS-L	POWER SUPPLY BUILDING, LINAC
E-1L	EXIT AND NUMBER, LINAC
PS-3LE	POWER SUPPLY BUILDING AND NUMBER, LOW ENERGY BOOSTER
E-3LE	EXIT AND NUMBER, LOW ENERGY BOOSTER
TB	TRANSPORT BUILDING
PS-1H	POWER SUPPLY BUILDING AND NUMBER, HIGH ENERGY BOOSTER
E-2H	EXIT AND NUMBER, HIGH ENERGY BOOSTER
RC	REFRIGERATION COMPRESSOR BUILDING
RF	RADIO FREQUENCY BUILDING
BD	BEAM DUMP
INJ	INJECTOR BUILDING
CO/L	CENTRAL OFFICE/LABORATORY BUILDING
HWB	HEAVY WORKS BUILDINGS
WH	WAREHOUSING
SB	SHOP BUILDINGS
FSR	FIRE SITE PATROL RESCUE
VSB	VEHICLE SERVICE BUILDING
IS	INJECTION SEPTUM
ES	EXTRACTION SEPTUM
AS	ABORT SEPTUM
IK	INJECTION KICKER
EK	EXTRACTION KICKER
AK	ABORT KICKER
IB/F	INJECTION BUMP AND FOIL
T	TRANSFER
AD	ABORT DUMP



1 TeV extracted beam: manip. and splitting

Lambertsons

Target Hall

Beams & exper. facilities

IV-9

Central Lab/Office and Injector Facilities

Parsons Brinckerhoff