

FAARM Collaboration Meeting

Water Shield

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Topics

- General arrangement
- Functional requirements
- Materials
- Construction Concepts
- Cost Drivers
- Approximate cost

Historical Perspective

- Earlier layouts:
 - Labyrinth opening
 - Walk in/move in any time
 - Versatile for size and frequency of access
 - Requires much greater space and water volume
- Current
 - Plug opening
 - Open plug for each entry
 - Less versatile
 - Substantially reduced space and water volume

Historical Perspective

- Sunken base shield
 - Outside prescribed limits
 - Increased above-grade space
 - Shield floor “at-grade”
- Raised base shield
 - Respects limits
 - Reduced above-grade space
 - Shield floor “above-grade”

Functional Requirements

- Shielding—2.3 m
- Each module has a PMT
- Modules plumbed together
- Minimal shield structure
 - Shield containers *ARE* structure

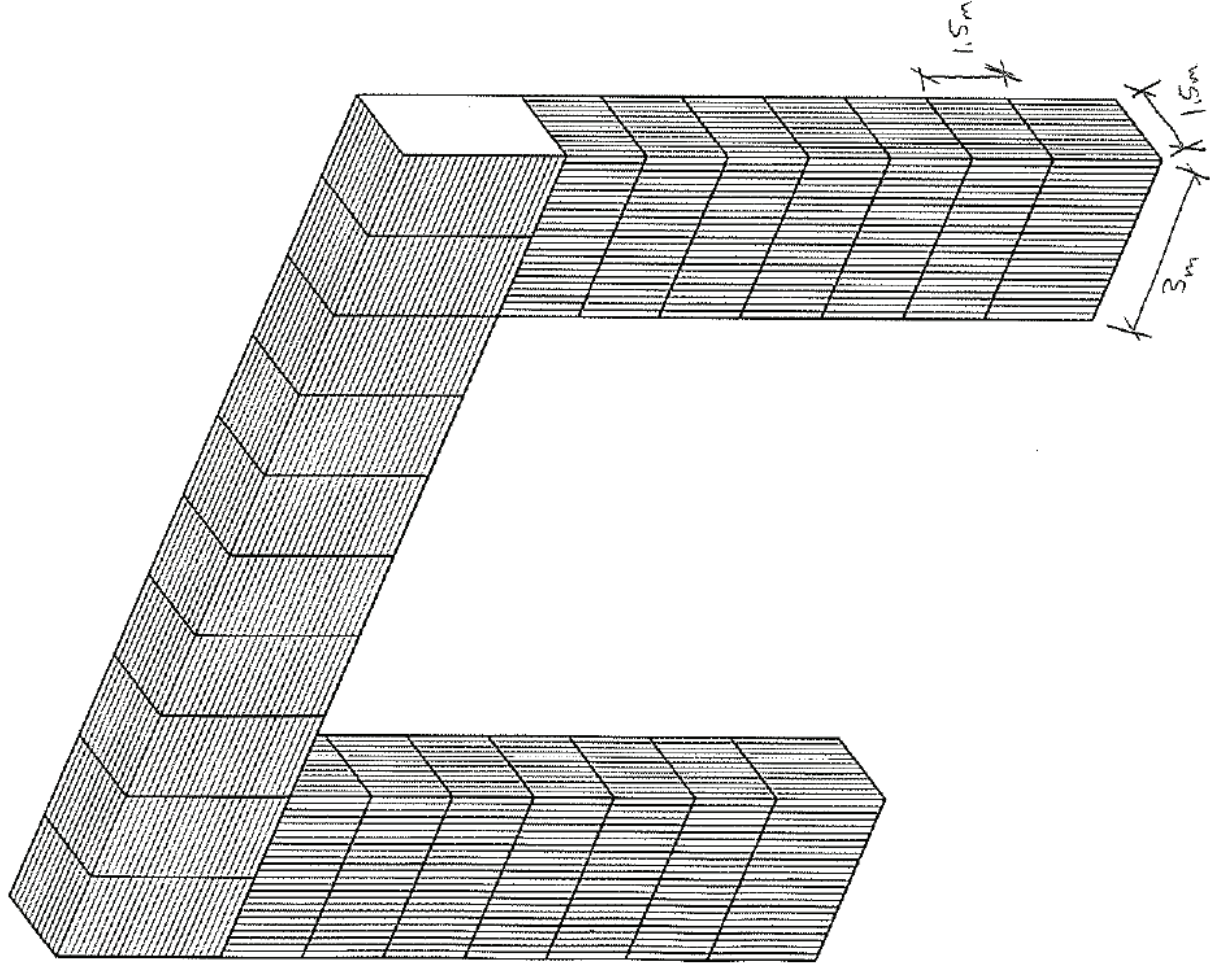
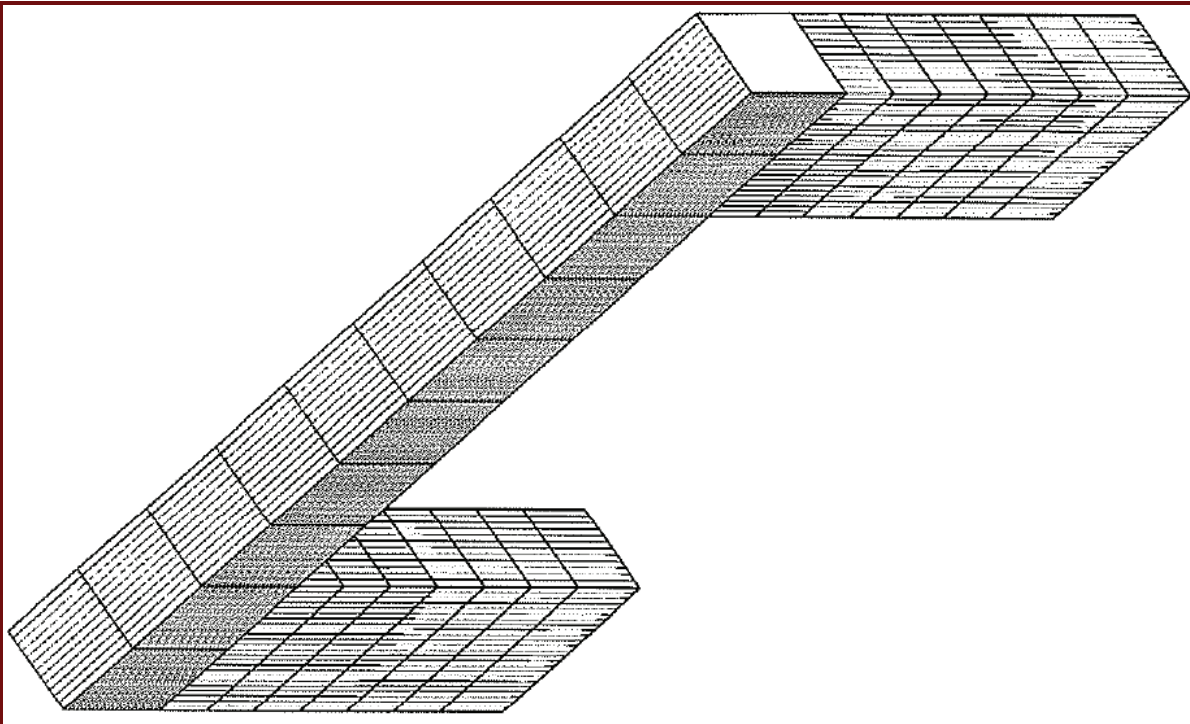
Construction Type

- Stick-Built construction
 - Shield constructed in place in the FAARM space, from components
 - Advantages:
 - Larger volume modules
 - Disadvantages:
 - Larger underground workforce
 - Larger underground laydown and assembly space
 - More construction dirt and debris
- Modular Construction
 - Modules constructed on the surface, assembled into shield underground
 - Advantages:
 - Better construction conditions and quality control
 - Disadvantages:
 - Smaller modules
- Have not considered impact of PMT

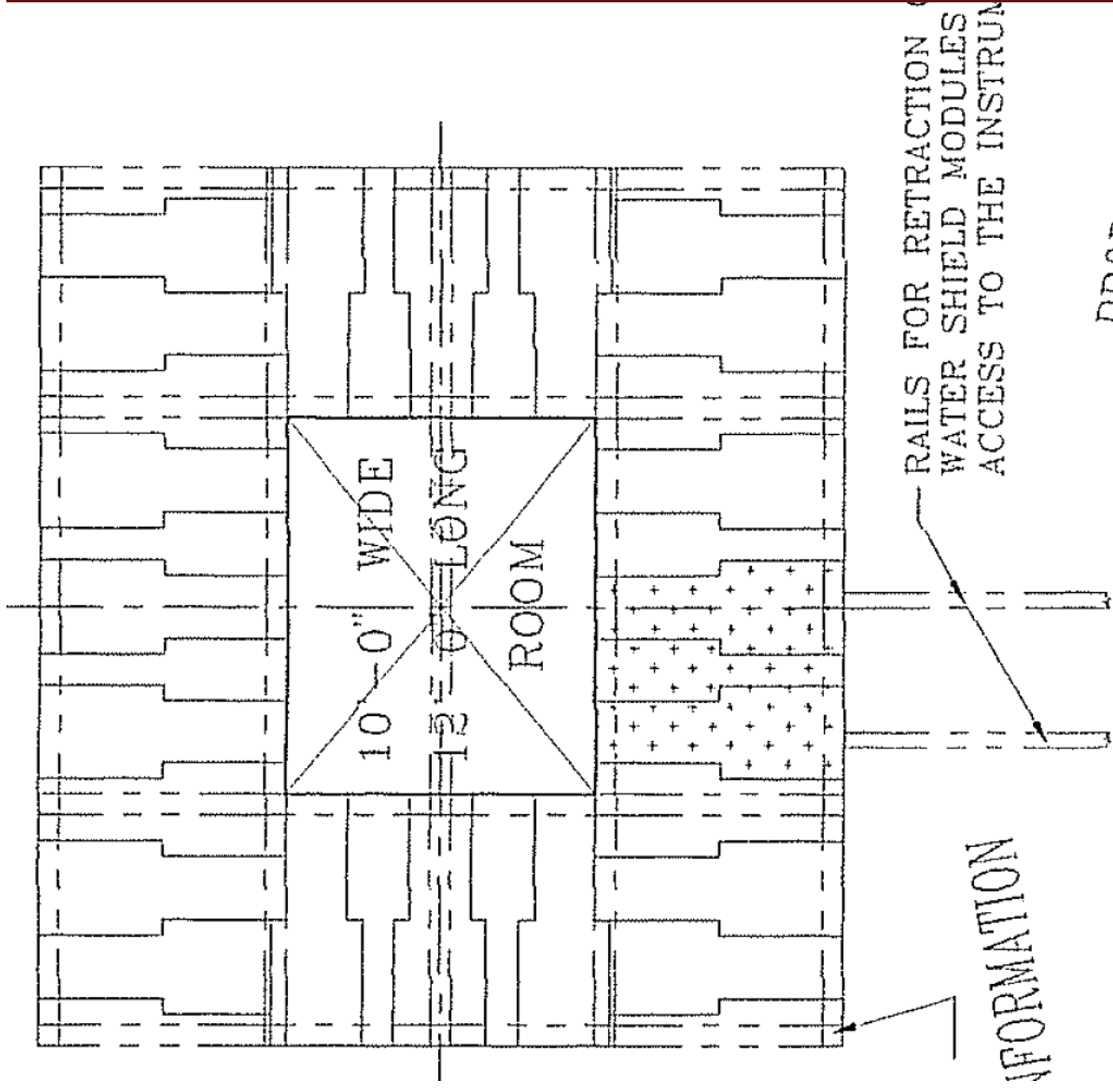
Construction Type

- Modular construction example
 - Individual modules of 3m x 1.5m x 1.5m
 - Dimensions are approximately the maximum size of the cage
 - Comprised of stainless steel skin, possibly corrugated
 - Corrugations prevent buckling (allowing thinner and lighter material)
- Compartmentalization and wise plumbing limits the head in each module

Corrugated Shield



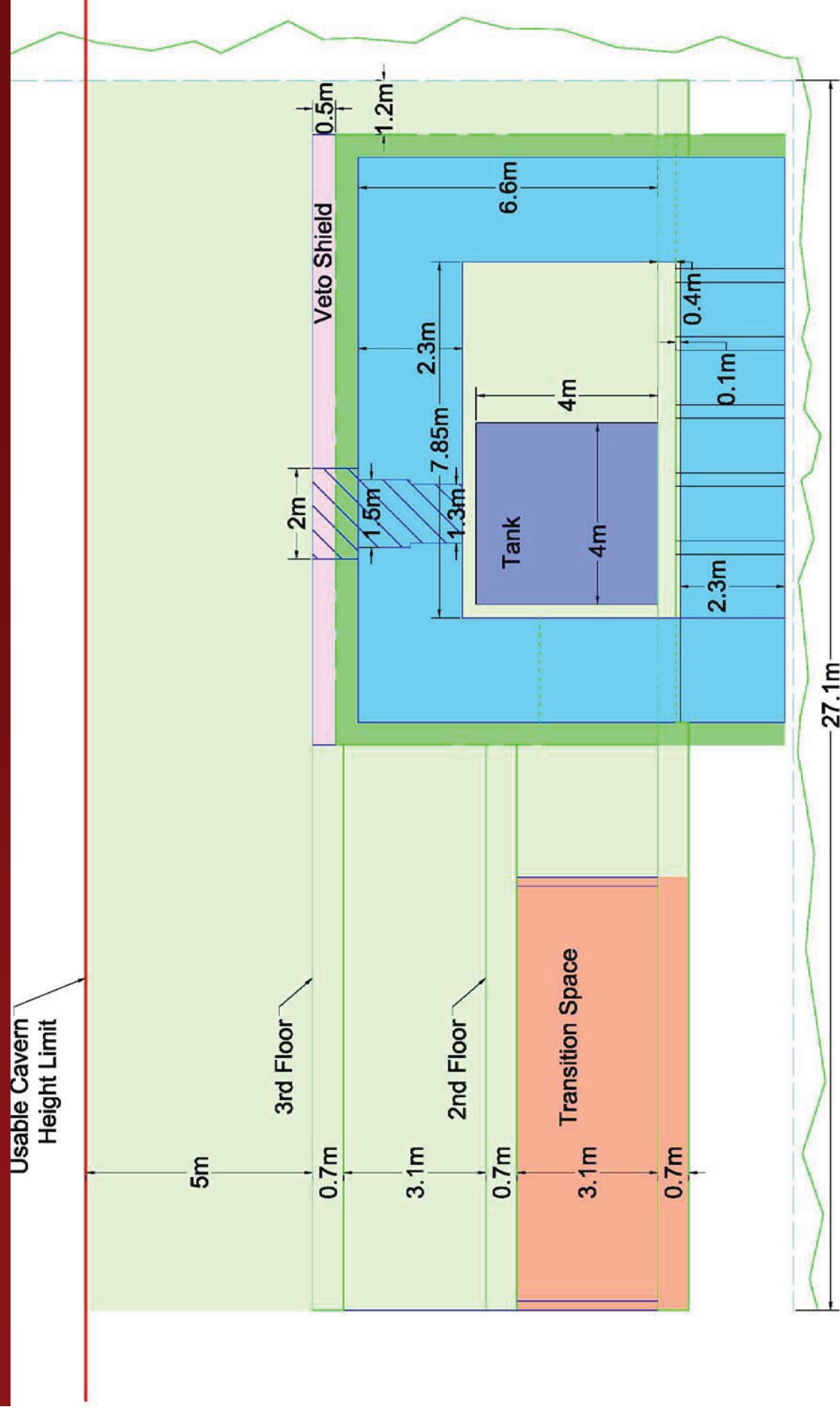
DuFrane Concept



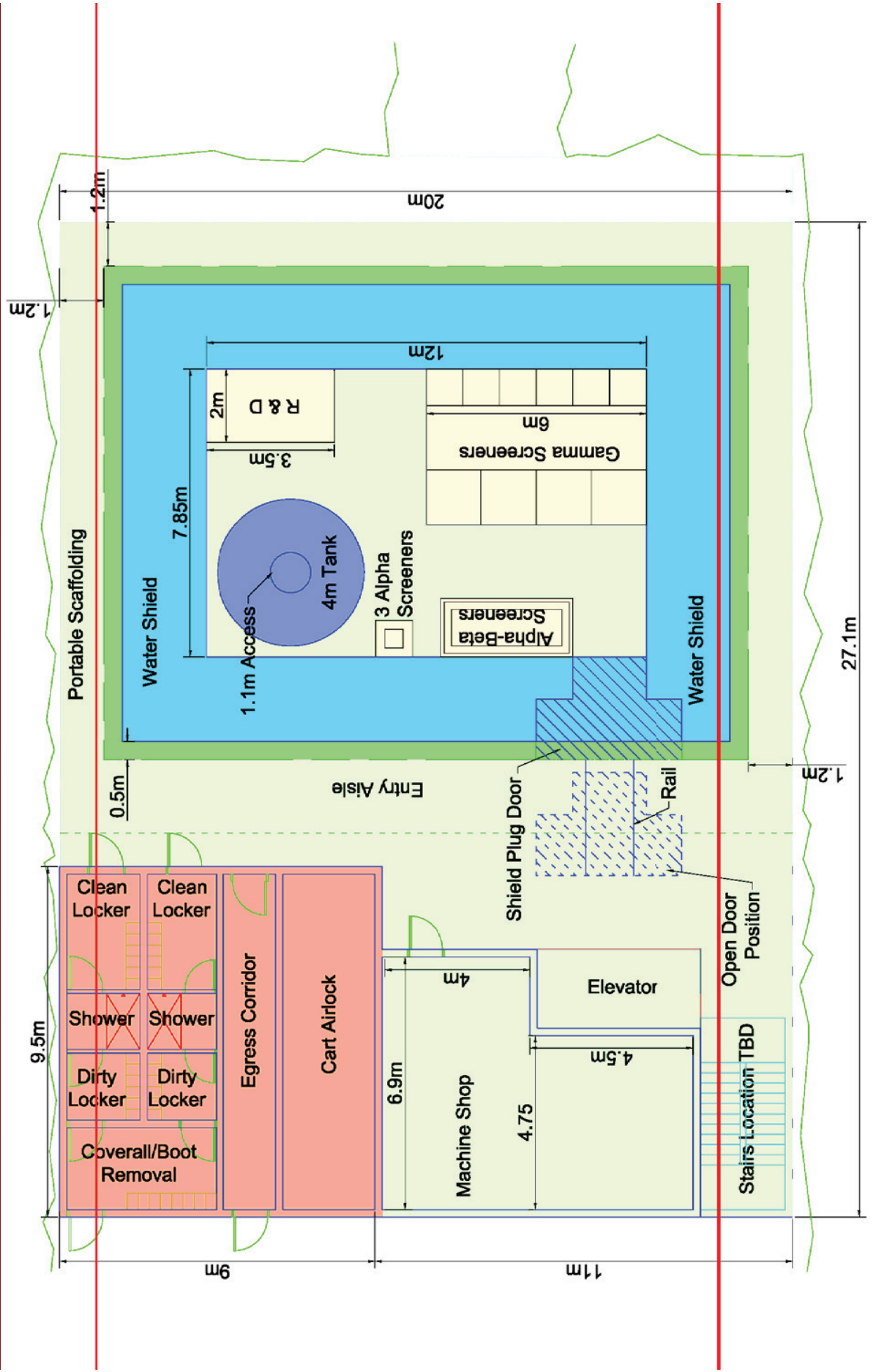
DuFrane Details

- 10 ft x 12 ft x 8 ft shielded volume
- 8 ft thick shielding
- \$2.785 m

Longitudinal Elevation



First Floor Plan



Unresolved Issues

- Raised or sunken base shield
- Plumbing and cabling
- Utility chases
- Construction type
- Will consider other alternatives later

Cost Drivers

- Underground logistics
 - Hoisting, transport, laydown space
- Construction type
- Internal volume
- Shield thickness
- Instrumentation
- Cabling and plumbing

Scaled Cost Range

