

52nd Annual Biological Safety Conference

Miami, Florida

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Design and Construction Methodologies for a New ACL-2 Insectary in an Existing Multi-tenant Life Sciences Research Facility at USF



G R E S H A M
S M I T H A N D
P A R T N E R S



Jeff Talka, GS&P

Andy Dulioki, Whiting-Turner

Agenda

- The Players
- The Project
- The Challenge
- The References
- The Method
- The Result



The Players

- Global Health Infectious Disease Research Program (Tenant)

- Thomas Unnasch, PhD
- Wil Milhous, PhD
- Dennis Kyle, PhD
- John Adams, PhD
- Alberto van Olphen, DVM
- Matt Rollie, MPH
- *Affiliation with College of Public Health*
- *Affiliated with Center for Biological Defense*
- *Malaria, West Nile Virus, Eastern Equine Encephalitis*



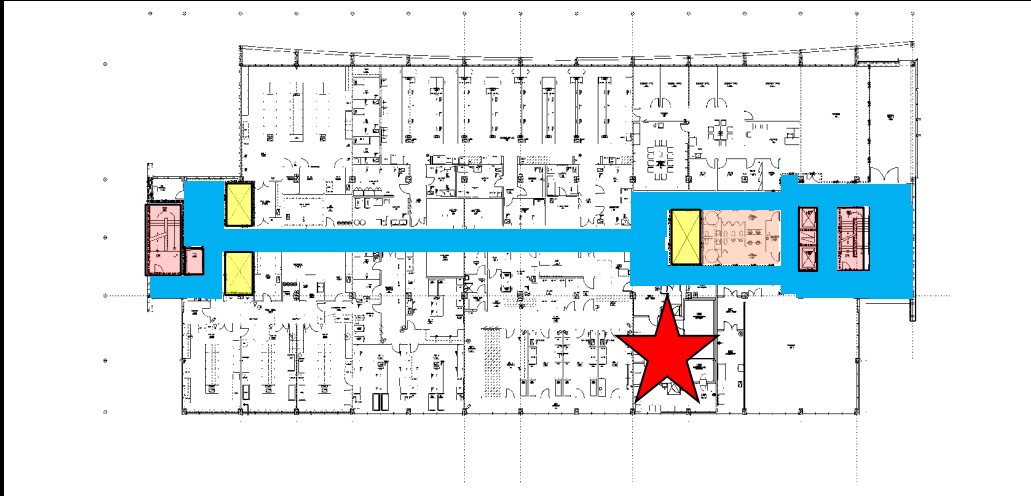
- USF Research Foundation (Landlord)
- Gresham, Smith and Partners (Architects)
- Whiting-Turner (Construction Manager)
- Farah Moulvi (USF BioSafety Officer)

The Project

- Develop a 1,500 SF Insectary to support Malaria Research
- Connection to existing BSL-2 Laboratories
- Project is within the four story Interdisciplinary Research Building (IDRB) at the University of South Florida



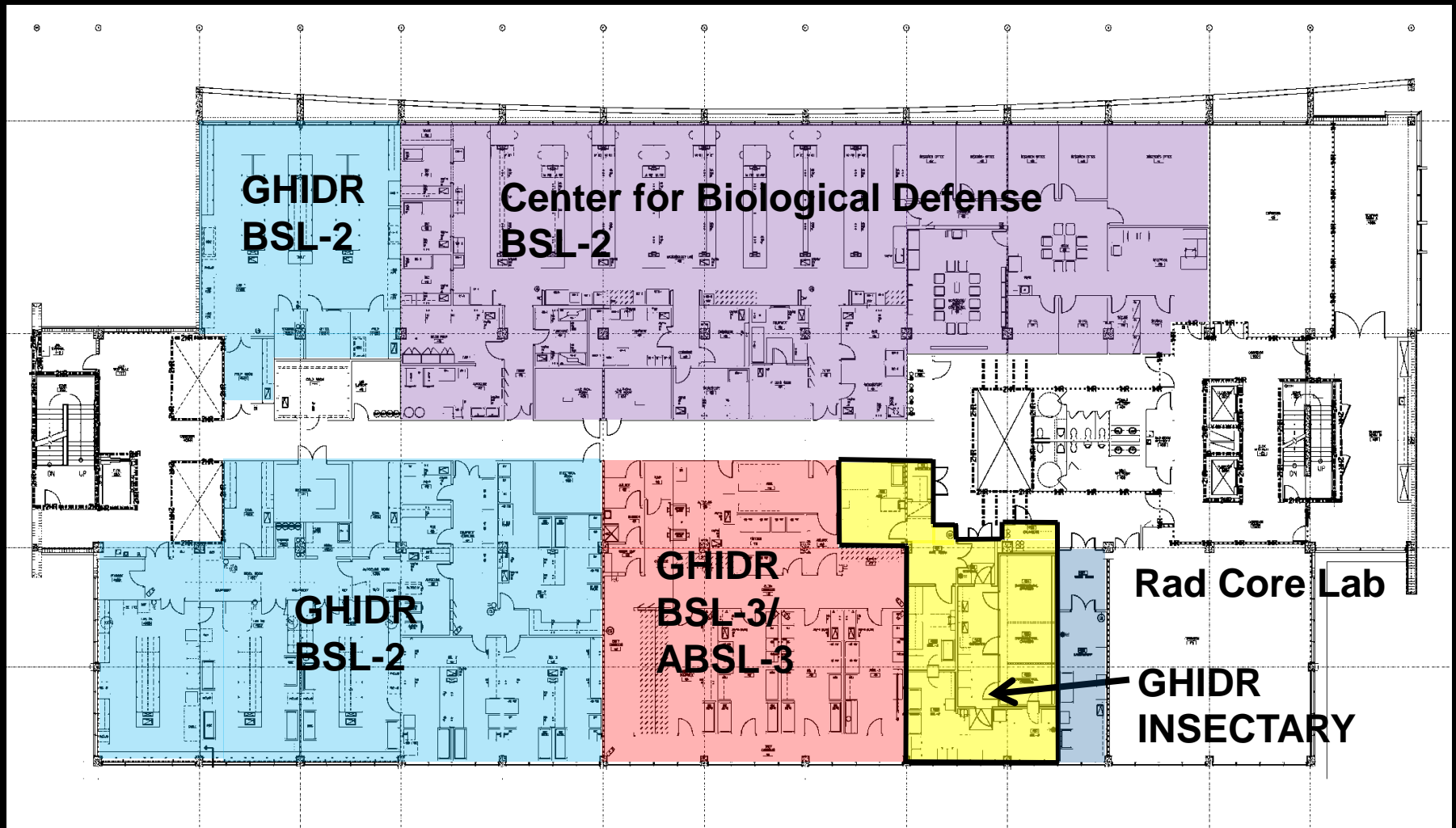
The Challenge



- Four Floors
- 30,000sf/ floor
- Multi-discipline
- Synthetic Chemistry, NMR, Electronics, Physics, Photovoltaics
- And Life Sciences



The Challenge



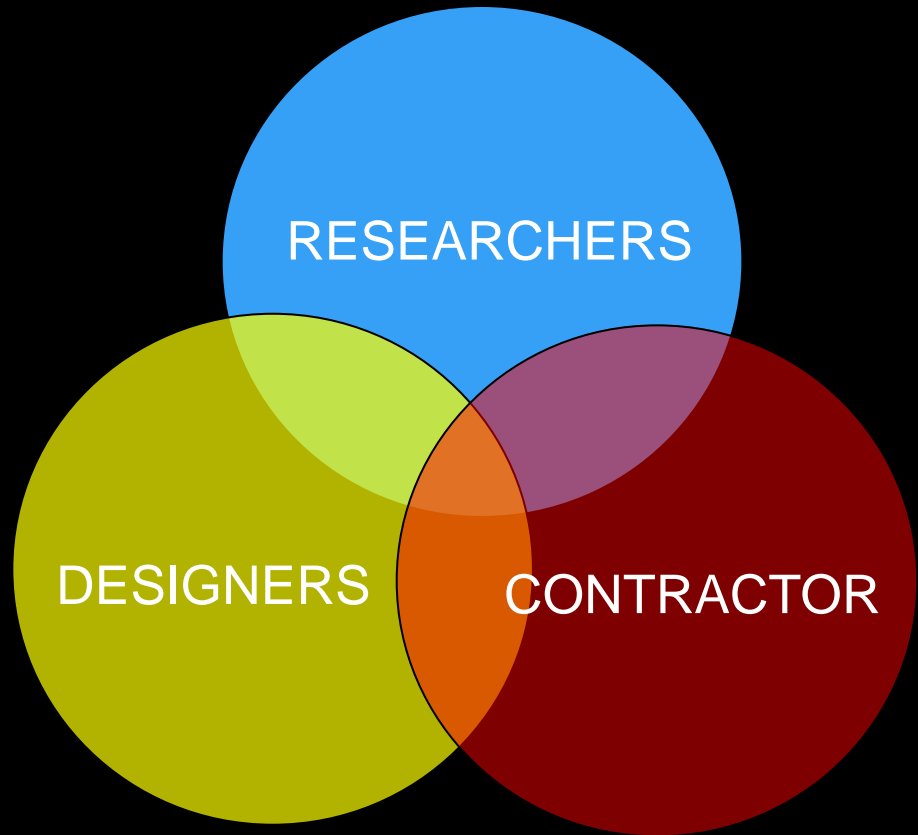
The References

- NIH-CDC BMBL 5th Edition
 - References Arthropod Containment Guidelines
- NIH Design Guidelines
 - Chapter C.1.1.5 references general criteria
- Arthropod Containment Guidelines
 - American Committee of Medical Entomology
 - American Society of Tropical Medicine and Hygiene

WE DESIGNED UPON BSL-3 PREMISES

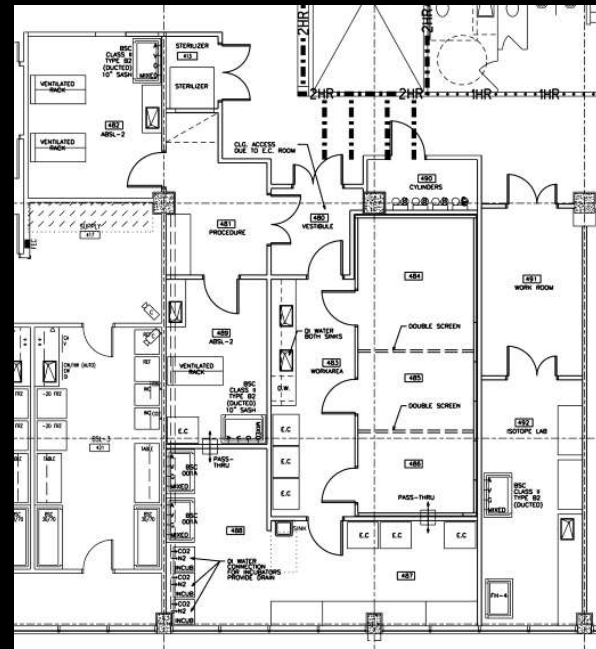
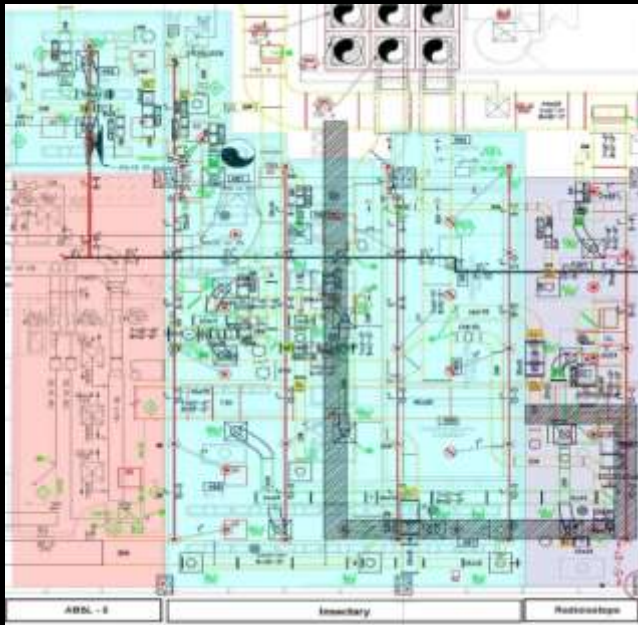
The Method

- Development of Planning Strategies with the Users
 - Evaluation relative to Risks
- Continual Budget Verification
- Frequent Team Meetings
- Close vendor communication and coordination
- Development of construction details
- Regular field visits during construction
- Continuous Communication



The Method

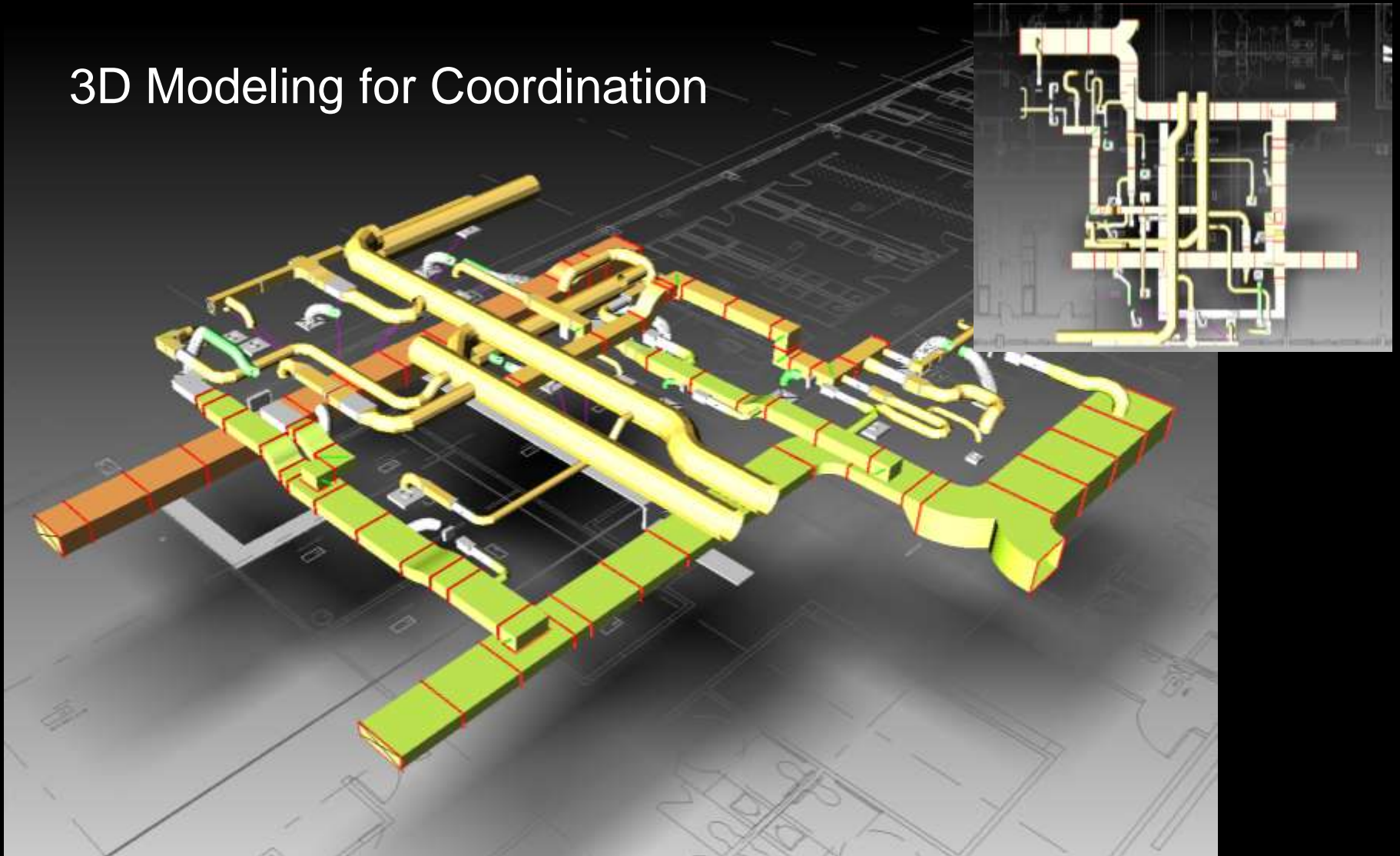
- Coordinated discipline documentation for installation certainty
- Participation by MPE sub-contractors, and equipment vendors



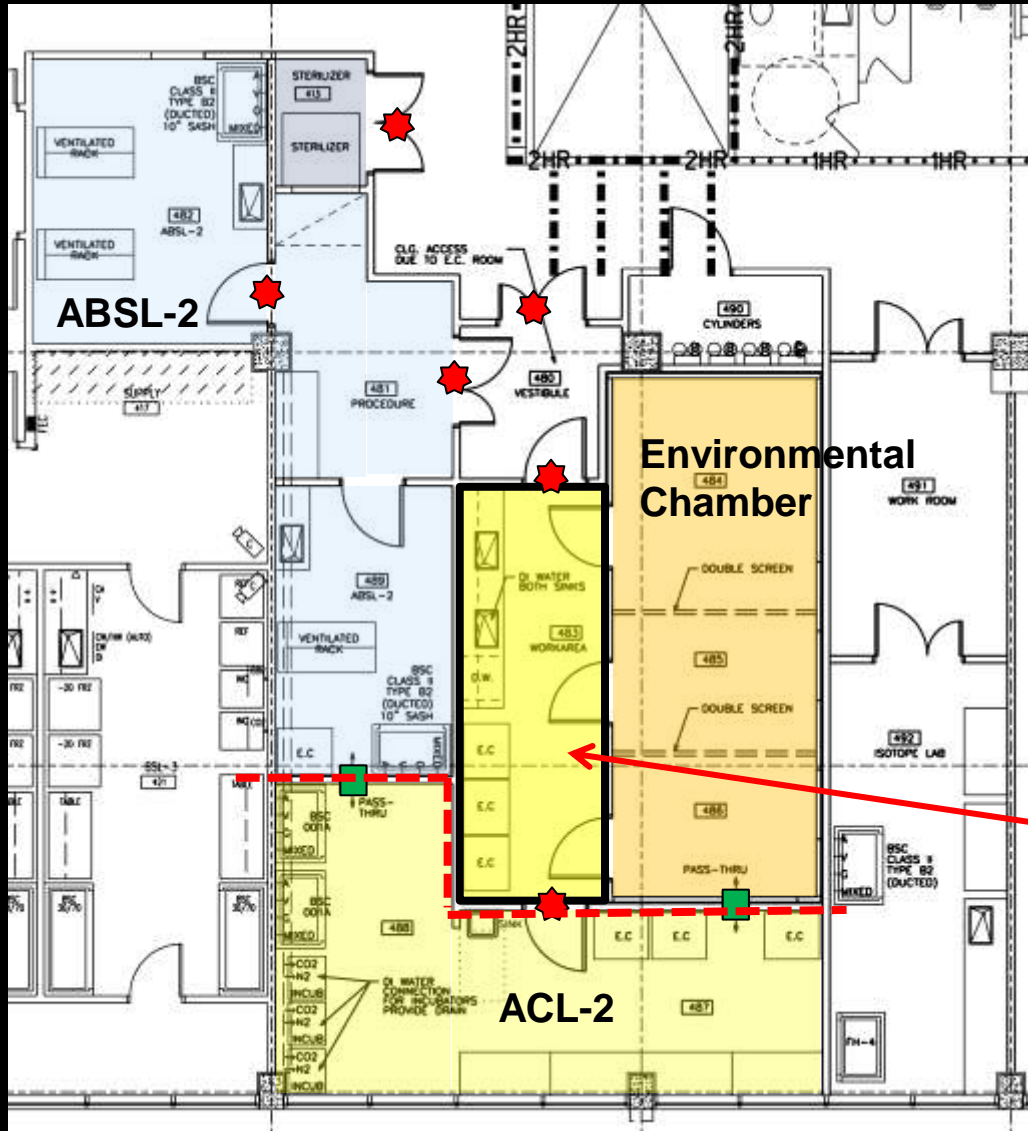
MPE Zones based onthe Layout

The Method

3D Modeling for Coordination



The Result



- ACL-2 Suite supported by Environmental Chamber
- Work Area
- ABSL-2 Suite supports ACL-2 work
- Door seals assist in preventing mosquito migration
- Work Room is also “Kill Zone” (68degrees F)
- Pass Boxes maintain containment

The Result: Construction



- Steel studs and gypsum wall board
- Reduction of access panels
- Monolithic flooring
- Built up floor to align with environmental chamber
- Sealed construction: lights, HVAC, drains, door seals, penetrations, electrical



The Result: Construction

- Environmental Chamber coordination
- Access from outside of suite to above
- Low overhead clearances



The Result: Finished Product



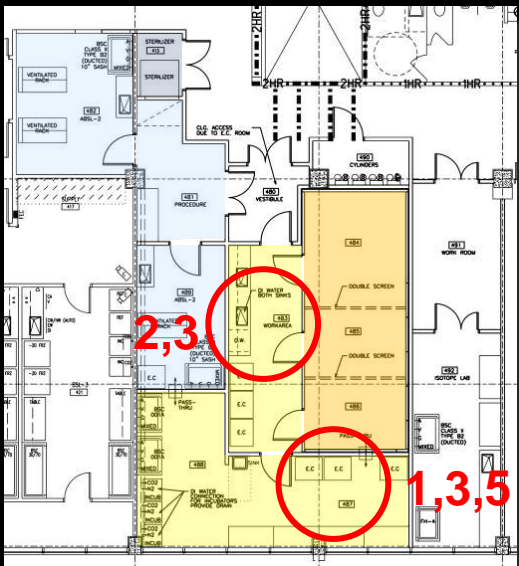
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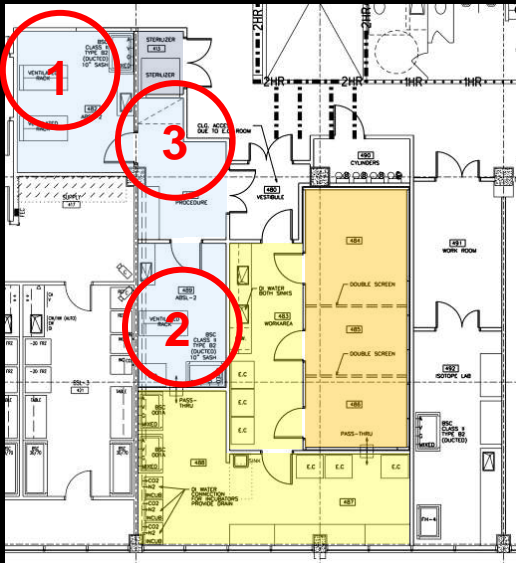


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The Result: Finished Product



2



1

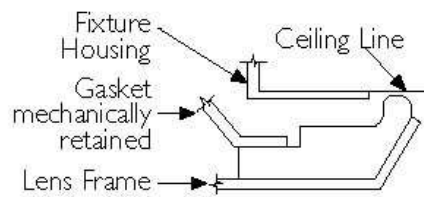


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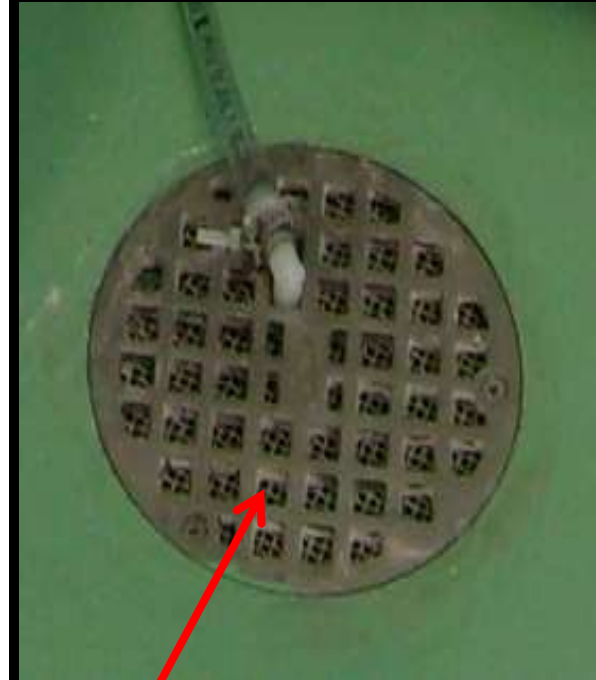
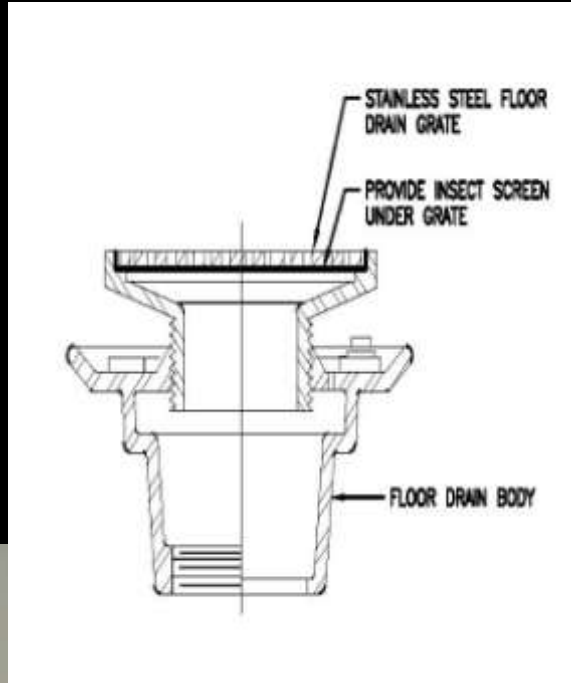
The Result: Lighting



Gasket Profile



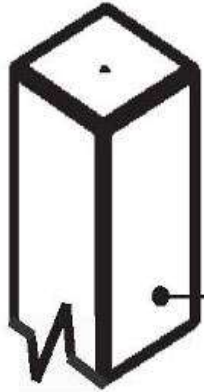
The Result: Drain Screening



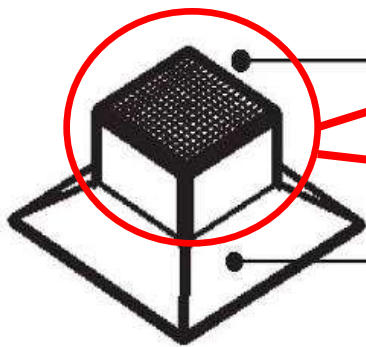
Mesh Drain Screen

Added protection to service fitting:
stand-off bracket and plastic rail

The Result: HVAC Screening

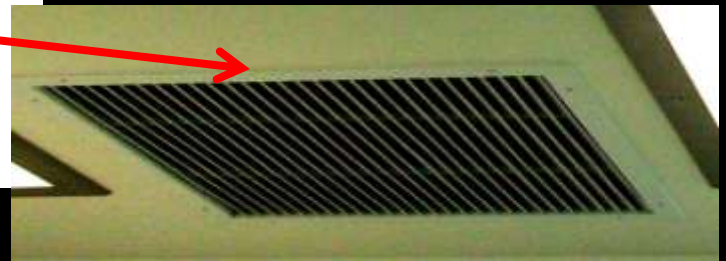


Stainless Steel Duct

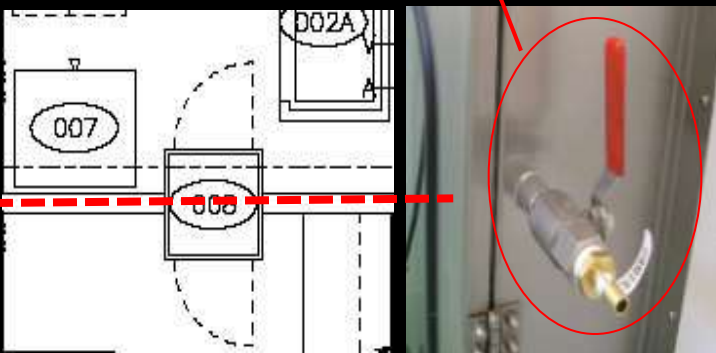
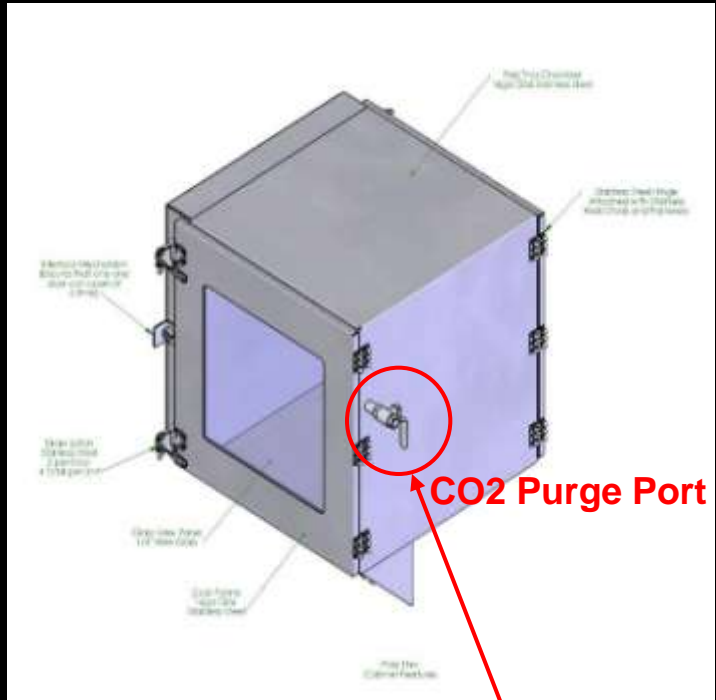


18 x 16 Stainless Steel Mesh Screen installed at the throat of the diffuser

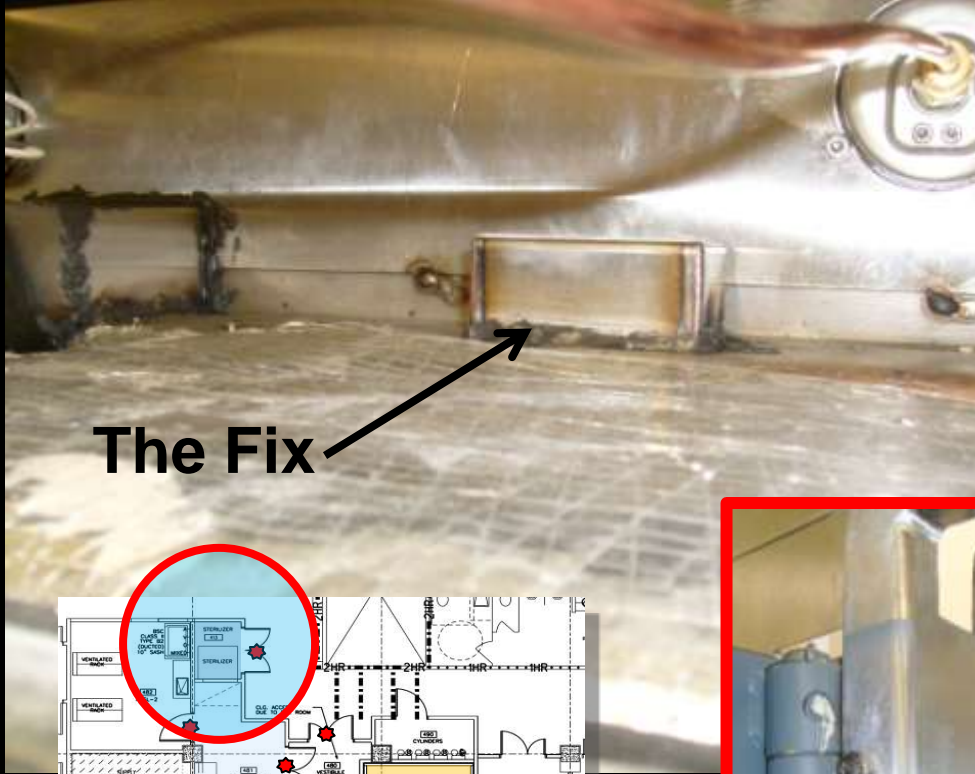
Return Air Diffuser



The Result: Pass Box

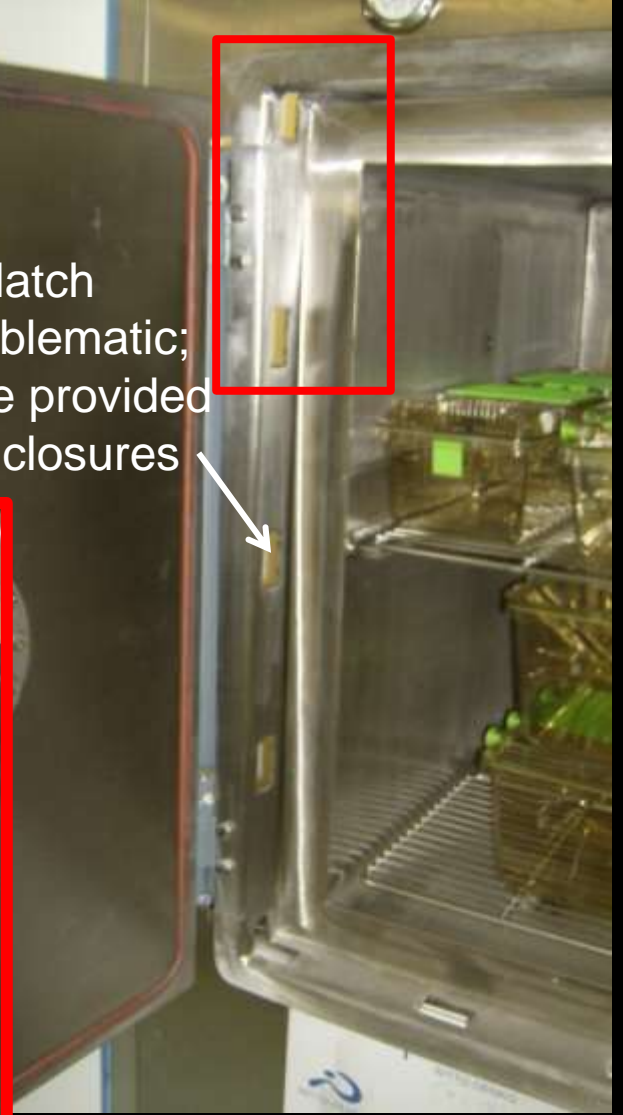
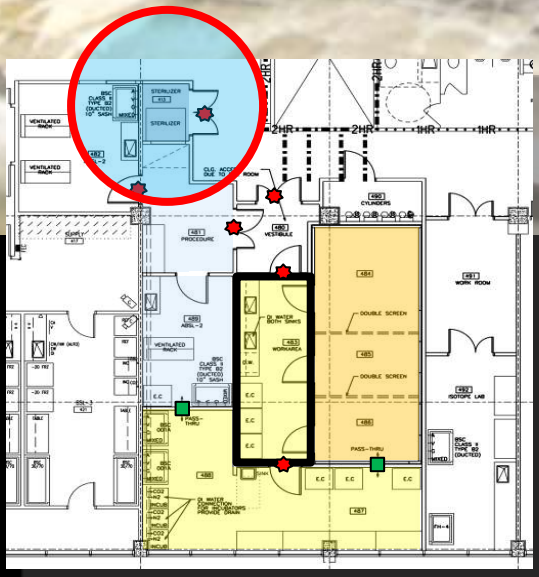


The Result: Sterilizer

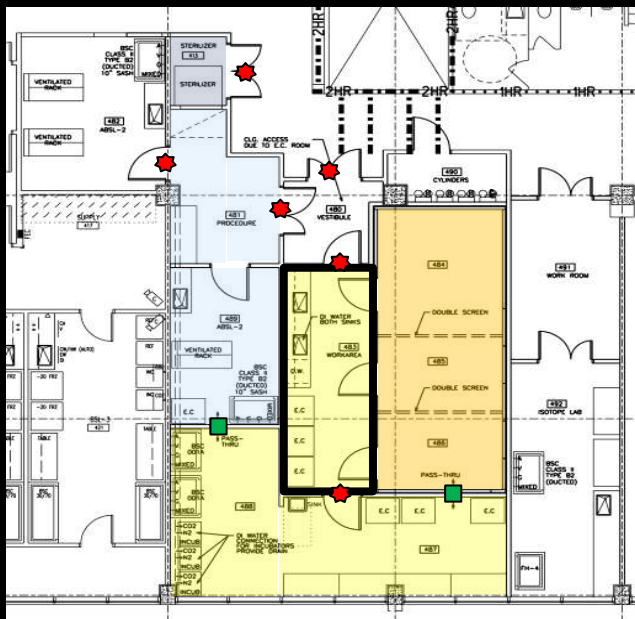


The Fix

Holes for latch spoke problematic; need to be provided with back closures



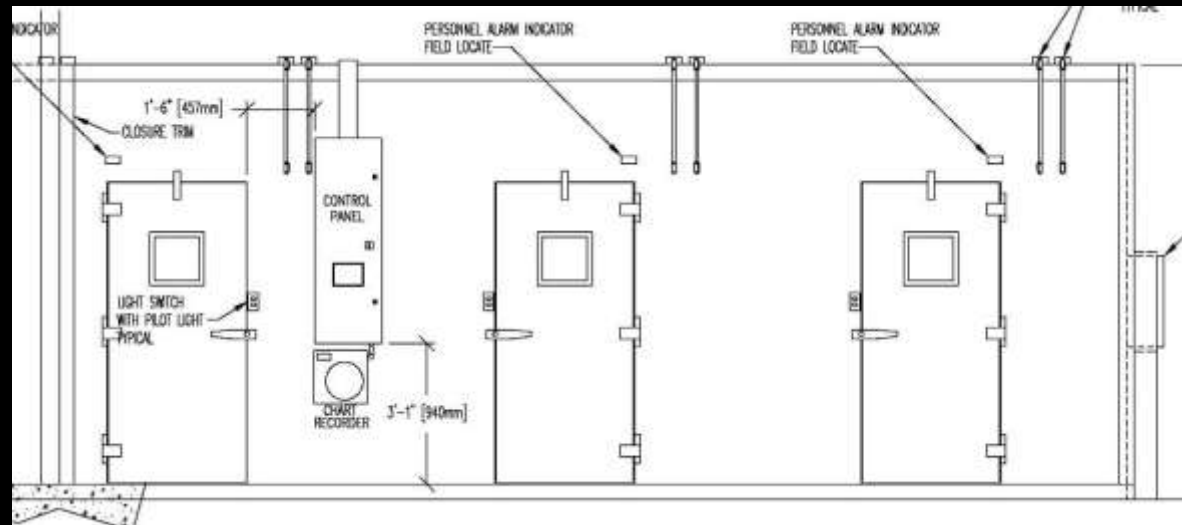
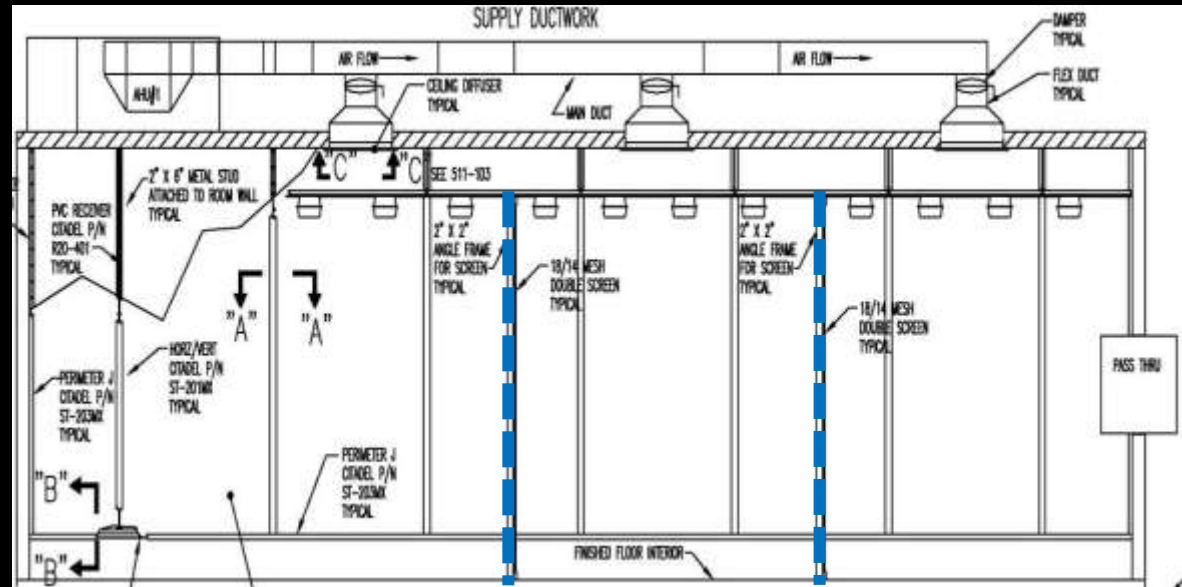
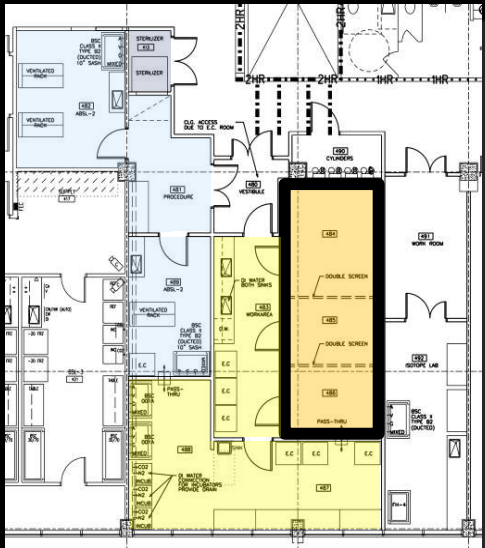
The Result: Seals



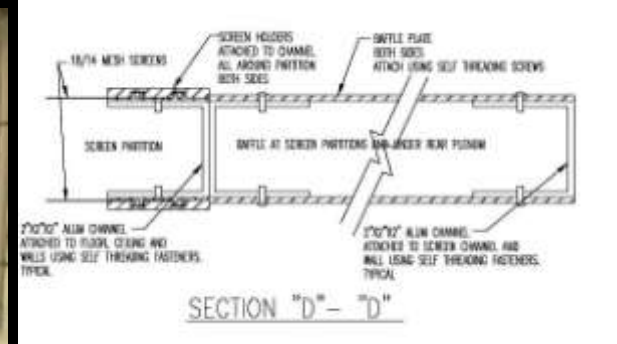
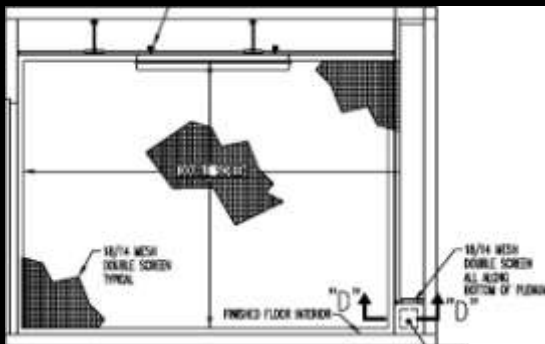
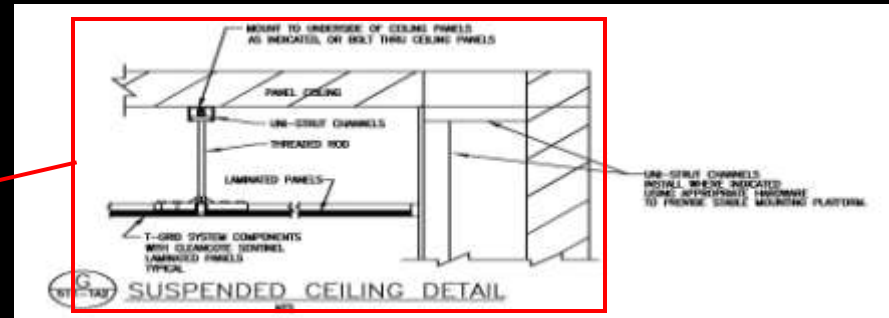
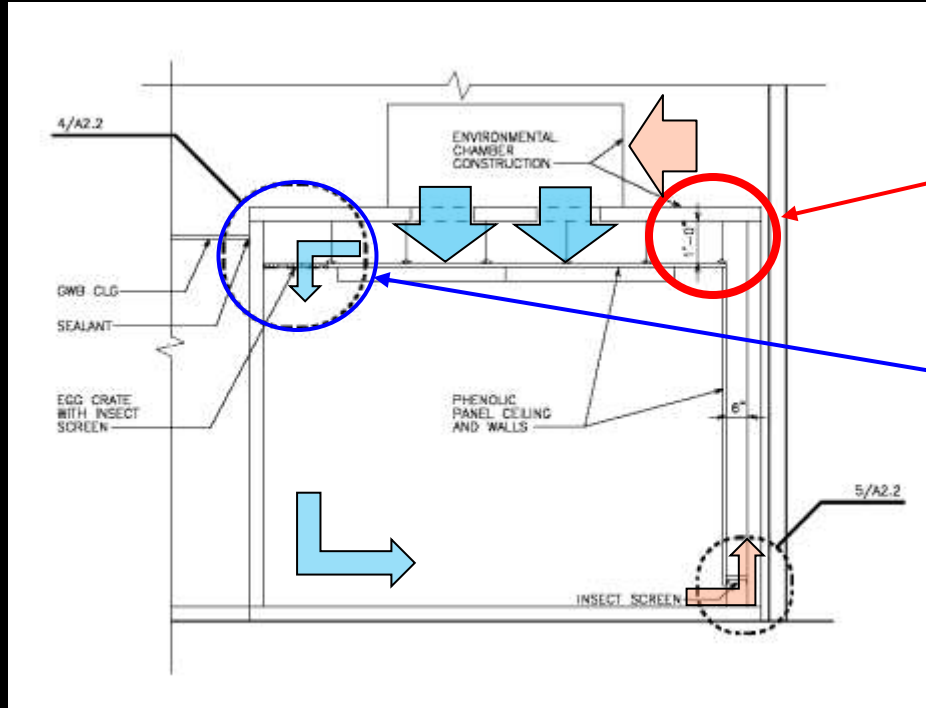
- Double doors
- Door gaskets
- Penetration seals
- Epoxy fill in conduit
- Build to BSL-3 Standards

The Result: Environmental Chamber

- Pre-fabricated Environmental Chamber
- 75%RH; 26 C
- Diffuser ceiling
- Directional Air Flow
- Plenum back wall
- Screened Partitions (2 layers)



The Result: Environmental Chamber



The Result: Environmental Chamber



Suspended Ceiling

Plenum back wall

Screen Partition: double mesh



Micro Processor

- remote monitoring
- call out



Conclusions

- Establish good lines of communication with ALL Parties
- State concise objectives
- Develop good solutions utilizing proven concepts and assemblies, BUT.....
- Don't be afraid to develop project specific solutions
- Keep sight of the desired outcome
- Be a TEAM Player
- Communicate and have fun
- LEARN





THANK YOU

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