Healthcare Best Practices

Restoration & Reconstruction

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BMS CAT

Healthcare Best Practices

1. Overview of the healthcare environment
2. Risk assessment and documentation
3. Work procedures

Healthcare

It's a different environment

A. Hospitals cannot shut down for construction. They have to operate 24 hours a day, seven days a week.

B. Nurses, doctors and other hospital staff members may be working around you.

C. Patient and visitor safety is a high priority. They may be close to your activities.

D. The key focus is to minimize cross-contamination from construction activities.

Healthcare

A different work environment

A

Rules and Regulations – OSHA, EPA, CDC, AIA, ASHE, NFPA, ASHRAE, ASME, USGBC, State and Local authorities.

B

The Joint Commission, formerly The Joint Commission on the Accreditation of Healthcare Organizations, formerly JCAHO, formerly…

C

Lots of Project Team Members – Ownership, Administration, Operations, Support Services, ICP, Department Managers, EVS, EHS, other personnel that will be impacted by the project.

D

Consultants & Vendors – Design professionals like architects, engineers and interior design. Contractors that do remediation, hazmat, reconstruction and all sub trades.

What is ICRA?

Infection Control Risk Assessment (ICRA)

Completing an ICRA can help identify potential areas of concern and develop strategies for completing construction projects without affecting adjacent operations.

Preconstruction Risk Assessment Components

An Infection Control Risk Assessment (ICRA) is an essential step in limiting the acquisition and transmission of infections in a healthcare environment.

Controlling infections requires a comprehensive approach that combines infection prevention, engineering and nursing.

An ICRA identifies the greatest risks and determines how these three disciplines can collaborate to control infections in a specific healthcare setting.

Before construction, renovation or demolition activities begin, there are six risk elements that should be assessed as part of the Pre-Construction Risk Assessment (PCRA or PRA).

- Utilities
- Infection Control
- Fire and Life Safety
- Air Quality
- Noise & Vibrations
- Other Hazards

Preconstruction Risk Assessment Components

Utilities Systems

- Will the HVAC system be affected by construction (outside air intakes, exhaust systems, air handlers)?
- Are utility shut downs required?
  - HVAC
  - Sanitary System
  - Steam
  - Hot/Cold Domestic Water
  - Medical Gas
  - Electric
  - Other
- All utility shut downs must be coordinated with facility.

Preconstruction Risk Assessment Components

Infection Control

- What engineering controls, or containment, is being used to minimize dust or other contaminates?
- Will debris removal require precautions above and beyond those required for the assigned ICRA precaution level?
- Establish approved debris transfer routes to be used by crews to minimize disruption.

Preconstruction Risk Assessment Components

Fire and Life Safety

- Will engineering controls, or containment, be constructed in hallways?
- Will engineering controls affect any of the following?
  - Fire doors
  - Emergency exits
  - Stairwells
  - Fire detection and suppression systems
- Does the construction area contain any environmental hazards?
  - Asbestos
  - Chemicals (specify in your action plan)
  - Other (specify in your action plan)

Preconstruction Risk Assessment Components

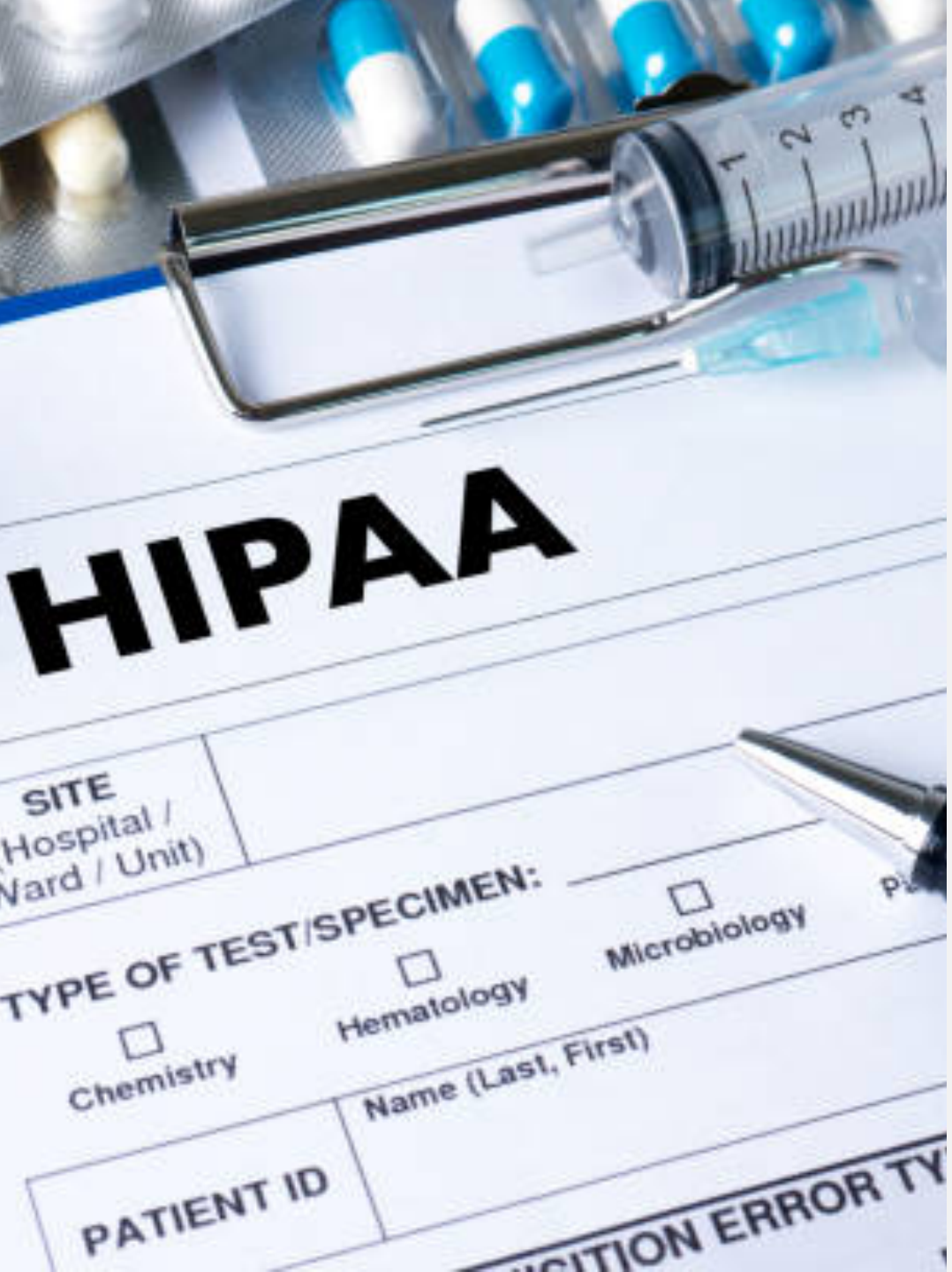
Air Quality

- What engineering controls will be in place to control the air quality in the adjacent patient and work areas?
- How will the air quality be monitored to ensure controls stay in place for the duration of the project?

Preconstruction Risk Assessment Components

Noise, Vibrations and Electrical

- Will construction activities generate noise that will disrupt occupants?
  - If so, affected occupants must be notified.
  - How will work be managed to minimize disruption?
- Will construction activities generate vibrations that will disrupt occupants?
  - If so, affected occupants must be notified.
  - How will work be managed to minimize disruption?
- Will de-energizing electrical hazards affect other occupied areas?



Preconstruction Risk Assessment Components

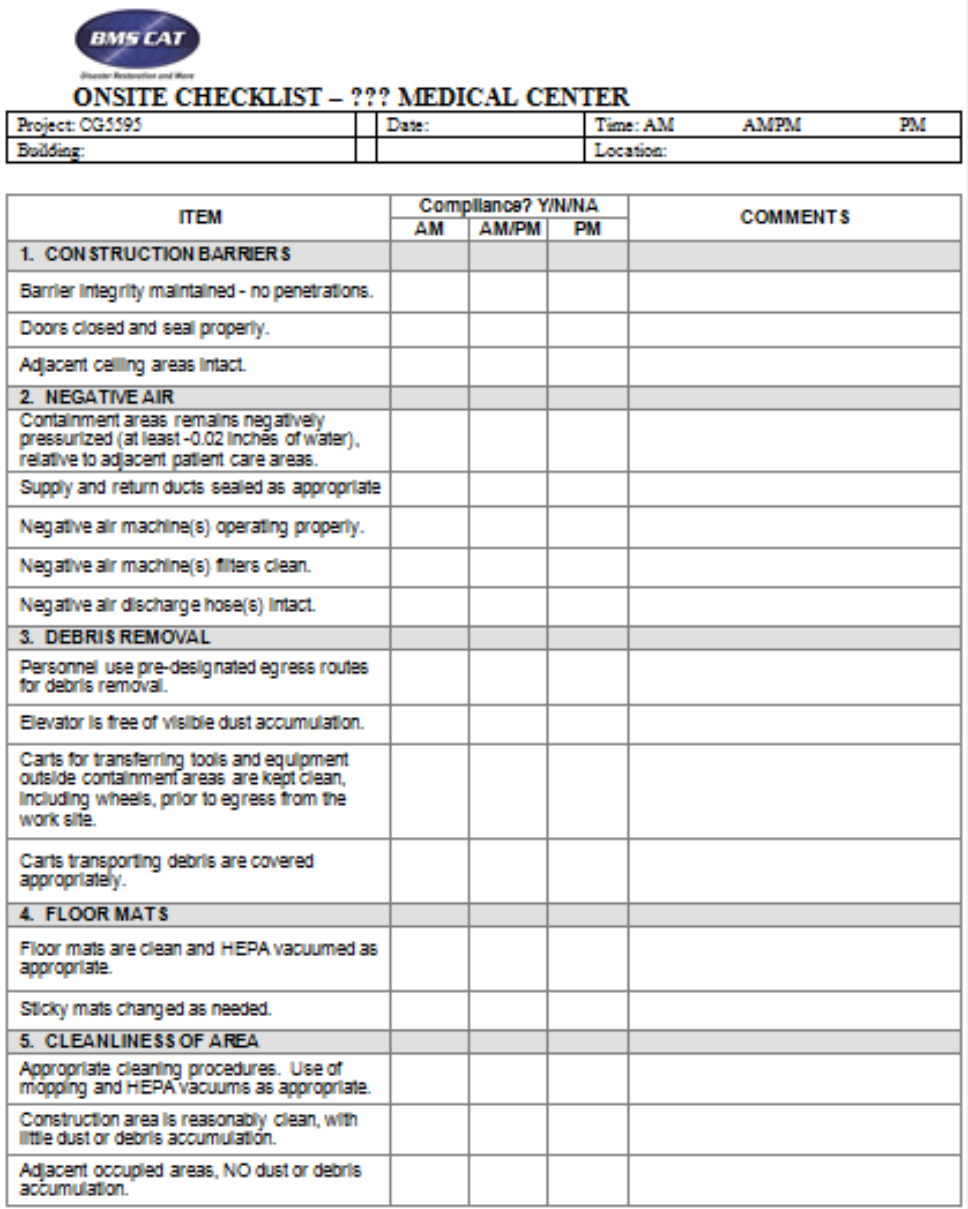
Privacy and Security

- What are the HIPPA concerns within the area you are working?
- What security procedures need to be followed while on property?

BEFORE CONSTRUCTION

Healthcare Preconstruction Techniques and Planning

Documentation of Infection Controls



BMS CAT

ONSITE CHECKLIST – ??? MEDICAL CENTER

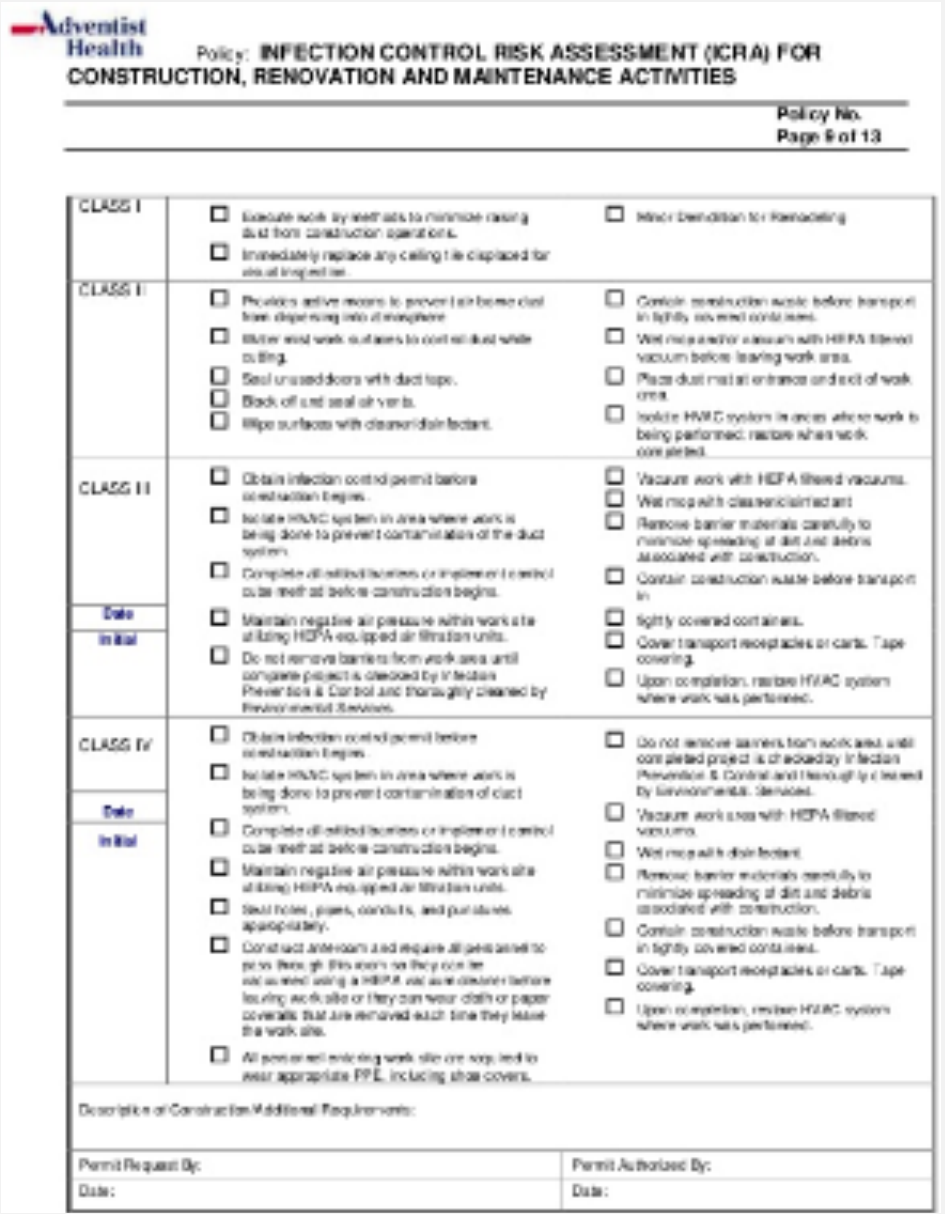
Project: CG5595		Date:	Time: AM	AM/PM	PM
Building:			Location:		

ITEM	Compliance? Y/N/NA			COMMENTS
	AM	AM/PM	PM	
1. CONSTRUCTION BARRIERS				
Barrier integrity maintained - no penetrations.				
Doors closed and seal properly.				
Adjacent ceiling areas intact.				
2. NEGATIVE AIR				
Containment areas remains negatively pressurized (at least -0.02 inches of water), relative to adjacent patient care areas.				
Supply and return ducts sealed as appropriate				
Negative air machine(s) operating properly.				
Negative air machine(s) filters clean.				
Negative air discharge hose(s) intact.				
3. DEBRIS REMOVAL				
Personnel use pre-designated egress routes for debris removal.				
Elevator is free of visible dust accumulation.				
Carts for transferring tools and equipment outside containment areas are kept clean, including wheels, prior to egress from the work site.				
Carts transporting debris are covered appropriately.				
4. FLOOR MATS				
Floor mats are clean and HEPA vacuumed as appropriate.				
Sticky mats changed as needed.				
5. CLEANLINESS OF AREA				
Appropriate cleaning procedures. Use of mopping and HEPA vacuums as appropriate.				
Construction area is reasonably clean, with little dust or debris accumulation.				
Adjacent occupied areas, NO dust or debris accumulation.				

Association for Professionals in Infection Control and Epidemiology (APIC): "The Role of Infection Control During Construction in Healthcare Facilities"

Defines strategic planning and the role of infection control.

Documentation of Infection Controls



Adventist Health

Policy: **INFECTION CONTROL RISK ASSESSMENT (ICRA) FOR CONSTRUCTION, RENOVATION AND MAINTENANCE ACTIVITIES**

Policy No.
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CLASS I

- ☐ Execute work by methods to minimize raising dust from construction operations.
- ☐ Immediately replace any ceiling tile displaced for visual inspection.
- ☐ Minor Demolition for Remodeling

CLASS II

- ☐ Provide active means to prevent air borne dust from dispersing into atmosphere
- ☐ Water mist work surfaces to control dust while cutting.
- ☐ Seal unused doors with duct tape.
- ☐ Block off and seal air vents.
- ☐ Wipe surfaces with cleaner/disinfectant.
- ☐ Contain construction waste before transport in tightly covered containers.
- ☐ Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.
- ☐ Place dust mat at entrance and exit of work area.
- ☐ Isolate HVAC system in areas where work is being performed; restore when work completed.

CLASS III

- ☐ Obtain infection control permit before construction begins.
- ☐ Isolate HVAC system in area where work is being done to prevent contamination of the duct system.
- ☐ Complete all required barriers or implement control measures before construction begins.
- ☐ Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.
- ☐ Do not remove barriers from work area until complete project is checked by Infection Prevention & Control and thoroughly cleaned by Environmental Services.
- ☐ Vacuum work with HEPA filtered vacuums.
- ☐ Wet mop with cleaner/disinfectant
- ☐ Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.
- ☐ Contain construction waste before transport in
- ☐ tightly covered containers.
- ☐ Cover transport receptacles or carts. Tape covering.
- ☐ Upon completion, restore HVAC system where work was performed.

Date
Initial

CLASS IV

- ☐ Obtain infection control permit before construction begins.
- ☐ Isolate HVAC system in area where work is being done to prevent contamination of duct system.
- ☐ Complete all required barriers or implement control measures before construction begins.
- ☐ Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.
- ☐ Seal holes, pipes, conduits, and punctures appropriately.
- ☐ Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site.
- ☐ All personnel entering work site are required to wear appropriate PPE, including shoe covers.
- ☐ Do not remove barriers from work area until completed project is checked by Infection Prevention & Control and thoroughly cleaned By Environmental Services.
- ☐ Vacuum work area with HEPA filtered vacuums.
- ☐ Wet mop with disinfectant.
- ☐ Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.
- ☐ Contain construction waste before transport in tightly covered containers.
- ☐ Cover transport receptacles or carts. Tape covering.
- ☐ Upon completion, restore HVAC system where work was performed.

Date
Initial

Description of Construction/Additional Requirements:

Permit Request By:	Permit Authorized By:
Date:	Date:

Lays groundwork for construction and renovation polices within healthcare facilities
(from design and planning phases through completion)

ICRA Risk Assessments & Construction Permits

Defines Construction Activity (CA) types *(A through D)* and Patient Risk (PR) groups *(Low through Highest)*

Match CA types with PR group within the IC Matrix to determine the Class of Precautions or Infection Control Procedures *(I through IV)* required for construction work

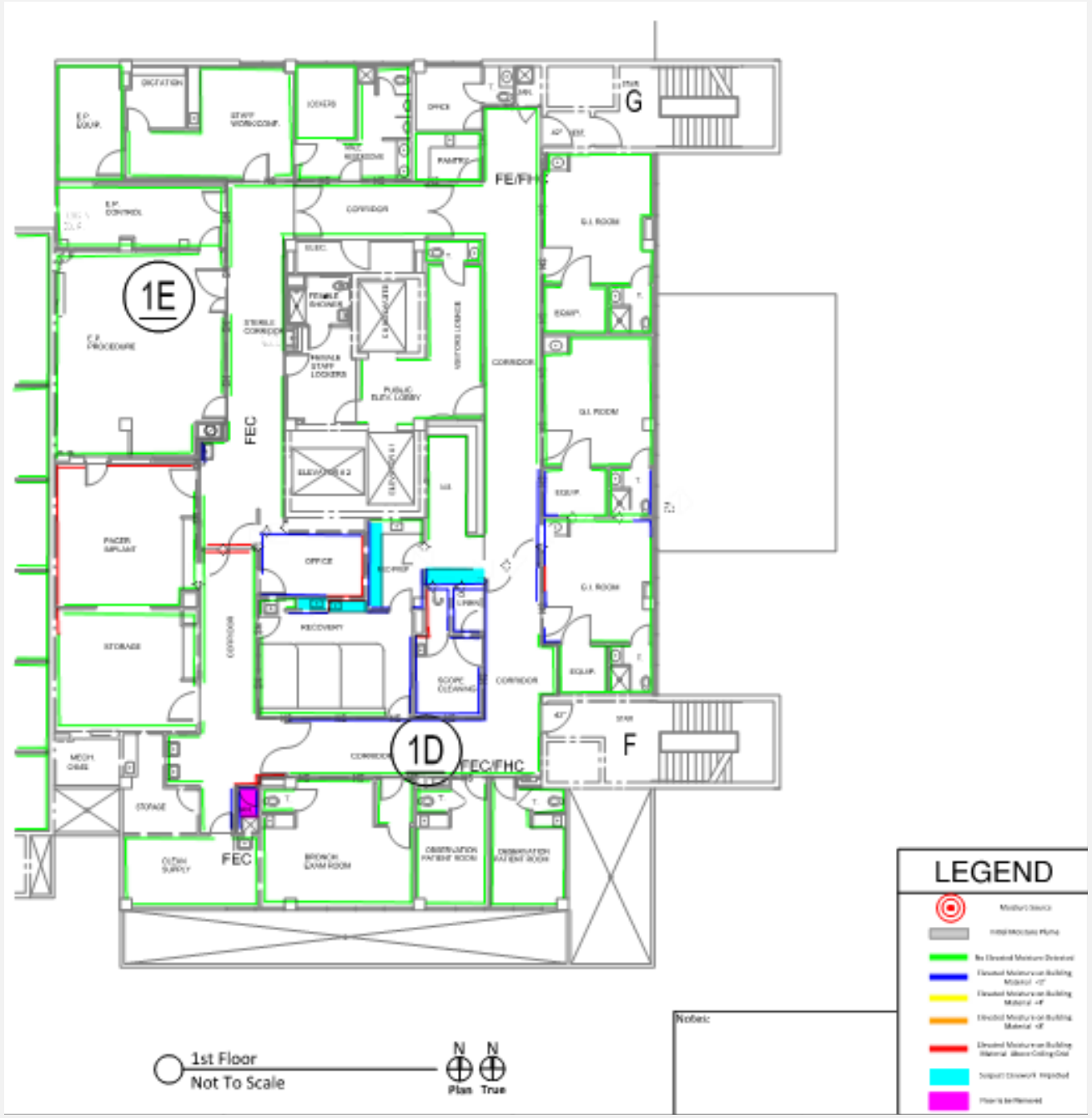
Reducing the Risk

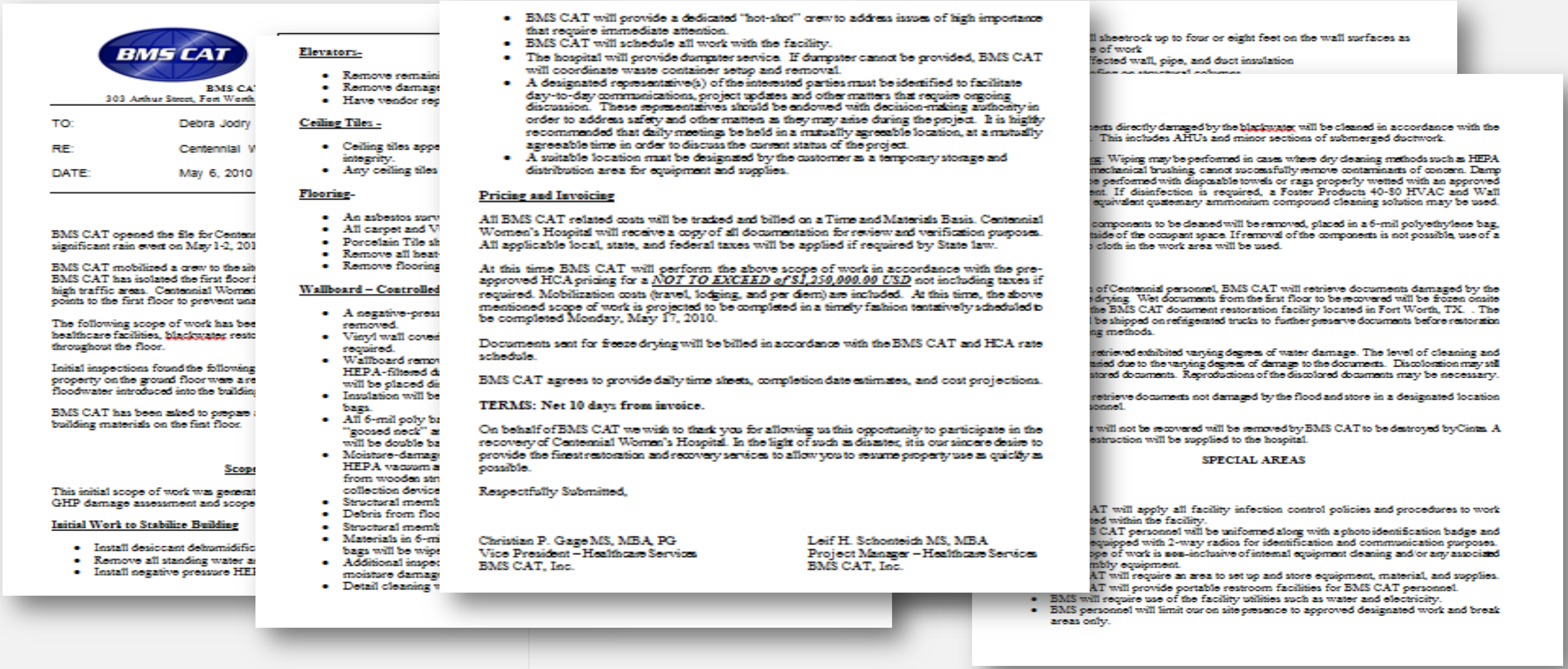
Documentation

Every water damage needs a moisture map.

If an IH is not present to make one, it's incumbent on BMS to document the conditions via a moisture map.

This document must be created prior to the scope of work.





BMS CAT

303 Arthur Street, Fort Worth

TO: Debra Jodry

RE: Centennial W

DATE: May 6, 2010

BMS CAT opened the file for Centen
significant rain event on May 1-2, 201

BMS CAT mobilized a crew to the sit
BMS CAT has isolated the first floor
high traffic areas. Centennial Women
points to the first floor to prevent una

The following scope of work has bee
healthcare facilities, blackwater resto
throughout the floor.

Initial inspections found the following
property on the ground floor were a re
floodwater introduced into the building

BMS CAT has been asked to prepare
building materials on the first floor.

Scope

This initial scope of work was generat
GHP damage assessment and scope

Initial Work to Stabilize Building

- Install desiccant dehumidific
- Remove all standing water a
- Install negative pressure HE

Elevators:-

- Remove remaini
- Remove damage
- Have vendor rep

Ceiling Tiles -

- Ceiling tiles appe
integrity.
- Any ceiling tiles

Flooring-

- An asbestos surv
- All carpet and V
- Porcelain Tile sh
- Remove all heat
- Remove flooring

Wallboard – Controlled

- A negative-press
removed.
- Vinyl wall cover
required.
- Wallboard remov
HEPA-filtered du
will be placed dis
- Insulation will be
bags.
- All 6-mil poly ba
"goosed neck" a
will be double ba
- Moisture-damag
HEPA vacuum a
from wooden str
collection device
- Structural memb
- Debris from floo
- Structural memb
- Materials in 6-mi
bags will be wipe
- Additional inspec
moisture damag
- Detail cleaning v

- BMS CAT will provide a dedicated "hot-shot" crew to address issues of high importance that require immediate attention.
- BMS CAT will schedule all work with the facility.
- The hospital will provide dumpster service. If dumpster cannot be provided, BMS CAT will coordinate waste container setup and removal.
- A designated representative(s) of the interested parties must be identified to facilitate day-to-day communications, project updates and other matters that require ongoing discussion. These representatives should be endowed with decision-making authority in order to address safety and other matters as they may arise during the project. It is highly recommended that daily meetings be held in a mutually agreeable location, at a mutually agreeable time in order to discuss the current status of the project.
- A suitable location must be designated by the customer as a temporary storage and distribution area for equipment and supplies.

Pricing and Invoicing

All BMS CAT related costs will be tracked and billed on a Time and Materials Basis. Centennial Women's Hospital will receive a copy of all documentation for review and verification purposes. All applicable local, state, and federal taxes will be applied if required by State law.

At this time BMS CAT will perform the above scope of work in accordance with the pre-approved HCA pricing for a ***NOT TO EXCEED of $1,250,000.00 USD*** not including taxes if required. Mobilization costs (travel, lodging, and per diem) are included. At this time, the above mentioned scope of work is projected to be completed in a timely fashion tentatively scheduled to be completed Monday, May 17, 2010.

Documents sent for freeze drying will be billed in accordance with the BMS CAT and HCA rate schedule.

BMS CAT agrees to provide daily time sheets, completion date estimates, and cost projections.

TERMS: Net 10 days from invoice.

On behalf of BMS CAT we wish to thank you for allowing us this opportunity to participate in the recovery of Centennial Women's Hospital. In the light of such as disaster, it is our sincere desire to provide the finest restoration and recovery services to allow you to resume property use as quickly as possible.

Respectfully Submitted,

Christian P. Gage MS, MBA, PG
Vice President – Healthcare Services
BMS CAT, Inc.

Leif H. Schonteich MS, MBA
Project Manager – Healthcare Services
BMS CAT, Inc.

l sheetrock up to four or eight feet on the wall surfaces as
e of work
ffected wall, pipe, and duct insulation

nents directly damaged by the blackwater will be cleaned in accordance with the
. This includes AHUs and minor sections of submerged ductwork.

ng: Wiping may be performed in cases where dry cleaning methods such as HEPA
mechanical brushing cannot successfully remove contaminants of concern. Damp
e performed with disposable towels or rags properly wetted with an approved
ent. If disinfection is required, a Foster Products 40-80 HVAC and Wall
equivalent quaternary ammonium composed cleaning solution may be used.

components to be cleaned will be removed, placed in a 6-mil polyethylene bag,
side of the occupant space. If removal of the components is not possible, use of a
cloth in the work area will be used.

of Centennial personnel, BMS CAT will retrieve documents damaged by the
drying. Wet documents from the first floor to be recovered will be frozen onsite
the BMS CAT document restoration facility located in Fort Worth, TX. . The
be shipped on refrigerated trucks to further preserve documents before restoration
ng methods.

retrieved exhibited varying degrees of water damage. The level of cleaning and
ired due to the varying degrees of damage to the documents. Discoloration may still
tored documents. Reproductions of the discolored documents may be necessary.

retrieve documents not damaged by the flood and store in a designated location
onnel.

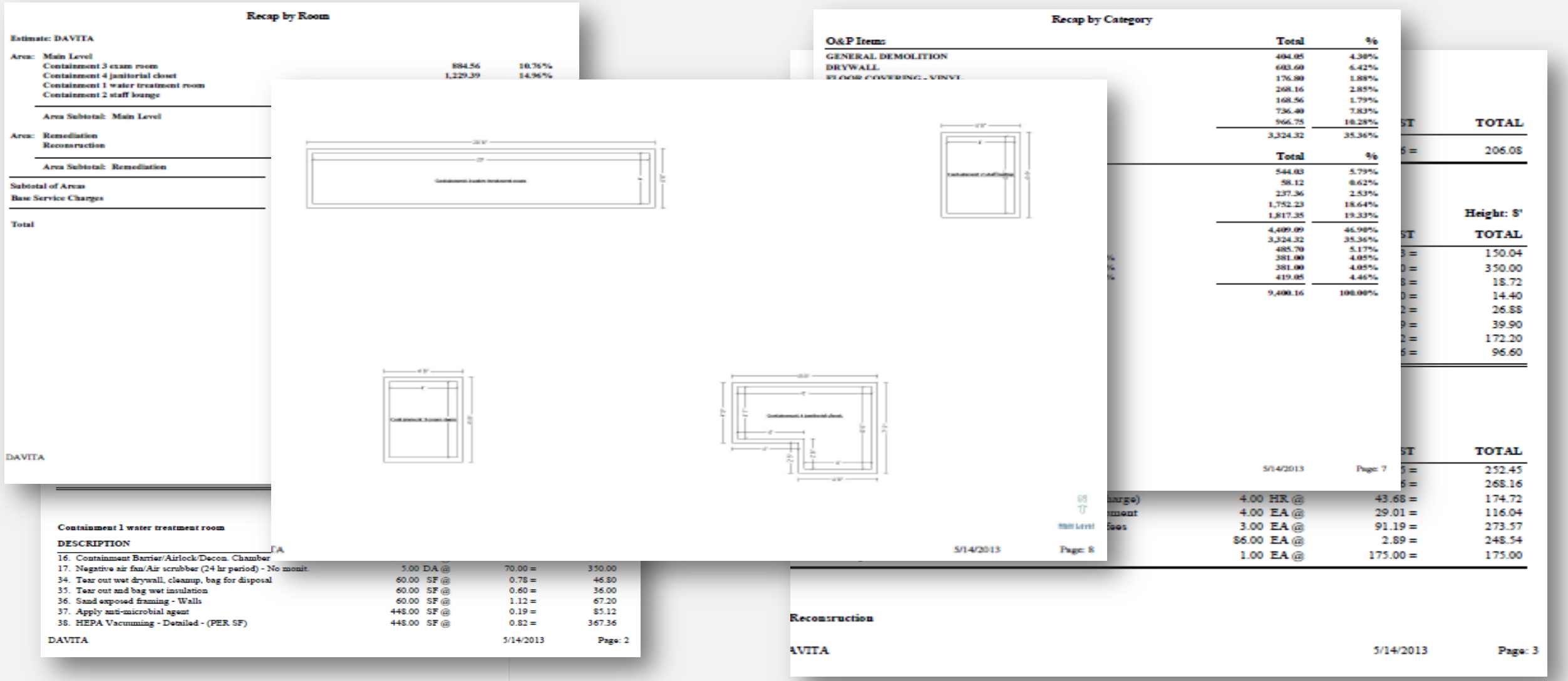
t will not be recovered will be removed by BMS CAT to be destroyed by Cintas. A
estruction will be supplied to the hospital.

SPECIAL AREAS

AT will apply all facility infection control policies and procedures to work
ted within the facility.
S CAT personnel will be uniformed along with a photo identification badge and
equipped with 2-way radios for identification and communication purposes.
ope of work is non-inclusive of internal equipment cleaning and or any associated
mbly equipment.
AT will require an area to set up and store equipment, material, and supplies.
AT will provide portable restroom facilities for BMS CAT personnel.

- BMS will require use of the facility utilities such as water and electricity.
- BMS personnel will limit our on site presence to approved designated work and break areas only.

Remediation Scope



Reconstruction Scope

Now, we must think before we work....

Will I stir up any dust?

How can I prevent it from getting into the air?

Is this material water damaged or soaked?

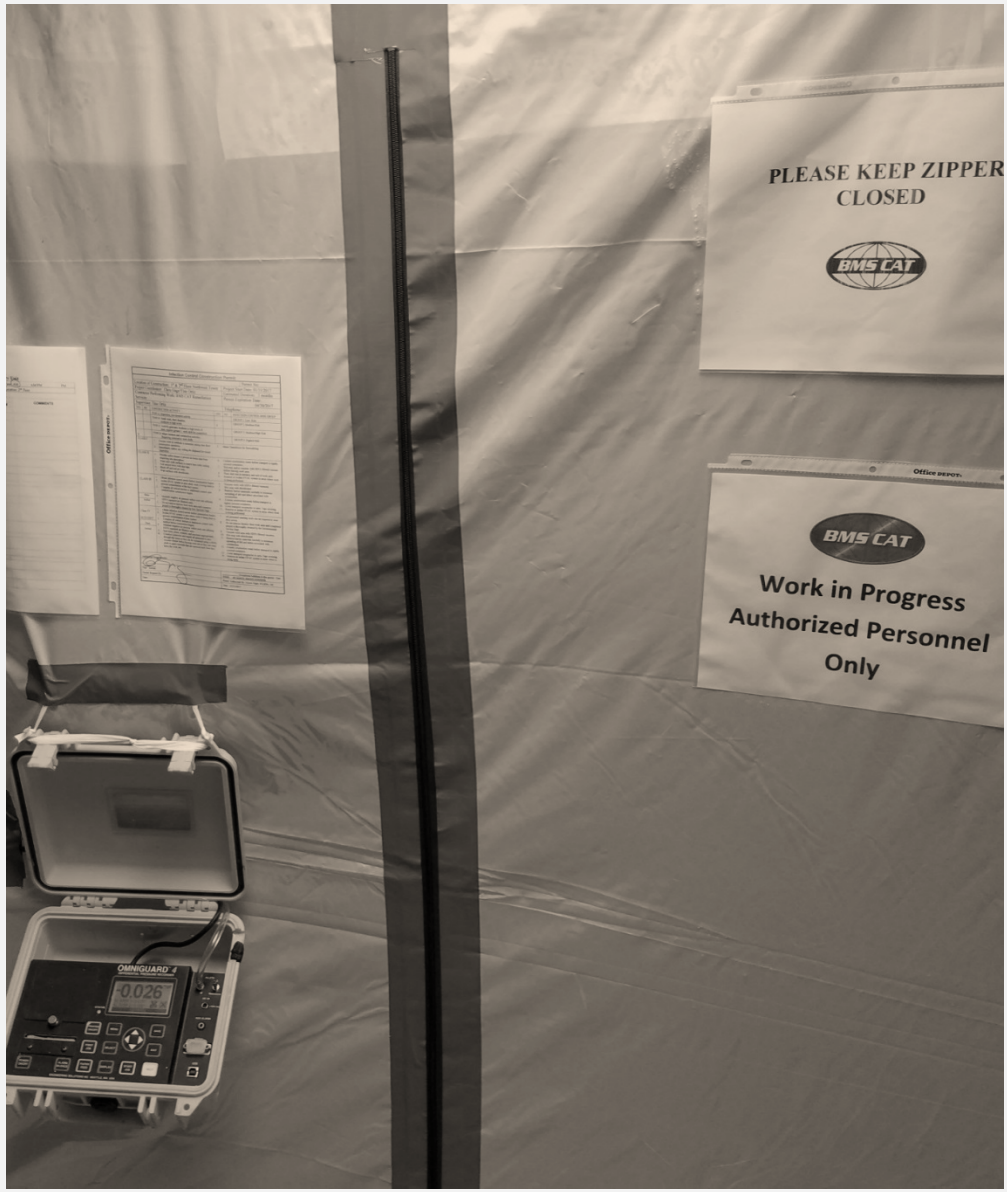
Keep surfaces clean and free of dust (as possible).

Work together during construction, renovations and repair projects.

Remove barriers systematically.

Engineering Controls

Contain	Are area containment barriers needed?
Anteroom	Is a "point-of-entry" environmental containment device necessary? (i.e. Anteroom)
HEPA	Are HEPA air filtration devices (AFUs) or vacuums needed?
Negative Pressure	Do we need to ensure continuous negative pressure? In the construction zone? In the maintenance zone?
Testing	Is there a need for testing? Airborne fungi? Respirable dust?
Supervision	Is there a need for more detailed supervision (monitoring) of the contractor and/or vendor?
Final	Is there final clearance criteria or is testing required?
Maintenance	If containment barriers and/or point-of-entry devices are necessary, they must be maintained and regularly inspected.



Goal of Barriers

To prevent the spread of construction dust into the hospital, by creating an airtight seal within the work area.

Types of barriers:

- Mobile containment cubes
- Temporary or soft-wall systems
- Hard-wall systems

Selecting a Barrier

Considerations of selecting a barrier:

- Duration of work task
- Amount of dust generated
- Local fire codes

Maintaining fire prevention measures, such as firewalls, is an important consideration when selecting a barrier.

Creating an Entry to Access the Work Area

Two common types of entries that can be used are:

- Self-adhesive zippers
- Flap door or a T-door

The most common doorway used in healthcare restoration projects with a soft wall barrier is the zipper door. The self-adhesive door creates a tighter air seal than a flap door.

Long-Term Barriers

Several factors drive the need for hard barriers

- Duration of project
- External risks to barrier integrity
- Privacy concerns
- Area in the facility
  - High-risk patients
  - Food service
  - Laboratories
  - Hallways

EDGE Guard is a brand name of portable panel system

Anterooms: Separating patient areas

- When feasible, anterooms are constructed for major projects.
- Anterooms must be of adequate size to allow workers to don and doff protective clothing, damp wipe shoes, house PPE and a HEPA-filtered vacuum cleaner.
- One door of anteroom should remain closed at all times.

Personal Protective Equipment

- Will vary depending on project requirements.
- Should always wear coveralls to keep clothing clean.
- Remove PPE in anterooms when available.

Patient Protective Apparel

- May be required in high-risk patient areas.
- Worn to protect the patient.
- May include shoe covers, gloves, surgical scrubs and masks.

Personal Protective Equipment & Patient Protective Apparel

Controlling the Air Pressure to Prevent Dust

Need to create negative air pressure within the work area to keep dust from escaping.

To achieve negative pressure, more air must leave the work area than enters.

If air is continually pulled into the work area, dust and airborne pathogens cannot get out.

HEPA-Filtered Air Machines

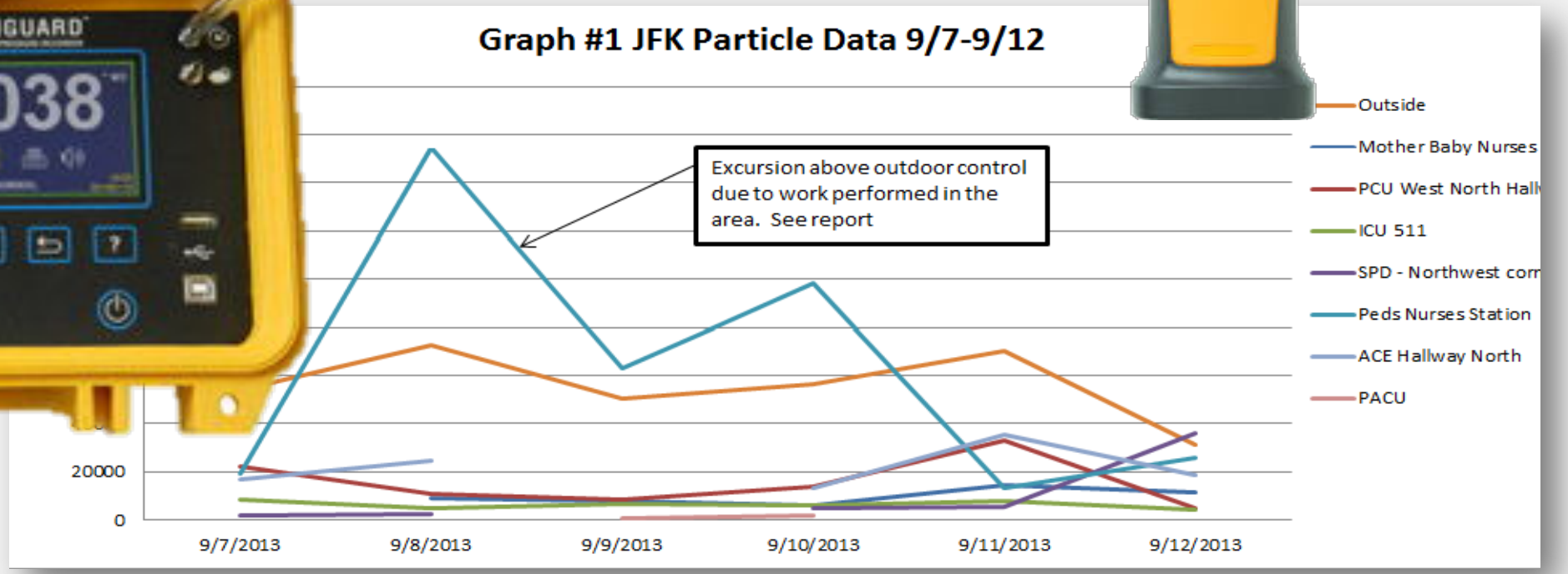
Performance requirements for HEPA-filtered negative air machines:

- Pressure differential of no less than 0.02 inches of water negative, relative to patient care areas.
- Unit must run continuously and be ganged to a single switch for emergency shutoff.
- Filters should be checked at regular intervals throughout the day, and replaced as often as needed.
- Efficacy should be checked with particle counter.

Continuous Environmental Monitoring

1. The facility owner will evaluate effectiveness of completed barriers, and other methods of control prior to project start up.
2. Thereafter, continuous pressure differential monitoring will be performed for the duration of the project.
3. The monitor can be tied into a phone line, to allow the notification of the appropriate parties of the pressure loss.
4. Stop project if the containment becomes positively pressurized, relative to patient care areas.

Continuous Environmental Monitoring



Good Housing
Minimizing the Spread of Dust

- Utilize sticky mats/tacky mats
- Cover all trash carts when they enter and leave the work area
- Covering or wrapping all equipment and construction materials
- Use HEPA vacuums
- Wet wipe all surfaces using hospital approved EPA-registered disinfectant
- Damp mopping surfaces inside and outside of containment (as needed)

- Mist work areas and edges of ceiling tiles before lifting
- Use a containment barrier
- Use HEPA-vacuum attachments when drilling or cutting

- Use hand tools instead of power tools
- HEPA vacuum instead of sweeping
- Perform cutting in a staging area outside of ICRA environment

Good Housing
Minimizing the Spread of Dust

Trash/Debris Removal

Transporting Debris

The cart must have a solid lid or be tightly covered with taped down plastic.

The ICRA plan typically requires the wiping down of the trash cart at each end of the trip:

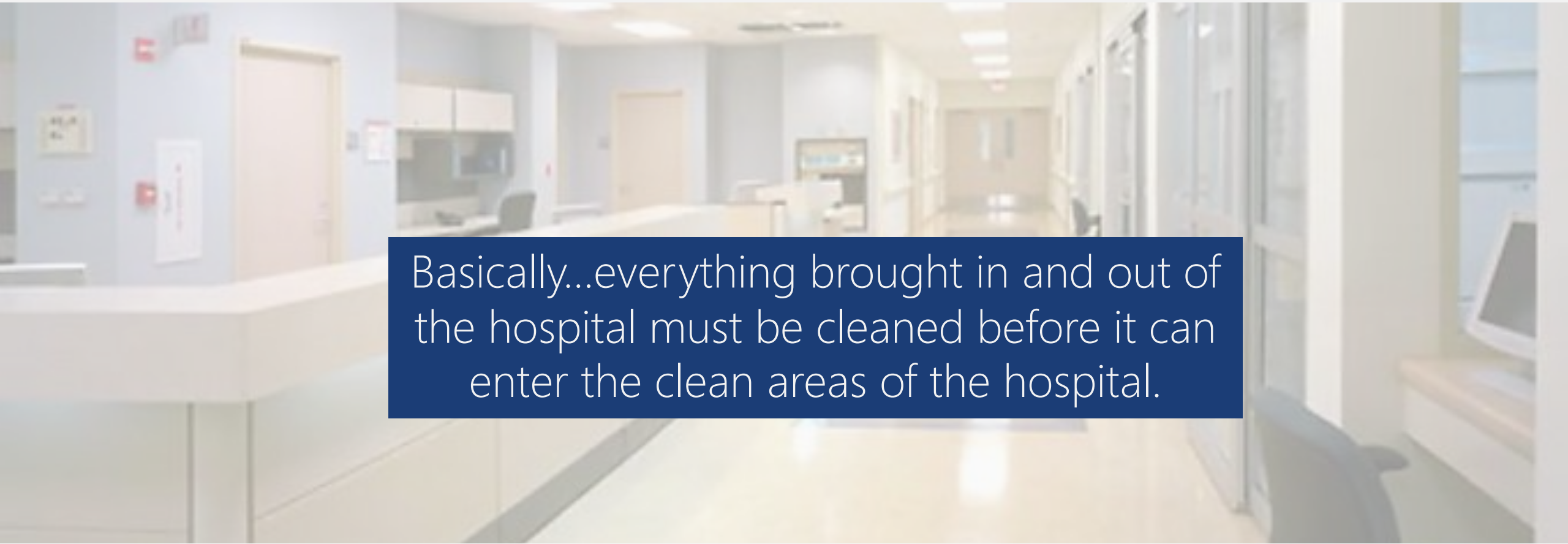
- Before it leaves the work area.
- Before it comes back into the hospital from the loading dock.

Cleaning should be performed using hospital approved EPA-registered disinfectant.

Prior to starting any project, the debris path should always be established.

Movement of Equipment and Tools

Workers have to remember that all tools & equipment brought onto the job must be wiped down and cleaned before entering the hospital.



Basically…everything brought in and out of the hospital must be cleaned before it can enter the clean areas of the hospital.

Clearance Testing

Center for Disease Control and Prevention (CDC)

General recommendations for microbiological air sampling:

Water Losses

After the cleanup of a typical water loss, air samples will be taken using spore traps. The test will be looking for non-viable spores.

Category 3

After a category 3 event, sampling will typically include swab samples – specifically looking for fecal coliform and E.coli.

Completion Phase

- Prior to the removal of engineering controls, the work site must be cleaned of equipment and debris. The area is thoroughly HEPA-vacuumed and mopped by the construction team.
- Start by removing containment from the furthest point and work towards the entrance.
- Following barrier removal, all surfaces should be cleaned and disinfected, including – floors, windows, sinks, fixtures, counters, walls and ceilings.
- Water supply lines should be thoroughly flushed.
- *Terminal clean to be performed by facility.*


FIRE
EXTINGUISHER


DIALYSIS
SUPPLY
ROOM


EXIT
VENDING

THANK YOU