

ICRA 2.0 and its implementation through automation

Aayushi Chheda

Why do we care about construction in healthcare?



Why do we care about construction in healthcare?

- Healthcare construction is recognized worldwide as presenting risk of infection to patients e.g., fungal infection.
 - Seriously ill patients, surgery patients.
 - Compounds sterile drugs for injection.
- High risk patients/activities have very low threshold for dust, etc. that can cause serious illness and infections to our patients.
- Construction impacts our ability to provide care to patients.

What is ICRA 2.0

- Infection Control Risk Assessment (ICRA) 2.0 is a framework developed by The American Society for Health Care Engineering (ASHE) in 2022 to manage Infection prevention activities during construction and Renovation in Healthcare settings.
- ICRA 2.0 had significant changes and clarifications for safety precaution
 - Higher stakes for Infection Prevention
 - Big change for Infection Prevention and Facilities

[ICRA-2.0-MATRIX.pdf \(icrasolutions.com\)](#)



Infection Control Risk Assessment 2.0

Matrix of Precautions for Construction, Renovation and Operations

Step One:

Using Table 1, Identify the Activity Type (A-D).

Table 1 - Activity Type: _____

Type A	<p>Inspection and non-invasive activities. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal of ceiling tile for visual inspection-limited to 1 tile per 50 square feet with limited exposure time. Limited building system maintenance (e.g., pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry work to include painting without sanding) that does not create dust or debris. Clean plumbing activity limited in nature.
Type B	<p>Small-scale, short duration activities that create minimal dust and debris. Includes but is not limited to:</p> <ul style="list-style-type: none"> Work conducted above the ceiling (e.g., prolonged inspection or repair of firewalls and barriers, installation of conduit and/or cabling, and access to mechanical and/or electrical chase spaces). Fan shutdown/startup. Installation of electrical devices or new flooring that produces minimal dust and debris. The removal of drywall where minimal dust and debris is created. Controlled sanding activities (e.g., wet or dry sanding) that produce minimal dust and debris.
Type C	<p>Large-scale, longer duration activities that create a moderate amount of dust and debris. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal of preexisting floor covering, walls, casework or other building components. New drywall placement. Renovation work in a single room. Non-existing cable pathway or invasive electrical work above ceilings. The removal of drywall where a moderate amount of dust and debris is created. Dry sanding where a moderate amount of dust and debris is created. Work creating significant vibration and/or noise. Any activity that cannot be completed in a single work shift.
Type D	<p>Major demolition and construction activities. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal or replacement of building system component(s). Removal/installation of drywall partitions. Invasive large-scale new building construction. Renovation work in two or more rooms.

Step Two:

Using Table 2, identify the Patient Risk Group(s) that will be affected. If more than one risk group will be affected, select the higher risk group.

Table 2 - Patient Risk Group: _____

Low Risk	Medium Risk	High Risk	Highest Risk
<p>Non-patient care areas such as:</p> <ul style="list-style-type: none"> Public hallways and gathering areas not on clinical units. Office areas not on clinical units. Breakrooms not on clinical units. Bathrooms or locker rooms not on clinical units. Mechanical rooms not on clinical units. EVS closets not on clinical units. 	<p>Patient care support areas such as:</p> <ul style="list-style-type: none"> Waiting areas. Clinical engineering. Materials management. Sterile processing department - dirty side. Kitchen, cafeteria, gift shop, coffee shop, and food kiosks. 	<p>Patient care areas such as:</p> <ul style="list-style-type: none"> Patient care rooms and areas All acute care units Emergency department Employee health Pharmacy - general work zone Medication rooms and clean utility rooms Imaging suites: diagnostic imaging Laboratory. 	<p>Procedural, invasive, sterile support and highly compromised patient care areas such as:</p> <ul style="list-style-type: none"> All transplant and intensive care units. All oncology units. OR theaters and restricted areas. Procedural suites. Pharmacy compounding. Sterile processing department - clean side. Transfusion services. Dedicated isolation wards/units. Imaging suites: invasive imaging.

Table 3 - Class of Precautions: _____

Patient Risk Group	Construction Project Type			
	TYPE A	TYPE B	TYPE C	TYPE D
LOW Risk Group	I	II	II	III*
MEDIUM Risk Group	I	II	III*	IV
HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

What is ICRA 2.0

Assess Infection risks to improve patient safety

1. Defines the activity (same as before)
2. Identifies patient risk: low-nonclinical areas, medium, high, highest (more clarity in 2.0)
3. Defines class of precautions (more clarity in 2.0)
4. Assess surrounding area (more focus in 2.0) - What is around the space-above, below, lateral, front, behind? Impact of noise, dust control, ventilation, pressure, gas/water systems
5. Mitigation plan - which controls are needed and which not?

Table 4 - Surrounding Area Assessment

Unit Below:	Unit Above:	Unit Lateral:	Unit Behind:	Unit in Front:
Risk Group:	Risk Group:	Risk Group:	Risk Group:	Risk Group:
Contact:	Contact:	Contact:	Contact:	Contact:
Phone:	Phone:	Phone:	Phone:	Phone:
Additional Controls: <input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust control <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization <input type="checkbox"/> Impact to other systems, such as: <input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gases <input type="checkbox"/> Water Systems	Additional Controls: <input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust control <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization <input type="checkbox"/> Impact to other systems, such as: <input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gases <input type="checkbox"/> Water Systems	Additional Controls: <input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust control <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization <input type="checkbox"/> Impact to other systems, such as: <input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gases <input type="checkbox"/> Water Systems	Additional Controls: <input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust control <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization <input type="checkbox"/> Impact to other systems, such as: <input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gases <input type="checkbox"/> Water Systems	Additional Controls: <input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust control <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization <input type="checkbox"/> Impact to other systems, such as: <input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gases <input type="checkbox"/> Water Systems
Noise & Vibration Mitigation Strategies				
<input type="checkbox"/> Use diamond drills instead of powder-actuated fasteners. <input type="checkbox"/> Schedule noise-making periods with adjacent spaces. <input type="checkbox"/> Use beam clamps instead of shot. <input type="checkbox"/> Prefab where possible. <input type="checkbox"/> Use tin snips to cut metal studs instead of using a chop saw. <input type="checkbox"/> Install metal decking with vent tabs, then use cellular floor deck hangers. <input type="checkbox"/> Consider pro-press instead of soldering, brazing or welding. <input type="checkbox"/> Wet core drill instead of dry core or percussion. <input type="checkbox"/> Instead of jackhammering concrete, use wet diamond saws. <input type="checkbox"/> Use HEPA vacuums instead of standard wet/dry vacuums. <input type="checkbox"/> Use mechanical joining system sprinkler fittings instead of threaded. <input type="checkbox"/> Where fumes are tolerated, use chemical adhesive remover (flooring glue) instead of mechanical. <input type="checkbox"/> To remove flooring, shot blast instead of using a floor scraper. <input type="checkbox"/> Use electric sheers instead of reciprocating saw for ductwork cutting. <input type="checkbox"/> Install exterior man/material lifts.				
Ventilation & Pressurization Mitigation Strategies				
<input type="checkbox"/> HEPA-99.97% to exterior. <input type="checkbox"/> Install temporary ductwork. <input type="checkbox"/> Utilize temporary HVAC equipment. <input type="checkbox"/> Vacate the area. <input type="checkbox"/> Install temporary partitions. <input type="checkbox"/> Use carbon filtration to filter odors.				
Impact to Other Systems Mitigation Strategies				
<input type="checkbox"/> Schedule outages. <input type="checkbox"/> Provide temporary systems <input type="checkbox"/> Back-feed electricity or medical gases. <input type="checkbox"/> Flushing and testing of building water systems.				

Implementing ICRA 2.0 at PAMC



First built in 1962; in same location during 1964 earthquake



Structure of building has been series of remodels vs new builds over the last 60 years



Main hospital campus with 17 Towers including 4 additional separate buildings and 4 parking garages



Currently, entire campus makes up approx. 2.1 million square feet

What are some common challenges you face with Healthcare Facilities and Maintenance staff/contractors?

Challenges we faced..

- Compliance
- Involving IP



GOAL:



1. Increase compliance with ICRA



2. Make it easy to involve IP

How do you get compliance with infection control requirements?

- Education
- Standardization
- Make it as easy as possible to comply

Education-Area of focus

1. Why do we care about construction/repairs in healthcare?

-No body knows what IPs do!

- Dust, mold, water sources, patient care areas
- Collaboration before projects

2. How can we standardize construction/repairs practice for campuses across all regions of Alaska.



Education-Online module content



- Identify the responsibilities of stakeholders
 - Opportunities to include IP early, frequent reminders to include IP throughout the module
- Describe the infection related hazards that can result from construction/repair activities.
 - Outbreak case studies/pictures of resulting harm
- Understand the purpose/function of the Infection Control Risk Assessment (ICRA)
 - Display of what the form looks like explains what to do during and after projects of each risk class

Education-Online module content

- Discuss the level of infection control activities required for project risk class
 - Infection control tools that can be used e.g. : Hogs, ECU, vent covers, vacuum attachments
- What can you expect from IP?
 - Monitoring frequency to promote transparency
- Resources
 - How to reach IP/How to submit a request



Education-Online module design

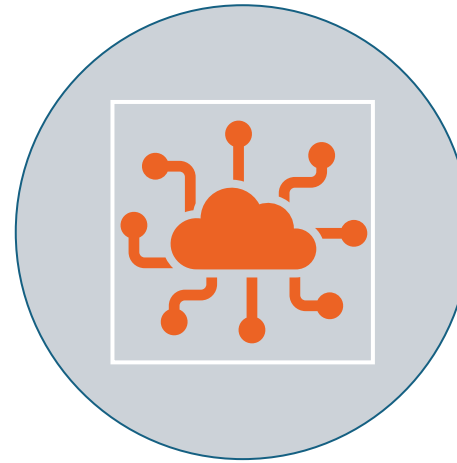
- Adults need to know why they need to learn something and build on their experience
 - Pictures and Case studies
- Adults want their training to be problem focused
 - Introduction of ICRA 2.0
- Adults learn best when motivation comes intrinsically
 - Leadership support



Standardization through automation

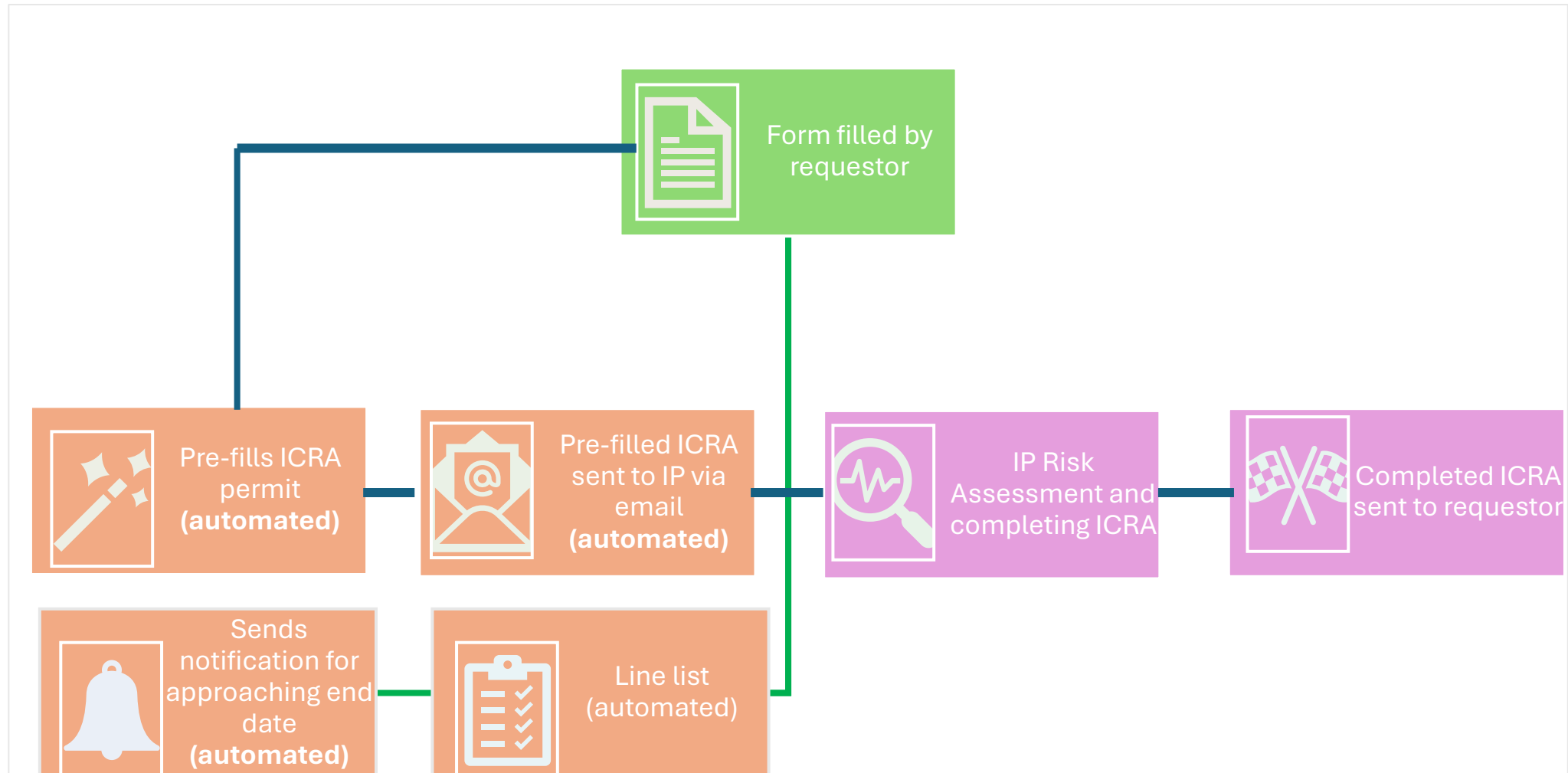


EFFICIENT COORDINATION BETWEEN IP
AND FACILITIES & MAINTENANCE STAFF



QUICK ACCESS TO IP WITHOUT MANY
PHONE CALLS/DROP-INS

Standardization through automation





Infection Control Risk Assessment (ICRA) Construction Permit

Infection Prevention
Department
Phone: 555-5555

Project/Permit # _____

Maintenance Location: Flamingo Room	Start Date: 6/1/2024
Description:	Permit Expiration Date: 6/5/2024
Project Coordinator/Supervisor: Ted Jedderson	Phone: 666-6666
Contractor Performing Work: Jerry	Phone: 111-1111

Project Risk Class (See reverse side for Risk Assessment Matrix-Permit Required for Class IV and V Project)

Class	Construction	
I	<ul style="list-style-type: none"> Perform noninvasive work activity as to not block or interrupt patient care. Perform noninvasive work activities in areas that are not directly occupied with patients. 	<ul style="list-style-type: none"> Perform noninvasive work activity in a manner that does not create dust. Immediately replace any displaced ceiling tile before leaving the area and/or at end of noninvasive work activity.
II	In addition to Class I:	
	<ul style="list-style-type: none"> Perform only limited dust work and/or activities designed for basic facilities and engineering work. 	<ul style="list-style-type: none"> Perform limited dust and invasive work following standing precautions procedures approved by the organization.
III	In addition to Class I and II:	
	<ul style="list-style-type: none"> Have all patient/unit equipment and supplies moved out of the construction/work area prior to beginning project. Provide active means to prevent airborne dust dispersion into the occupied areas through the use of hand-held HEPA vacuum devices, polyethylene plastic containment, isolation of work area by closing room door, etc. Remove or isolate return air diffusers to avoid dust from entering the HVAC system. Remove or isolate the supply air diffusers to avoid positive pressurization of the space. If work area is contained, then it must be neutrally to negatively pressurized at all times. Seal all doors with tape that will not leave residue. Contain all trash and debris in the work area. 	<ul style="list-style-type: none"> Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area. Do not remove barriers from work area until completed project is thoroughly cleaned by Env. Services Dept. Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy. Adhesive mats must be changed routinely and when visibly soiled. Maintain clean surroundings when area is not contained by damp mopping or HEPA vacuuming surfaces. Worker clothing must be clean and free of visible dust before leaving the work area. HEPA vacuuming of clothing or use of cover suits is acceptable.
IV	In addition to Class I, II, and III:	
	<ul style="list-style-type: none"> Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling or, if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements. (See Technical Standard 465 – Infection Control Risk Assessment for additional barrier requirements) Environmental containment units (ECUs) are approved for Class IV precautions in small areas totally contained by the unit and that has HEPA-filtered exhaust air. Maintain negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows does not require HEPA-filtered air. If exhaust is directed indoors, then the system must be HEPA filtered. Prior to start of work, HEPA filtration must be verified by particulate measurement as no less than 99.97% efficiency and must not alter or change airflow/pressure relationships in other areas. 	<ul style="list-style-type: none"> Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is not acceptable. See Technical Standard 405 – Infection Control Risk Assessment for additional guidance on negative pressure. Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator. Vacuum work area with HEPA filtered vacuums or wet mop every shift of construction activity, minimize tracking. Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed.
V	In addition to Class I, II, III, and IV:	
	<ul style="list-style-type: none"> Construct anteroom large enough for equipment staging, cart cleaning, workers. The anteroom must be constructed adjacent to entrance of construction work area. Personnel will be required to wear disposable coveralls at all times during Class V work activities. Disposable coveralls must be removed before leaving the anteroom. 	<ul style="list-style-type: none"> Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized.

Additional Requirements: See Class III for abatement work. Reference Mold Mitigation Remediation – Bulletin ID: 10024906.

Permit Requested By: Ted Jedderson	Permit Authorized by: _____
Date: 5/6/2024	Date: _____

This permit must be posted at worksite for duration of the project.
Failure to comply with any of the above requirements will result in immediate shut down of the job.

Revised: 7/27/2023

Step 1: Select Construction Activity Type

Type A	Inspection and Non-Invasive/General Upkeep Activities. Includes but is not limited to: removal of ceiling tiles for visual inspection (limited to 1 tile per 50 square feet); limited building system maintenance (e.g., pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry work to include painting without sanding) that does not create dust or debris; clean plumbing activity limited in nature.
Type B	Small scale, short duration activities that create minimal dust. Includes but not limited to: work conducted above the ceiling (e.g., prolonged inspection or repair of firewalls and barriers, installation of conduit and/or cabling, and access to mechanical and/or electrical chase spaces); fan shutdown/startup; installation of electrical devices, installation of new flooring, removal of drywall, or controlled sanding activities which produce minimal dust and debris. (Projects in this category are typically completed in a single work shift.)
Type C	Any work that generates a moderate-to-high level of dust. Includes but not limited to: removal of pre-existing floor covering, walls, casework or other building components; new drywall placement; renovation work in a single room; non-existing cable pathway or invasive electrical work above ceilings; removal of drywall or dry sanding where a moderate amount of dust and debris is created; work creating significant vibration and/or noise. (Projects of this type cannot be complete within a single work shift.)
Type D	Major demolition work and construction projects. Includes but is not limited to: removal or replacement of building system component(s); removal/installation of drywall partitions; invasive large-scale new building construction; renovation work in two or more rooms.

Step 2: Select Infection Control Risk Assessment Groups/ Zones

Group 1 – Lowest	Group 2 – Medium	Group 3 – High	Group 4 – Highest
Public hallways and gathering areas not on clinical units	Waiting areas	All acute care units	All intensive care units (including PICU/NICU)
Office areas not on clinical units	Clinical engineering	Emergency Department	All oncology units/clinics
Breakrooms not on clinical units	Materials management/General Stores	Pharmacy – general work zone	OR theaters and restricted areas (including day surgery, Lab, and Delivery, PACU, etc)
Bathrooms or locker rooms not on clinical units	Sterile processing department – dirty side	Medication rooms and clean utility rooms	Procedural suites (Including Cath labs, etc)
Mechanical rooms not on clinical units	Gift shop	Imaging suites: diagnostic imaging	Pharmacy compounding
EVS not on clinical units	Kitchen, cafeteria, coffee shop, and food kiosks	Laboratory	Sterile processing department – clean side
Non-patient/ low risk areas not listed elsewhere	Cardiac Rehab	Outpatient Clinic*	Transfusion services
	PT/OT Rehab		Dedicated Isolation wards/units
			Imaging suites: invasive imaging
			Children's Hospital/Pediatrics
			Dialysis Suites/Renal Care Units
			Wound centers
			Microbiology and Special Laboratories

*Outpatient clinic spaces risk class may be different based on level of care provided

Step 3: Determine Project Risk Class from Construction Activity Infection Control Matrix

Risk Level	Construction Activity			
	Type A	Type B	Type C	Type D
Group 1	I	II	III	III/IV
Group 2	I	II	III/IV	IV
Group 3	II	III	IV	V
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Group 3	II	III	IV	V
Group 4	III	IV	V	V

Revised: 7/27/2023

Behind the scenes instructions for automation

#APIC24

When Construction or Facilities submits the form



Read details



Retrieve details of submitter

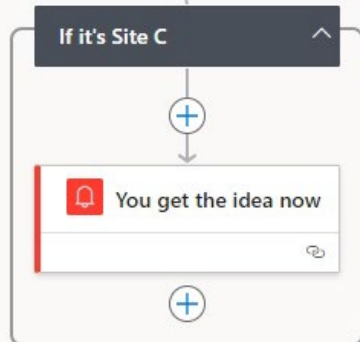
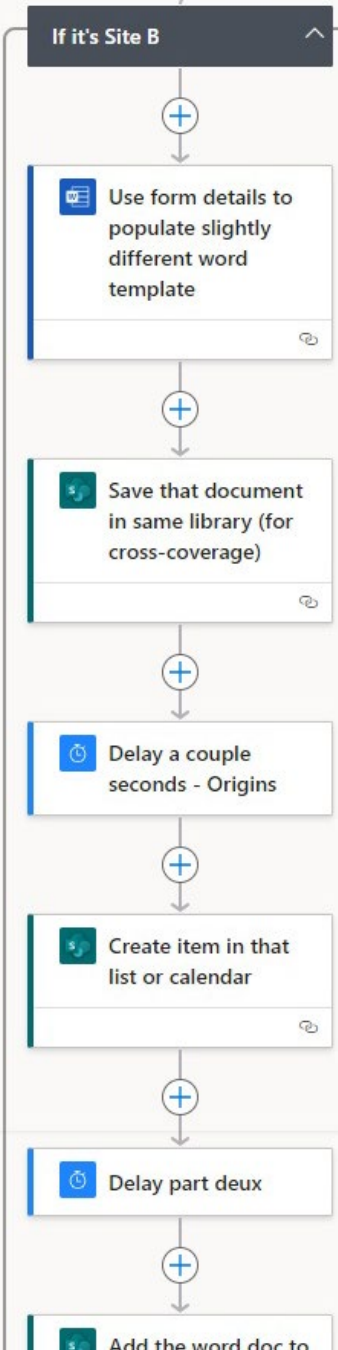
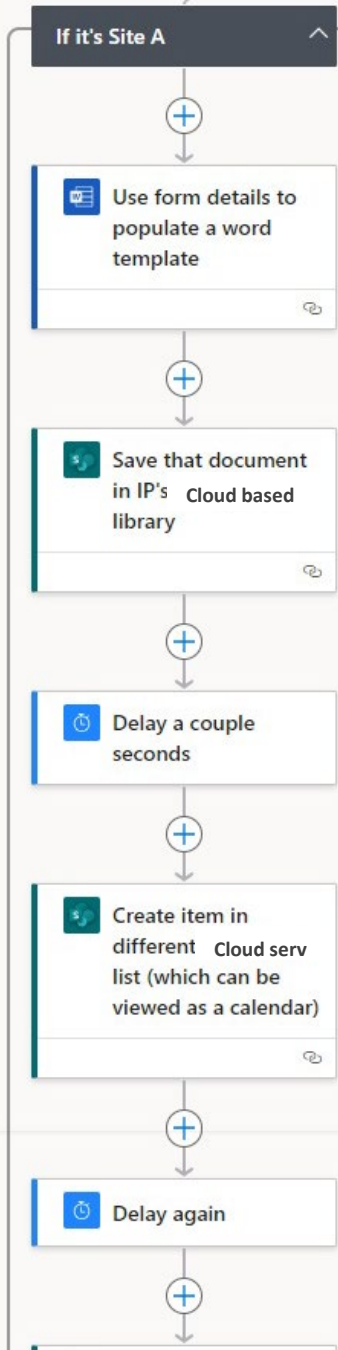


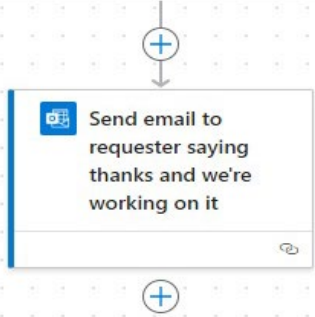
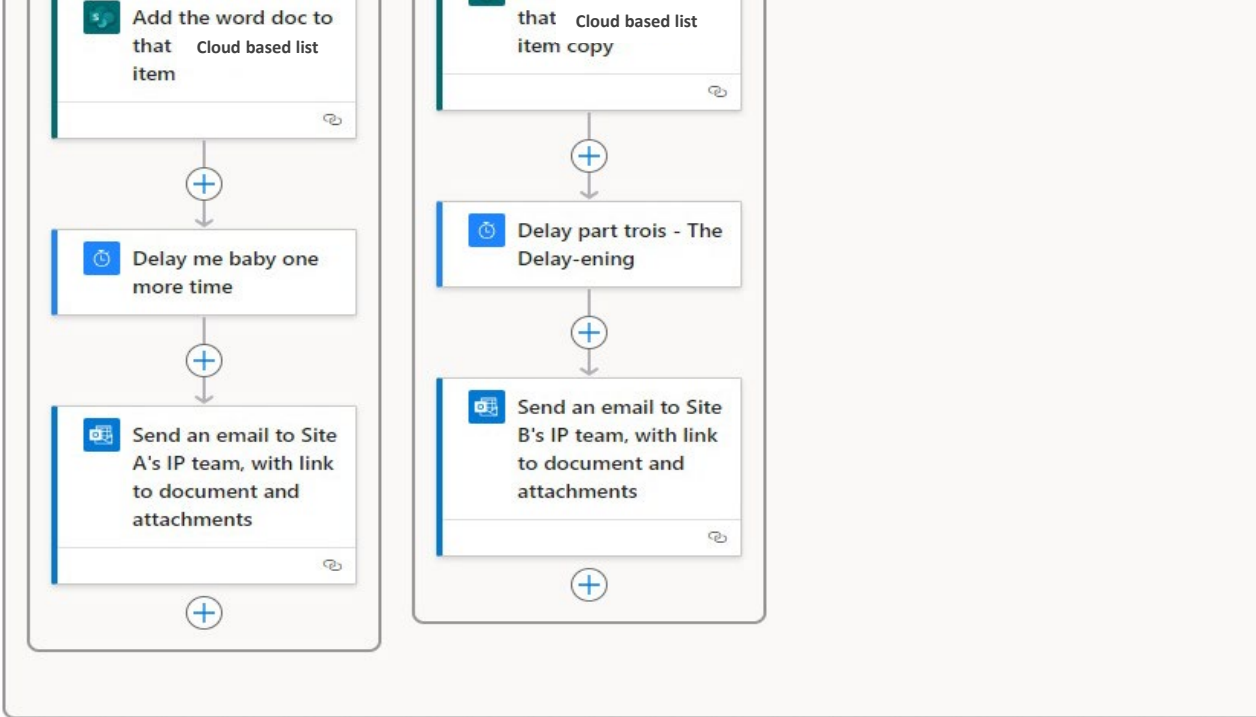
Convert time zone (because UTC is confusing and irrelevant)



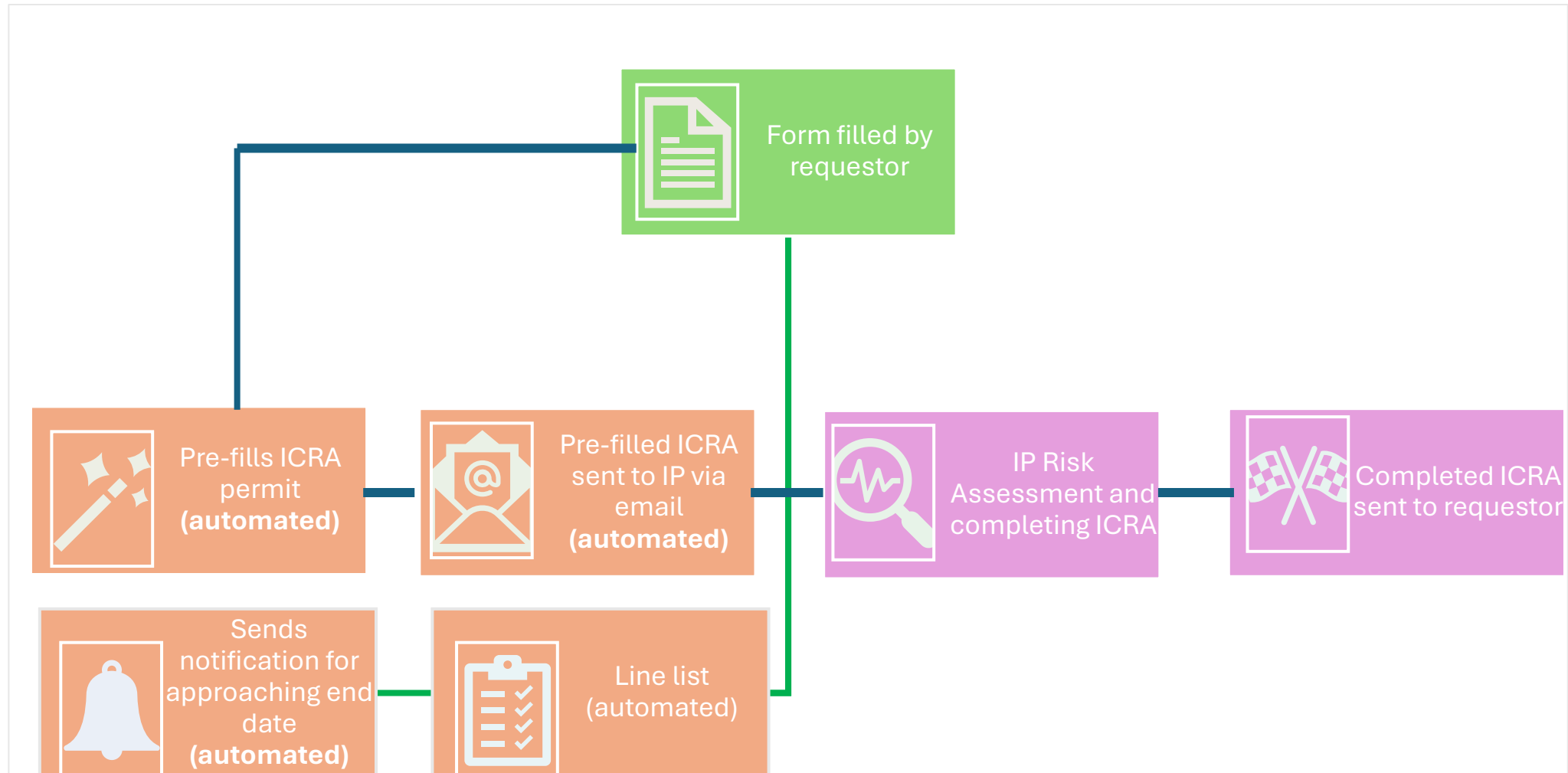
Switch







Standardization through automation



Easy to comply-Monitoring



Infection Control Construction Inspection Log

Project: _____ Project Class: _____
 Project Manager/Contact: _____ ICRA Permit Posted? Y N N/A

ITEM	Y	N	N/A	ITEM	Y	N	N/A	ITEM	Y	N	N/A
Barricades sealed with minimal penetrations – doors closed and gasketed/sealed with duct tape				Barricades sealed with minimal penetrations – doors closed and gasketed/sealed with duct tape				Barricades sealed with minimal penetrations – doors closed and gasketed/sealed with duct tape			
All intake/exhaust vents covered				All intake/exhaust vents covered				All intake/exhaust vents covered			
HEPA hog operational and exhausted appropriately				HEPA hog operational and exhausted appropriately				HEPA hog operational and exhausted appropriately			
Negative pressure reading (≥ -0.03):				Negative pressure reading (≥ -0.03):				Negative pressure reading (≥ -0.03):			
No dust/dirt seen outside of the barricade - floors clean near entrances				No dust/dirt seen outside of the barricade - floors clean near entrances				No dust/dirt seen outside of the barricade - floors clean near entrances			
Appropriate clothing worn by workers for work area				Appropriate clothing worn by workers for work area				Appropriate clothing worn by workers for work area			
Demonstrate compliance with debris removal				Demonstrate compliance with debris removal				Demonstrate compliance with debris removal			
No water leakage seen				No water leakage seen				No water leakage seen			
Tacky mats sticky at entrances				Tacky mats sticky at entrances				Tacky mats sticky at entrances			
Tacky mat #:				Tacky mat #:				Tacky mat #:			
Adjacent ceiling tiles intact				Adjacent ceiling tiles intact				Adjacent ceiling tiles intact			
Restricted to authorized personnel only				Restricted to authorized personnel only				Restricted to authorized personnel only			

Date:	Date:	Date:
Inspected by:	Inspected by:	Inspected by:
Comments:	Comments:	Comments:

Easy to comply-Automation

For Facilities and Maintenance

- Easy to comply for Facilities and Maintenance staff including outside contractors
 - Form completed in 5 mins
 - Easy access via phones for contractors (link, QR codes) enhances compliance
 - Ensures timely risk assessments
- Automated emails before permit expiration



Easy to comply-Automation

For Infection Preventionists

- Streamlines ICRA request process and reduces administrative burdens
- Coverage for IPs across the region and fosters independence among IPs
- Encourages collaboration
- Efficient record keeping
- Enhanced the overall oversight



Challenges with Automation



Success Depended On



Support from Facilities and
Construction leadership

IP leadership support with automation
learning, tools, and resources

Fostering partnerships and easing the
way

Resources

<https://www.ashe.org/icra2>