

24TH ANNUAL



24TH LCI CONGRESS
OCTOBER 18-21

Using LEAN Thinking to Safely Control Outcomes

Nemours Children's Hospital, Delaware – Infrastructure Upgrades



Using LEAN Thinking to Safely Control Outcomes

Nemours Children's Hospital, Delaware – Infrastructure Upgrades



Patrick Delagol
MEP Project Manager
Nemours Children's
Hospital - Delaware



Dave Fallon
Associate Principal
BR+A Consulting
Engineers



Dan Capello
Project Director
HSC Builders &
Construction Managers



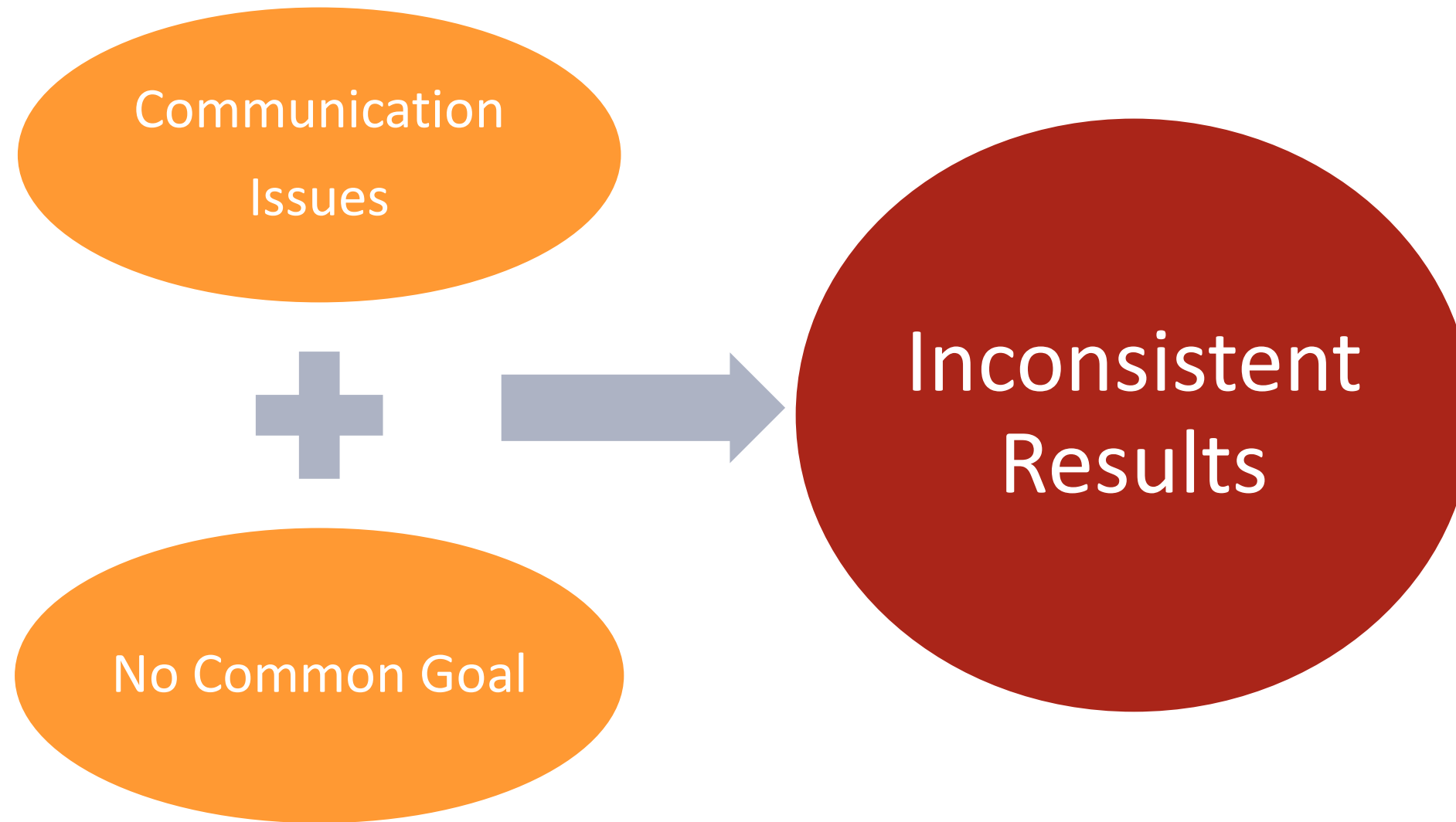
Dave Twardowski
Project Manager
I. D. Griffith
Mechanical Contractors

Infrastructure Replacement at duPont Pavilion circa 1980

Nemours Children's Hospital, Delaware



Challenges



Using LEAN Thinking

- 1 Respect for People
- 2 Optimize the Whole
- 3 Generate Value
- 4 Eliminate Waste
- 5 Focus on Flow
- 6 Continuous Improvement

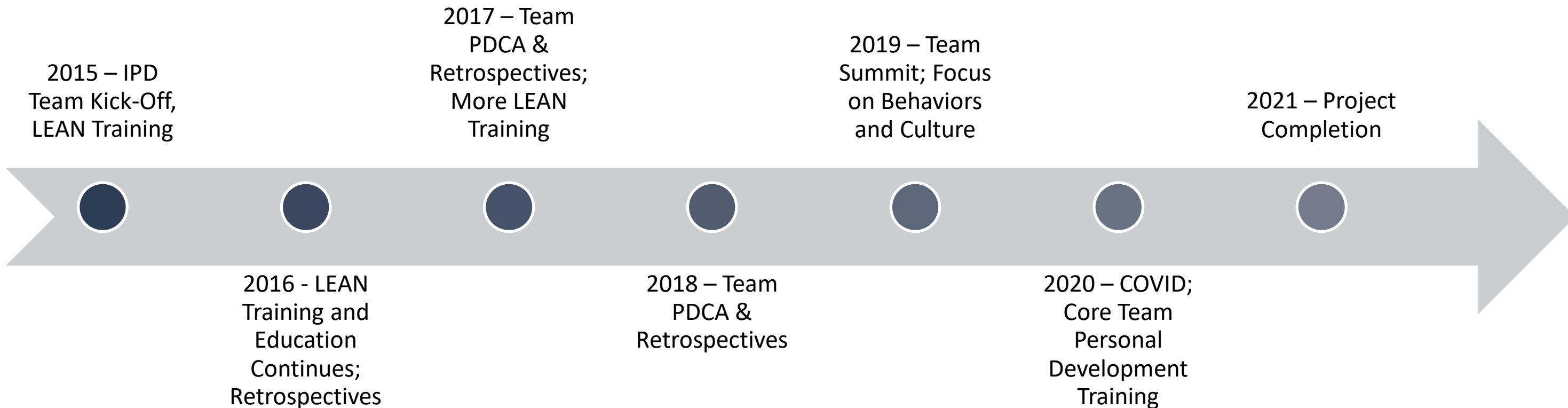


Using LEAN Thinking

- 1 Respect for People
- 2 Optimize the Whole
- 3 Generate Value
- 4 Eliminate Waste
- 5 Focus on Flow
- 6 Continuous Improvement



Timeline of Continuous Improvement



PDCA Events



Core Questions for a Lean Project:

Are we adding value?

Are we eliminating waste?

Are we improving the workflow?



Promise Log

Nemours Infrastructure Upgr - IPD Team Promise Log

No.	Item Description	Promise	Team Member	Date Promised	Done / Not Done (by Date Promised)	Notes / Comments	Closed
52	49	Seismic requirements	Review seismic requirements for the project	Dave, Ted, Joe	11/06/15	Done Meeting to be setup and focus group to report back. Investigate if something better than C...Joe (H&B) reached out to Mason (seismic vendor) 10/30 and asked that he contact engineer and architect to review seismic requirements. 2/8/15: Per Bill H, Duffield in process of scheduling site visit to perform test. No date confirmed. 2/22/2016: Contract is formally executed. Awaiting testing date	<input type="checkbox"/>
74	70	Budget Cluster Group	Provide monthly burn rate projections	Dan C.	TBD	Not Done Sufficient information not available at this time. Pending schedule update and final target value; To be discuss at PMT meeting 3/7/2016	<input type="checkbox"/>
85	81	P6 Schedule	Update P6 schedule based on H&B schedule info and AHU equipment fab/del information. (Pending item 80)	Dan C.	03/16/16	Not Done pending H&B info, to be sent today; IDG to send remainder AHUs schedule; Awaiting Nemours internal review on AHU schedule. H&B sent updated schedule to HSC 2/1/16. 2/8/16: Individual AHU replacement schedules being developed . 2/23/2016: scheduled meeting with IDG to discuss 2016 AHU schedules	<input type="checkbox"/>
88	85	Project Schedule	Export Infrastructure to MS Project for Nemours use after update on 11/11/5.	Dan C.	03/16/16	Not Done On Track	<input type="checkbox"/>
97	93	A3.0003 Update	Price alternative approach to risers using existing stairs, produce A3	Mike G.	01/28/16	Done Pending item number 103; Received drawings from Ewing Cole on 1/4/2016. Awaiting BR+A sketch and EC A3.0003. Price will not be complete by 1/13 as we are still awaiting information, date should be revised based on when info is estimated to be available. Complete and e-mailed to HSC 1/28/15.	<input checked="" type="checkbox"/>
116	111	Areaway/ GA substation layout	Show location of NSBU AHU in lawl	Dave F.	02/17/16	Done Layout presented to PMT team	<input checked="" type="checkbox"/>
139	134	A3.0003 update	Price alternative approaches to risers using existing stairs	Ted P.	02/26/16	On track; need pricing of stair demo, new slabs and adjustment to electrical costs to complete A3. - request costs by 1/22.; pending item 170 - Have received misc trade costs from HSC on 2/5/2016 - assembling A3 - need ME costs to complete - can finish 2/11 if we have costs by noon 2/9. Progress update to be provided 2/24/2016 at PMT	<input type="checkbox"/>
140	135	A3.0006 (6/7 year option)	Provide response and direction	Chuck E.	03/21/16	Nemours internal meeting date to be confirmed. Feb or Mach 2016. 3/18/2016: Nemours internal meeting	<input type="checkbox"/>
150	145	5 kV Junction Box Sub-basement	Provide drawings to IDG	Mark G.	TBD		<input type="checkbox"/>
155	150	A3 Submittals	A3.0007 - Core closets now included in target value	Dan C.	02/05/16	Not Done Submitted today.	<input checked="" type="checkbox"/>
167	162	Support Steel for holes in service floor for E-sub	Provide RFI to be sent to Ewing Cole	Dave T.	TBD	Done Sent 1/14/2016	<input checked="" type="checkbox"/>

Action Log / Executive Schedule

Action Item

Task Name
Update 2019 projected schedule
Confirm what will need help
Update 2018 schedule
Update 2018 schedule
Update 2018 schedule
Review AG-P
RFI to Ewing support for gy
substation de
Contact vend
substation eq
Review 3D-B
Follow up with testing of exis
AHU replacer
Allowance log
Allowance log
Allowance log
HSC to verify
North substat requirements
Review scan
Provide feedb solution to ha
chain at top o
IDG to perform that AHU-GC milestone sch
ACM matrix to
Pat D to issue
Bus Duct insu

TARGET SCHEDULE DASHBOARD
NEMOURS INFRASTRUCTURE IPD PROJECT

Weeks Remaining to Completion: 25

Total Float Trend Legen

Significant Change
Notable Change
No Change

12/10/2021
6/18/2021

Base Plan as of 4/30/21
Current Plan from Pull Plans

Critical Activity Legend

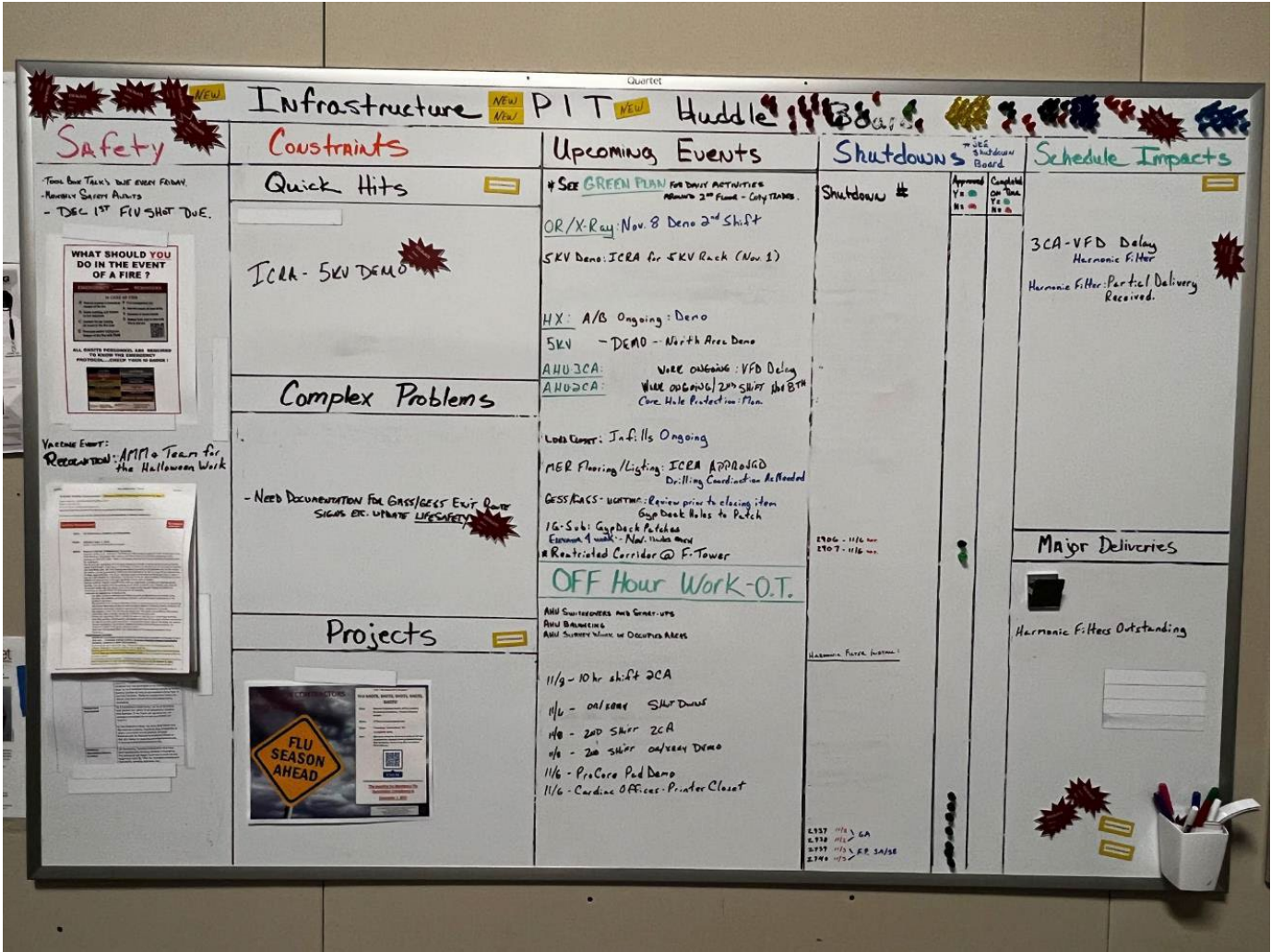
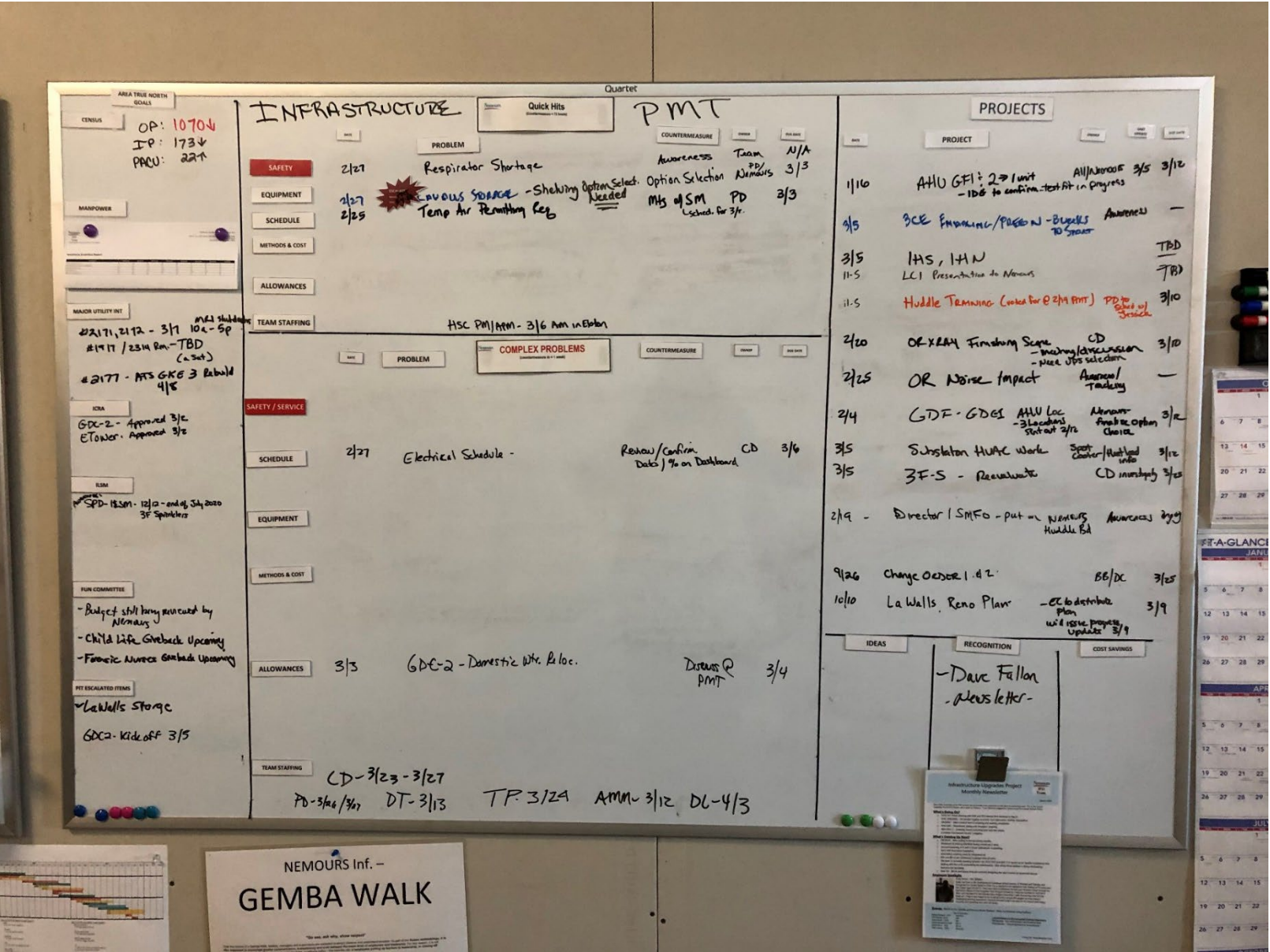
NOT STARTED
CONSTRAINT
IN PROGRESS

Print Date: 6/18/2021

Work Scope	Start	Complete	Total Float	% Complete (Planned vs. Actual)	2021												2022		Critical Activity #1	Critical Activity #2	Critical Activity #3	Constraints	Countermeasure
					APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR							
E/F TOWER HX	10/12/20	5/27/21	142	100%															Demo of Existing	Equip Pad Demo			
	10/12/20	6/25/21	127	97%																			
A/B TOWER HX	3/1/21	8/27/21	78	61%															Slab Removal	Floor Drains	Slab replacement		
	3/22/21	8/27/21	78	56%																			
AHU GCN	11/2/20	5/13/21	157	100%															Work to Complete Items	Final Punchlist	De-Mob Inspection		
	11/4/20	6/7/21	143	100%																			
AHU GD-1 & 2	3/1/21	9/17/21	47	55%															Sheet Metal (2nd Shift)	AHU Assembly	AHU Assembly		
	3/1/21	9/17/21	47	55%																			
AHU 3CA Refurb	7/10/21	8/1/21	37	0%															Scope & Work Plan Coordination				
	7/10/21	8/1/21	37	0%																			
AHU 2CA	9/7/21	12/4/21	18	0%															2CA Vacated / 1A Reno Complete	Reno Design Drawings	Duct Sketching		
	9/7/21	12/4/21	18	0%																			
B TOWER CONDUIT DEMO	5/17/21	6/25/21	128	82%															MCC Demo in MERs	Conduit Demo in MERs	Conduit Demo in Service Levels (90% Complete)		
	5/17/21	6/25/21	128	82%																			
E TOWER CONDUIT DEMO	2/1/21	6/18/21	132	100%															Final Cleanup Items	De-Mob Survey			
	2/1/21	6/25/21	127	95%																			
F TOWER CONDUIT DEMO	8/9/21	9/17/21	69	0%															Conduit Demo in MERs	Conduit Demo in Service Levels (90% Complete)			
	5/31/21	9/17/21	69	17%																			
A/B TOWER CONDUIT DEMO	9/20/21	10/15/21	50	0%															Conduit Demo in MERs (90% Complete)	Conduit Demo in Service Levels (90% Complete)			
	9/20/21	10/15/21	50	0%																			
E/F TOWER CONDUIT DEMO	9/20/21	10/15/21	50	0%															Conduit Demo in MERs (75% Complete)	Conduit Demo in Service Levels (90% Complete)			
	9/20/21	10/15/21	50	0%																			
5KV DEMO	10/4/21	12/10/21	13	0%															5KV Shutdown for Demo				
	10/4/21	12/10/21	13	0%																			
LAWALLS EXPANSION	3/29/21	8/2/21	85	64%															Passageway Install				
	3/29/21	7/21/21	102	71%																			
E SUBSTATION DEMO	3/1/21	3/26/21	182	100%															Slab Demo				
	3/22/21	7/2/21	182	90%																			
F SUBSTATION DEMO	7/12/21	8/6/21	85	0%															5KV Shutdown for Demo	Xrnr Evac			
	7/12/21	8/6/21	85	0%																			
B SUBSTATION DEMO	7/12/21	8/6/21	85	0%															5KV Shutdown for Demo	Xrnr Evac			
	7/12/21	8/6/21	85	0%																			



Huddle Boards



Huddle Boards

N/AIDHC Infrastructure Project PMT Huddle

QUICK HITS						
Type	Date	Problem	Countermeasure	Owner	Action Item(s) Needed Before Next Huddle:	Due Date
Today's Facilitator: Joe D.						
Awareness	25-Aug	2020-2021 Flu Shot / COVID	8/25/20: Flu shot awareness - will be mandatory for associates. Will be Required across the board except for religious/health exceptions. Anyone entering building will need flu shot or approved exception. Additional info tbd. Deadline for compliance: 12/1/20, Denise has badge tags for those who have submitted letters. 12/8: just remember if you have anyone new (cranes, second tier subs, visitors for meetings, etc.) - make sure you send in the letters - just need letters not the backup. 12/22: COVID stand down was held on 12/18 1/19: No new business; COVID vaccinations are starting to being offered by Nemours on an invitation-basis. 1/26: No update	Awareness	N/A	N/A
Safety	5-Jan	Standdown - Demo	Tri-M - Standdown - line cut 12/23- had standdown over holidays. Issue with supervision. Put pause on Tri-M demo until protocol established; SOP for verification and tracking process from Tri-M - making sure what's being removed is correct and ready. Tri-M to have report/etc. by 1/11 - team to discuss path forward before 1/11. DC to ask Tom S. about accelerating response 1/12: Received report from Tri-M 1/11 evening; to be reviewed and follow-up to be scheduled to review report and adjustment to be made for future prevention. DC/BB to discuss post-huddle. 1/19: Tri-M to follow up on meetings held last week with additional info; DC/BB has not received yet. HSC to check with Tom S. on status. 1/26: Still need to followup with Tri-M and close this out	Team/HSC/ Nemours/Tri-M	HSC to check with Tri-M on status of follow-up items	22-Jan
Equipment						
Schedule						
Methods & Cost						
Allowance Costs	12-Jan	Premium time projection	January needed - H&B sending in 1/12 morning; IDG by end of day 1/12. 1/19: BB still needs IDG; MT to check with DT 1/26: DT sent in: Item closed.	HSC/H&B/IDG		12-Jan

COMPLEX PROBLEMS						
Type	Date	Problem	Countermeasure	Owner	Action Item(s) Needed Before Next Huddle:	Due Date
Safety		Site Readiness	Oversight Gemba - Readiness of site for JCO (next week) and for maintenance of project/etc. 1/12: had a walk through on Friday of active areas. Developed some items that were addressed. Will continue to have walks weekly to review. Have formal discussion of maintenance plan. 1/27 - PMT Component Group mtg tomorrow at 10. Mtg today re: walk-through done previously and review the daily survey process (HSC/Nemours) - will feed into tomorrow's component meeting - re: timing/duration/effort level/reporting.	Team	Being Discussed at PMT Component Mtg 1/27	27-Jan
Equipment						
Schedule						
Methods & Cost	26-Jan	Team Review of 2021-2022	Cost projection review - drafts being reviewed; should be able to finalize and present to Nemours within a week.	Team	DC - drafts under review	29-Jan
Allowance Costs						
Escalate						
Item Completed - will be removed before next huddle						

N/AIDHC Infrastructure Project PMT Huddle

PROJECTS						
Date	Project	Owner / Action Needed Before Next Huddle	Last Update	Next Update	Due Date	
5/14	AHU GGS Serviceability (Carried over from Ideas / Cost Savings)	EC/HSC	26-Jan	26-Jan	2-Feb	
	BB - Jeff Harris re: AHU GGS (service level). Had maintenance doing work - trouble accessing the unit - very difficult to access. Team to try to review and improve serviceability. DF - has been looking at it with Jeff Harris. 1/19: CD sent out info on the door he got on 1/14 for both ORX-Ray and GGS; TP has started to review and will complete today. EF verifying dimensions and we will need shop dwgs from Man. at that time. They need an order to get more info to us. 1/26: Ed did verifications, spoke with TP re: location; will be discussing with facilities on thoughts based on the proposed location; proposed location would be better served by a 36x36 - TP proposed another size, discussed access with the lower impact. Additional hatch cut sheets to be reviewed with facilities as well. Should be able to move forward based on facilities' discussions.	EF to review with Facilities and determine path forward on size hatch etc.				
7/28	Component Group Topic: Topic for 1/27 - Site Readiness	Team	26-Jan	26-Jan	N/A	
5/28	Vertical Bus Ducts Removal Plans (Added to Projects at end of 5/28 Huddle)	HSC/EC/IDG	26-Jan	26-Jan	28-Feb	
	1/19: Safety platform concept reviewed; BB getting HSC safety team reviewing it this week (hopefully); H&B safety to review too. EF to start survey for rest of the towers: targeting 1/22 for budgeting for A-tower (cash flow). 1/26: EF to walk down additional towers - in progress. All towers to be surveyed and preped by end of February. Safety walk with HSC & H&B safety members to occur today to review means/methods	HSC and H&B's Safety Teams to Review plan 1/26 EF to survey rest of towers by end of Feb.				
28-Jul	Open Demolition - controls/electrical conduit	HSC/Tri-M/H&B	26-Jan	26-Jan	2-Feb	
	1/19: BB had mtg with Tri-M/H&B for additional detail and map update; BB has map update and will present at PMT 1/20 1/26: Updated plans issued last week; reviewed in last week's PMT. Monthly update in Feb; please review and provide Bob with any comments.	Provide any feedback/comments to BB				
4-Aug	Allowances - CPMS, IS conduit, etc.	HSC	26-Jan	26-Jan	2-Feb	
	1/12: Discussed at PMT; pricing being vetted. CD/DC - have invoices from Tri-M, trying to figure out what was applied to the line item. What is where is the big question. DC will be working on for tomorrow. CD dissecting/organizing. AT5 vs. base target value. 1/19: DC has had discussions regarding the ownership of the work; trying to find the detail - working to resolve what was charged to the line and what should have been charged elsewhere. Planned update trow to team. CD sent email out yesterday w/ additional discussion w/ JB - these 4 unit would be the last ones needed to be able to completely divorce from the modicon system and be able to remove it in the future. 1/26: Line item with \$115K for H&B for demo work where Tri-M would safe off and H&B demo back; adjusted approach - Tri-M doing demo for modicon. Charges appear to be justified in that allowance based on how it was structured. With the additional 4 AT5 - shortfall in the allowance. More discussion with PMT for path forward to be planned. If there is other allowance dollars that could be scrubbed - to review to see if can still make this work.	PMT discussions needed regarding path forward due to shortfall in current allowance.				
19-Jan	GD-1/2 - Laundry Unit Project Start-Up Tracking	Team	26-Jan	26-Jan	15-Mar	
	Developing work plan for GD / Laundry. Will plan internal kick-offs etc. get started in March. Will track in new projects for tracking. 1/19: added for tracking; pre-mob walk through yesterday; BB surveyed service level of existing conditions. BB generating inspection report. Significant amt. of debris and some safety issues; need review. Will add to PMT - will send out ahead of mtg so team can review. Will do initial pull plan 1/19 in PIT; BB to develop work plan and maps to AMM for kick-off meeting to be set up with users. Will need permit dwgs and PCRA/CRA will be prepped and submitted once through Work Plan. 1/26: AMM/BB walked space yesterday and the occupied areas that will be impacted - a lot of the noisy work will need to be off-hours. Will need more vetting re: schedule for that area. Kick-off being developed - schedule/timing with users.	BB to develop maps for AMM for kick-off with Users Permit Dwgs needed CRA to be submitted				

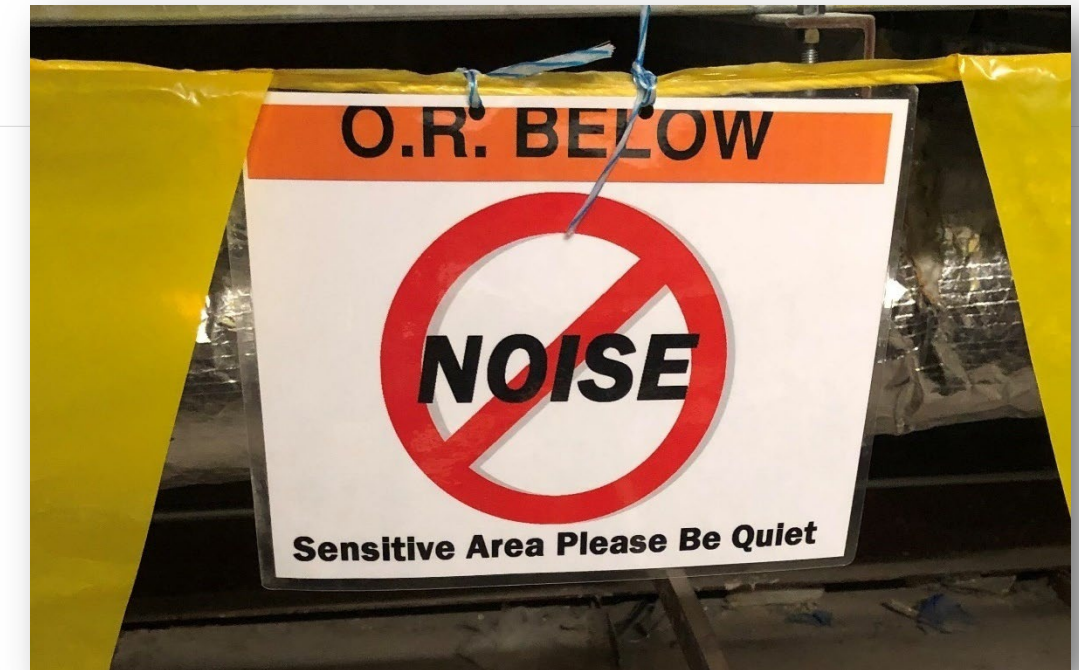
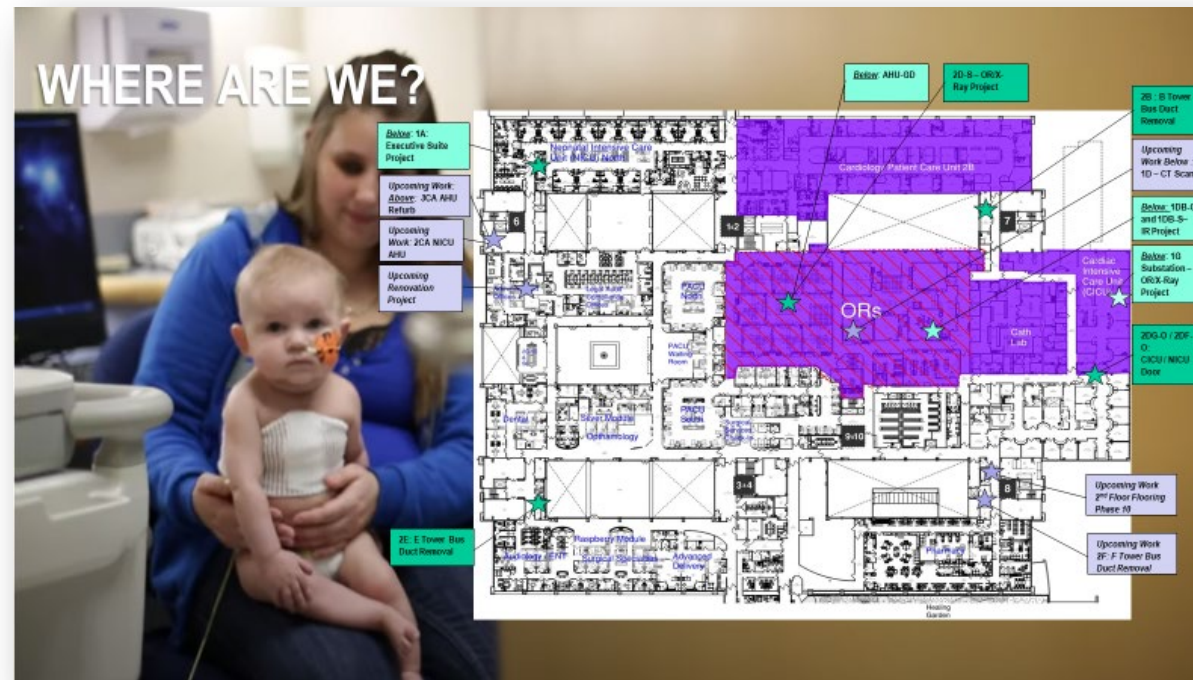
N/AIDHC Infrastructure Project PMT Huddle

Cases	Major Utility Interruptions	ICRA / ELM	Manpower Updates/Changes	Next Huddle Facilitator	New Business from Previous Huddles
Regulations Gemma system not working today.	ATC (downing for Substation - Normal 1/19 B 1/20) and Thursday 1/21 for Emergency - Done	APLs: ID - Approved 6/7 IDC - J - Approved 1/2 - Extension approved IDC - Approved - 1/2 ID - will be prepared and submitted	DO 1/5 - No changes. IDG - 18-20 onsite, site-wide. Have some on using with Cash Lab. Do not anticipate any health - planned possible up to March (to be confirmed). Still on 4 days/week. 1/26 / Update this week and next.	1/28 EC - Techs got Thursday 2/2 HSC 2/4 BB/A 2/6 IDG 2/11 H&B 2/16 EC 2/18 HSC	
PRCA		HE Blower 1K - Approved 1/23 - extension to 1/23/21. Approved, updated (done) (CRA approved), 1/23. ET Tower Heat Exchanger Demo/Installation - Approved 1/19	H&B 1/5 - no changes. 18-20 onsite at all times. 1/19: down 1 approved/2 mechanics.		
		Electrical: ORX-Ray Phase 2/3: Approved 4/24, extension approved; equipment for Phase 3 added (see 4/11/21) Bus duct demo - to be developed. Need to discuss work plan and how many CRAs are needed. North Phase Refractory - Supplement submitted 11/23 All Electrical Work Extensions have been received.	HSC 1/19: integration of Klackson - transition has started; will be attending meetings and getting more involved in project. 1/26: 30/70 transition ongoing; Lars Peterson, Insulator supervisor - made as of yesterday doing work across the projects and doing some self perform capacity. 1/26: PD - plan for last 12 months of project. Discuss any resource sharing across other jobs, etc.		
			Brink, Frank, Eric and Dan will be coming to help supplement (Dan, Eric - electrical; Frank - HVAC). H&B - copy Frank, Mark/Dave, add Eric. Dan on electrical. Just having additional hands on support.		
Team Staffing	Fun Committee	PIT ESCALATED ITEMS	Ideas / Cost Savings	Recognition	New Business
4th Jan R - 1/28, 1/29 1st 1 - 2/5 13 - 1/28	Newsletter - BB&A working on edit.	DMT Initiative: Overlook Follow up 1st - mtg on re-energize lights (can clip on hard hats) for use in service levels + bat lights. AMM looking at options - will send to team for review and opinion. AMM will present this week.			HSC: BB correspondence re: insulation availability - insulation is having delay getting materials - keep an eye on it. material would shortage impacting the manufacturers - go back to them as an option as an alternative. Look into cost impacts/availability. John Manville has another type of insulator - Manon - John manville adjacent. DF has been using general Poly and knows no. DF hasn't heard from insulation any concerns but will reach out and be proactive about finding out about this other product.
Timing Code					IDG /
Nemours: PG - 2/3					HAZ /
BB-A					Nemours: /
IDG					EC /
H&B					H&B /



Stakeholder Inclusion

- Key People Involvement
- Kick-off Meetings (Internal / External)
- Sound and Vibration Mock-Ups
- Huddles with Hospital Clinical Staff
- Improved Signage



ATTENTION: ALL CONTRACTORS
NO NOISE ZONE

MONDAYS 8:00am to 9:00am

AND

THURSDAYS 7:00am to 10:30am

ED FRATONI - HSC - 555-555-5555



“Why We Are Here?” – A Common Goal & Connection to Purpose



Big Lessons Learned

- PDCA with Honest Communications
- Invest in Team
- More than Process - Build Your Lean Mindset
- No One-size Fits All
- Develop Pivot Strategies
- Understand the “Why”
- Have Fun



Having Fun



QUESTIONS?

