

Fort Leonard Wood Hospital Replacement



Rendering by RLF (Rogers, Lovelock & Fritz, Inc.)



To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED

Fort Leonard Wood Hospital Replacement



Kelly Miller, RA, DBIA, LEED AP, PMP
Program Manager
Kansas City District
US Army Corps of Engineers



Travis Lynch, PE
Area Engineer
Kansas City District
US Army Corps of Engineers

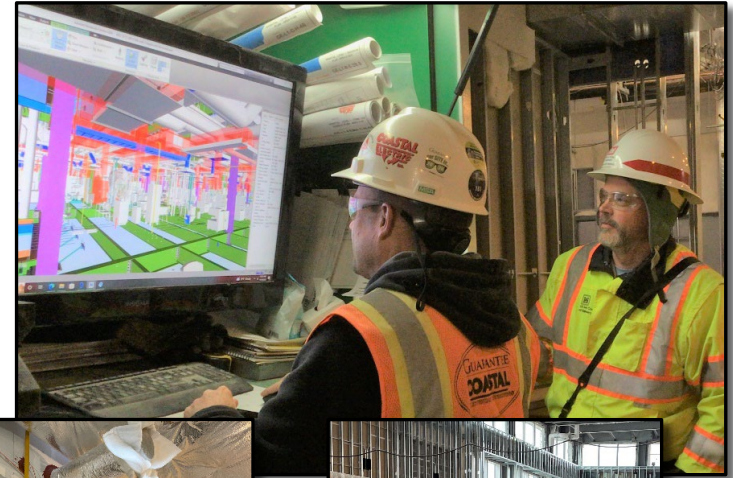


Tommy Turner, DBIA, LEED AP
Sr. Project Manager
JE Dunn Construction Co.



Agenda

- **Project Overview**
- **Lessons Learned & Best Practices**
 - Risk-Informed Decision Making
 - Performance oriented design-build
 - Physical & virtual reality mockups
 - Lifecycle Partnering Initiative including Collaborative Analytics



Existing Hospital Overview

General Leonard Wood Army Community Hospital (GLWACH)

- Over 300,000 encounters annually
- FLW trains 80,000 uniformed/year

Existing Condition:

- **Size:** 471,403 SF/six stories structure
- **Built:** 1965 (~60 years old)
- **Type:** Staffed for 65 beds
- **Staff:** 1156
- **Services:** Full range of medical services

Daily Facts:

- Admit 6.6 Patients
- Fill 1,651 Prescriptions
- Give 440 immunizations
- Complete 716 Lab procedures
- Take 285 X-rays
- Deliver 1 Baby
- See 1,000 Outpatients in clinics



New Hospital Overview

Scope: Construct 235,376 SF Hospital; 193,332 SF Clinic; Central Utility Plant; 5-bay Ambulance Garage; Helipad; & Supporting Facilities

Award: Aug 2019

Award Amount: \$296.0M

NTP: Oct 2019

Construction Duration: 48 months +25 days
(due to inclement weather)

Contract Construction Completion: Nov 2023

Current Cost: \$315.1M

Construction Status: 79% complete

Owner: DoD/Defense Health Agency

Design Build Acquisition & Contract Administration Team:

Kansas City District, US Army Corps of Engineers

RFP Development Team: Leo A Daly

Design Build Team: JE Dunn Construction & RLF
Architecture-Engineering-Interiors



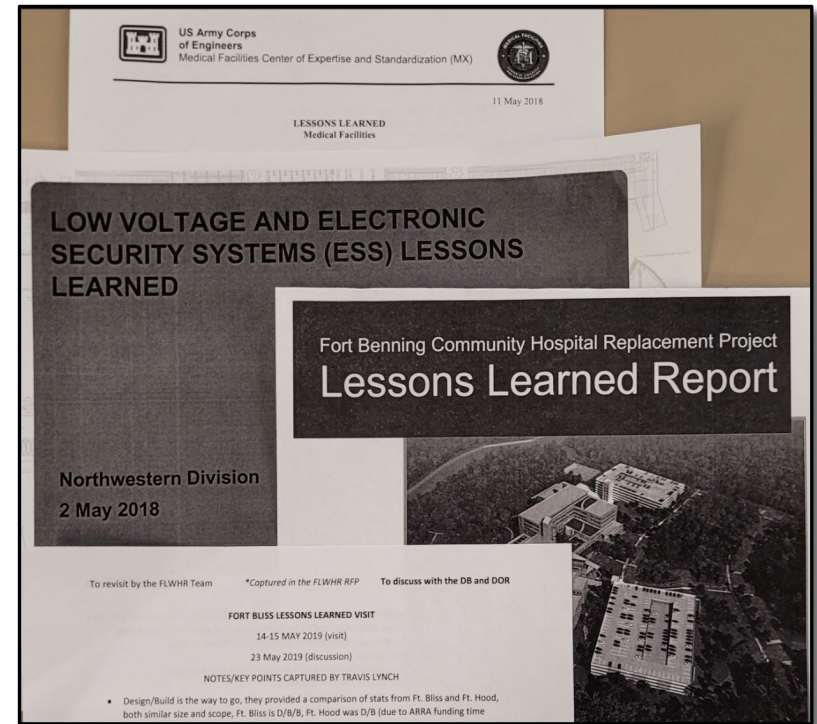
Lessons Learned

Lessons Learned sources:

- USACE MX
- Ft Benning
- Ft Bliss
- Ft Hood
- Ft Riley
- Ft Irwin
- Others

Key Take-Aways:

- Lots of risk!
- Required Risk Informed Decision Making (RIDM)
- Helped our team determine best acquisition strategy
- Requires a multi-disciplinary collaborative approach
- Early approach to Risk Management Framework (RMF)
- Need coordinated approach for Information & Communication Technology (ICT) & Cybersecurity



Lessons Learned

Procurement Method Selection

- DB vs DBB vs ECI

Lessons Learned from previous hospitals:

Design Bid Build (DBB) experience:

- More modifications
- DOR protective of their design
- Higher cost growth
- Increased schedule delay

Design Build (DB) experience:

- Fewer modifications
- DOR & Contractor resolve design issues
- Reduced cost growth
- Fewer schedule delays

Early Contractor Involvement (ECI) experience*:

- Fewer modifications than DBB, more than DB
- Owner & Contractor share design risk
- Less cost growth than DBB, more than DB
- Less schedule growth than DBB, more than DB

* Only one data point (Fort Riley Hospital)



Best Practices

- Risk-Informed Decision Making
- Performance oriented design-build
- Physical & virtual reality mockups
- Life Cycle Partnering Initiative including Collaborative Analytics



Jun 2023



Sep 2020



Feb 2021



May 2021



Sep 2021



Feb 2022



Risk Informed Decision - Making

- Process used to assess, manage & communicate risks
- Uses qualitative or quantitative assessment information
- Five step process
- Initial Cost Schedule Risk Analysis (CSRA) baseline
- Technical teams formed to address risks
- Developed and managed risk registers
- Team using Joint Risk Register Management

Joint Risk Register - Fort Leonard Wood Hospital Replacement										
30-Mar-23										
Risk No.	Risk Status	Date Added	Risk Statement	Issue Summary and Mitigation	Likelihood	Cost Impact	Schedule Impact	Action Owner(s)	Action Date	Days to Action Date
61	Top 4 Short Term	24-Jun-21	STC Conformance	<p>26 JAN 2023: Todd noted the STC Mockup Testing will be completed the 07 FEB 2023. Tommy noted JE Dunn is expecting a letter from USACE on testing requirements moving forward.</p> <p>2 FEB 2023: Travis noted USACE will respond to the serial letter following the test.</p> <p>09 FEB 2023: Todd informed the project team the condition of the spaces where the portions were tested had no ceiling, no flooring, no doors, etc. The LDRP, ED Exam passed with current conditions. Patient space and exam room in clinic did not pass but tested out with a score of 39 which is closer to the 45 then what was expected.</p> <p>16 FEB 2023: Travis noted USACE owes a response to the serial letter. Goal is within next week.</p> <p>23 FEB 2023: Kelly informed USACE plans to issue the letter by EOB 24 FEB 2023. Todd noted JE Dunn has obtained our own STC Speaker for future testing on rooms scheduled to be finished early.</p> <p>02 MAR 2023: Travis expects a response to the letter to be issued by the EOB 3 MAR 2023.</p> <p>09 MAR 2023: Todd noted JE Dunn relieved the letter response 03 MAR 2023. Future coordination is will</p>	Low	Low	Low	Todd Wigginton (JE Dunn)	1-Apr-23	2



To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED

Risk Informed Decision - Making

Project Leadership Team (PLT) Collaboration

- Conducted Cost Schedule Risk Analysis early in project life-cycle
- Nineteen (19) PLTs focused on addressing all risks determined to be moderate or high
- Outstanding Items List (OIL) used to communicate risk countermeasures

Infrastructure/Engineering PLT

- Low Voltage Systems (LVS) – examples: AV systems, cabling, nurse call
- Information and Communication Technology (ICT) – examples: phone, network
- Electronic Security Systems (ESS) – examples: door hardware, camera placement
- Cybersecurity / Risk Management Framework (RMF) – discuss ATO of new

Resulted in many countermeasures that improved RFP quality. Design builder's proposal so well aligned with expectations that we skipped Charrette. Cost growth is currently 2.4%

DATE INITIATED	18-Oct-17	FLW Hospital Replacement, Phase 1	PLT: Sustainability Tech Lead: Nicole Burman			RISK MATRIX
UPDATED	15-Mar-23					
BY WHOM	MG					
RESPONSIBLE	RISK IDENTIFICATION		PROBABILITY	SEVERITY	TOTAL RISK	MITIGATION AND ADDITIONAL INFORMATION
Leo Daly/Larry Wright	How are we handling storm water management? Engineering school and hospital will collect at same outlet.		PROBABLE	CRITICAL	HIGH	Manage hospital water on site for sustainability. Funding may be an issue. Jimmy Childers to follow up with DPW's long range plans on drainage. DB contractor to address storm water issue specific to the hospital site. 6 Dec-Briefing to the Real Property Master Planning Board. Intersection of 1st & Nebraska NE quadrant.

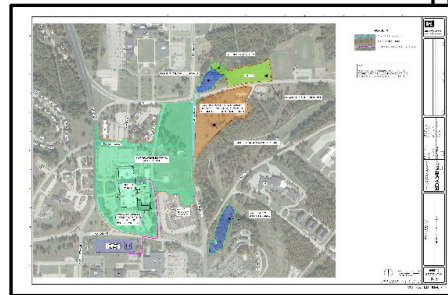


To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED

Performance Oriented Design Build

- Performance specifications with substantiation
- Use of Room Data Sheets (RDS)
- Development of Test Fit – Proof of Concept
- Regulating Plans
- Imagery/Aesthetics via photos of benchmark facilities
- Use of structured betterments
- RFP did not include:
 - ✓ Test Fit/Proof of Concept
 - ✓ Definitive site plan
 - ✓ Other bridging documents



SECTION 06000 - Partitions and Ceiling Requirements

SECTION 06000 - Partitions and Ceiling Requirements

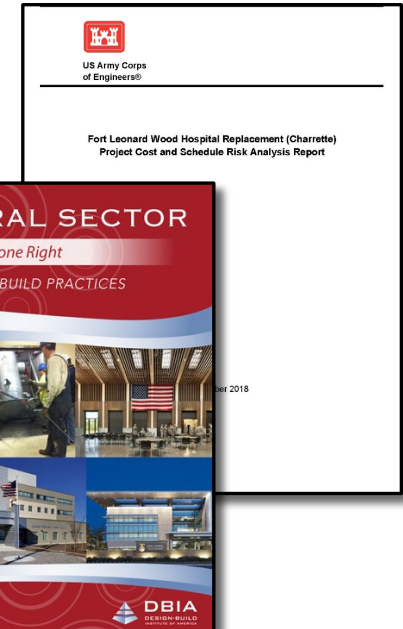
SECTION 06000 - Partitions and Ceiling Requirements

Item	Reference List	Accepted	Additional Aspects Accepted
1	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
2	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
3	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
4	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
5	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
6	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
7	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
8	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
9	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed
10	Provide a new wall with all necessary construction.	Accepted as proposed	If include, but not limited to the further, the extended boundaries beyond the two ends as proposed

SECTION 06000 - Partitions and Ceiling Requirements

SECTION 06000 - Partitions and Ceiling Requirements

SECTION 06000 - Partitions and Ceiling Requirements



Performance Oriented Design Build

Enterprise Approach:

- Program for Design (PFD)
- Concept of Operations (ConOps)
- MHS Space Templates
- Project Rm Contents Report (PRCR)
- UFC 4-510-01 Design Military Medical Facilities

FLW Approach:

- Provided Room Data Sheets (RDS)
 - Included PFD/PRCR/UFC
 - Industry Standard Practice – Design Build Institute of America (DBIA) Best Practice
- Attached ConOps
- Referenced Space Templates

LED A DAY		BIM Export Line No: 3	
Department:	HOSPITAL COMMON AREAS	Room Name:	Office, Supervisor Lead Guard
Functional Area:	SECURITY	Room Code:	OFAD4
Room Name:	Office, Supervisor Lead Guard	Blueprint No:	n/a
Room Code:	OFAD4	Staff:	1
Criteria Rm Name:		Default Staff:	1
Room Type Name:	OFFICE, ADMINISTRATIVE, PRIVATE	Net Area:	100 SF
Room Type Name:	OFFICE, ADMINISTRATIVE, PRIVATE	Default Area:	120 SF
Net Area:	100 SF	Omniclass:	
Room Comments:			
Space Parameter Notes:			
Ceiling Height:	96	Noise Level Maximum:	40
Door Width:	36	Noise Level Minimum:	30
Gen. Comments:		Sound Transmission Class:	40
Floor Finish:	CP	Wall Material:	G
Floor Finish Alt:	-	Wall Finish:	PT
Wall Material:	G	Ceiling Material:	A
Wall Finish:	PT	Ceiling Finish:	T1
Ceiling Material:	A	Ceiling Finish Alt:	-
Ceiling Finish:	T1	Additional Comments:	
Electrical:	General Lighting Level: 300	Task Lighting Level:	500
Outlets on Essential Power:		Lighting on Essential Power:	
Medical Gases:	Medical Air:	Process Air:	Oral Evacuation:
Dental Air:	Medical Vacuum:	Laboratory Dust Evacuation:	Oxygen:
Laboratory Air:	Dental Surgical Vacuum:	Waste Anesthetic Gas Disposal:	Nitrous Oxide:
Medical Gas Notes:		Instrument Air:	
HVAC:	Air Balance: O	Temperature Summer: *	Intermediate Filtration (MERV): 13
Min. Air Change Rate:	a	Temperature Winter: 68	Final Filtration (MERV):
Min. Outside Air Rate:	a	Relative Humidity: Y	Is Exhaust 100% Outside?
Mechanical Notes:			



Performance Oriented Design Build

Test Fit/Proof of Concept

- 35% Design - Did Not Include in RFP
 - Allowed DB Offerors to be Creative
 - Avoided liability associated with bridging documents
 - Many Firms Avoid “Draw Build”
- Basis of the Government estimate
- Informed the RFP Requirements
 - Identified Problems
 - Site Issues
 - Adjacency Study/ConOps Rqmts (Net-Gross Bldg Area)
 - Exemptions/Waivers
 - Sole Source items

Infrastructure / Engineering

- Security Camera Placement
- Wireless Systems (WiFi, DAS, Radio)
- Ceiling/Interstitial Coordination



Physical & VR Room Mockups

- Lessons learned from other projects
- Eight physical room mockups
- Ten room mockups in virtual reality
- Exterior finish mockups
- Helped solve numerous problems before construction



Physical Room Mockups

- Constructed in warehouse off-post
- Used foam facsimiles of equipment
- Completed at 65% design review
- Nearly 200 deficiencies identified/corrected
- Used color coded status report to manage
- Created virtual walk-through due to COVID

FLWHR Mock-Up Corrections 3/20/2023 4 of 17

Virtual Only No action, discussed during USACE/IE Durn Meeting Complete Note added

Updates from 16 APR walk in red. If item has no red comments, it can be closed in Project. All furniture related items to be left open for now, as noted below.

3/20/2023

Item #	Room	Comment	Commenter	Reference	Yes, No, N/A or ?	Notes from USACE/IE Durn Meetings	Comments for 16APR21 Walk
38	3F16	Wrong cabinet height, configuration, size.	Josh Shields	QAT p.21	Y	23 FEB 2021: See item #25	Tried to fix, and a day later the same separation occurred. Due to where floors where door is mounted
39	3F16	Electric outlets height interfere with backdrops.	Josh Shields	QAT p.21	Y	23 FEB 2021: Will be adjusted	
40	3F16	Remove screws from door frame to closet.	Josh Shields	QAT p.21	N	23 FEB 2021: Frames are knock-down vs. fully-welded. Team agreed these can stay	Located per 100% design
41	3F16	Gap between door and wall.	Josh Shields	QAT p.21	Y	23 FEB 2021: Will be corrected	Located per 100% design
42	3F16	Missing door gap caulk.	Josh Shields	QAT p.21	Y	23 FEB 2021: Will be corrected	Located per 100% design
43	3F16	Flooring has separated from door.	Josh Shields	QAT p.21	Y	23 FEB 2021: See item #17	16 APR 21: Leave comment open in Project
44	3F16	Are outlets at sink GAC?	Josh Shields	QAT p.21	N	23 FEB 2021: Verification only, nothing needed in the mock-up. USACE to follow up with Jim Childers.	16 APR 21: Base stayed in room, 4" base for counter.
45	3F16	Relocate medication cart.	Colleen Darmsdy	G p.8	Y	16 APR 21: Leave comment open in Project	Removed from design, note added in mock-up
46	3F16	Relocate trauma clock. Replace wall mounted desk w/ mobile workstation.	Colleen Darmsdy	G p.9	Y	16 APR 21: Leave comment open in Project	Removed from design, note added in mock-up
47	3F16	Relocate infant warmer.	Colleen Darmsdy	G p.10	Y	16 APR 21: Leave comment open in Project	Removed from design, note added in mock-up
48	3F16 (TV)	Remove windows from rooms. No hidden wall penetrations.	Colleen Darmsdy	QAT p.7	Y	16 APR 21: Leave comment open in Project	Physical change needed, just note in physical mock-up
49	3F16 (TV)	Remove windows from rooms. No hidden wall penetrations.	Darren McDevitt	QAT p.14	Y	16 APR 21: Leave comment open in Project	Physical change needed, just note in physical mock-up
50	1022	Examine pharmacy doors need to be full pane glass.	Colleen Darmsdy	G p.12	NA		Actual devices
51	1022	Examine pharmacy dispensing window requires transaction badge.	Colleen Darmsdy	G p.12	NA		Actual devices
52	1107	Remove coat hook, outside curtain track, side chair, rail. Provide isolation cabinet.	Colleen Darmsdy	QAT p.5	NA		How CE lights to be installed 16APR21.
53	1149	Receivables are not tamper resistant.	Josh Shields	QAT p.18	Y	23 FEB 2021: Will be omitted images, not actual devices	
54	1148	Light fixtures not recessed.	Josh Shields	QAT p.18	Y	23 FEB 2021: Will be removed	
55	1142	Move 2x4 light per 60% reflected ceiling plans.	Ron Fortenberry	QAT p.24	Y	16 APR 2021: Item being moved to GA/GC	
56	1143	Re-directions are not tamper resistant.	Josh Shields	QAT p.18	Y	23 FEB 2021: Will be replaced	

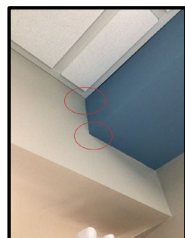
Repair drywall above base trim cap



Paint scuff on door jamb



Patch gaps around soffit



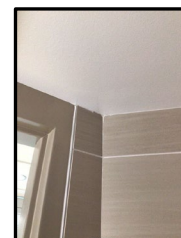
Repair pin holes in marked locations



Repair inconsistent weld height



Repair grout at wall/ceiling joint



Floors is lifting at seam. Repair weld



Physical Room Mockups

Planning / Architecture:

- Early design phase - rough foam/cardboard mockups
- End of design Phase - finished materials & equipment
- Provides as-built condition before construction
- Means and methods of construction/acceptable quality
 - Examples: Relocated curtain track to provide more space and avoid contamination. Wall mounted equipment moved to headrail. Door swing wrong direction.

Infrastructure / Engineering:

- Technology coordination with medical equipment
- Power and communications locations
- Medical Gas locations
 - Examples: Locate gases on left side of bed (facing headwall). Add vacuum outlets. Relocate power and comms for mobile workstation to head of bed, left side. Relocate Nurse Call/Code Blue on headwall, left side. Conflict between patient lift system and boom. Reconfigure electrical & med gases on booms.

Government Expectations:

- Staff can work through function/flow within the mockup
- Hands on approach for users; allows critical dialogue between government stakeholders, DOR, and Contractor
- Allows feedback and adjustment before final buildout
 - Examples: Beneficial for Government QA staff. Invaluable for obtaining end user feedback – able to understand issues that might have been missed with a review using drawings and specifications.
- Use of Matterport scan of physical mockups



Virtual Room Mockups

Planning / Architecture:

- VR does not eliminate need for actual mockups
- Cost Savings - 5% of the cost of Physical Mockups
- Use for spaces where physical mockups are impractical
 - Entry Lobby Space
 - Pharmacy
 - Laboratory
- Beneficial for establishing aesthetic quality expectations

Infrastructure / Engineering:

- Technology integration with architecture
 - Computer Placement
 - Display Placement
 - Headwall coordination

Government Expectation:

- Work through function and flow
- Visual (eyes on) approach for users
- Stakeholders provide feedback before final design or construction



Exterior Mockups

Planning / Architecture:

- Demonstrates means and methods of construction
- Establishes Level of Workmanship/Quality
- Allows for adjustments in details/finishes

Infrastructure / Engineering:

- Engineering means and methods of construction
- Inspection of final product
- Allows for minor adjustments
- Performance testing prior to installing

Government Expectations:

- Visual & physical inspection for government stakeholders and customer representatives
- Stakeholders provide feedback before final design or construction



- Jointly developed decision-making process
- Conducted Initial Partnering Session
- Breakouts During Design Charrette, Draft RFP, & Final RFP Conferences
- Use of Over the Shoulder (OTS) Meetings Between Design Conferences

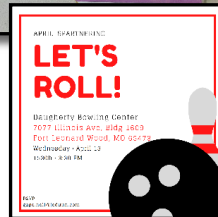
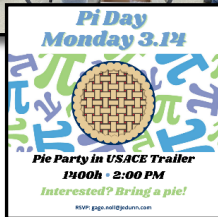
- Eight Industry Engagements
- Selection consideration for teams with excellent client partnering history and partnering plan



Lifecycle Partnering

During Construction:

- Formal partnering workshops (every six months)
- Employee Spotlight
- Formal team member on-off Boarding
- Monthly social gatherings
- Co-located; deck for outdoor activities
- Regular recognition
- Senior leader briefings conducted jointly
- Collaborative Analytics



To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED

Lifecycle Partnering

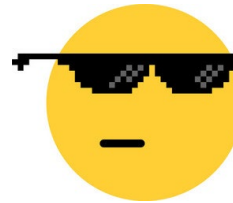
THE INTANGIBLES OF PARTNERING



START WITH GRATITUDE



UNDERSTAND EACH OTHER



**WORK DIRECTLY WITH
DECISION MAKERS**



**BE CREATIVE WITH
RULES**



**DON'T LET THINGS SIMMER
or BAD NEWS EARLY**



PICK UP THE PHONE



HUMOR



DON'T GET STRESSED

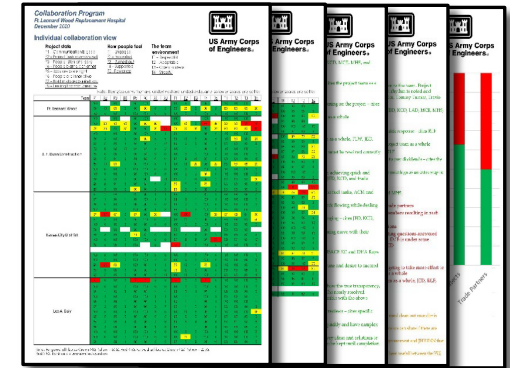


To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED

Collaborative Analytics

- Component of the Partnering Process
- Monthly surveying of all PDT members.
- Monitors series of early indicators not typically visible
- Reports quality of collaboration; can predict project stress
- Focused on communication, listening, engagement, quality of work & innovation
- Benefits:
 - Spotlight Effect (encouragement of desired behaviors)
 - What gets measured, gets done
 - Focuses PDT attention on the importance of collaboration
 - Requires leaders to remain engaged
 - Assists team leaders with identifying and resolving collaboration issues *before they impact quality, schedule, or budget*

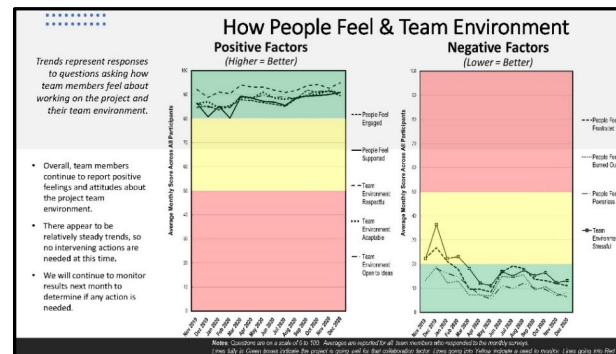


Monthly Report

Points to communicate (based on our read of the data)
Things seem good this month. Participation may be low just because of the holidays and year end, but we will continue to monitor.
The main question is about "trade partners" – they seem to have multiple low level indicators of problems. Meaning that nothing really sticks out, but there are multiple places of small concern. It may be good just to check in and see if everything is OK.

	Good	Things to watch	Things to fix
General trends	• EDC and NRC improved participation • Collaboration is improved • EDC and NRC have been open positive this month • EDC and NRC have been open positive this month	• EDC may be having some collaboration issues with others (this is very preliminary insight, because they identified two other groups, and two groups identified them)	• Participation is still low for NRC
Project environment	• EDC average positive and NRC has been holding steady • NRC has been holding steady and NRC has been holding steady	• TP trends in the wrong direction on some attributes (communication, disagreement, listening, innovation), but is still in the green	• NRC still having financial pressure
How people feel	• EDC average ratings are in the green range • NRC has been holding steady and NRC has been holding steady	• TP trends in the wrong direction on some attributes (communication, disagreement, listening, innovation), but is still in the green	• NRC still having financial pressure
Team environment	• EDC average ratings are in the green range • NRC has been holding steady and NRC has been holding steady	• TP trends in the wrong direction on some attributes (communication, disagreement, listening, innovation), but is still in the green	• NRC still having financial pressure

NOTE: Items in bold were problematic last month as well



Trend Analysis

Executive Summary



To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED

Questions?



To lead collaborative efforts to identify and resolve national security infrastructure-related challenges.

BECOME INVOLVED