2020 Project Delivery Symposium

Healthcare Project Delivery Strategy

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Learning Objectives:

- Identify a process by which a Healthcare Owner can evaluate what project delivery method is the most appropriate and effective approach to deliver a healthcare capital project.

- Identify the impacts and risks of the Owners procurement strategies on the design and the team, including cost of pursuit, teaming strategies, intellectual property and stipends.

- Describe where the design risks and opportunities lie in integrated project delivery, including building design and materials, methods and systems, design and construction contracting, execution, ethics and regulations governing practice of architecture, legal and insurance issues.

- Provide guidelines for launching and best practices for implementing alternate integrated project delivery strategy on the project.

- Learn where the technology stands in the healthcare project delivery ecosystem and the role it plays in improving reliability, sustainability, connectivity, life safety, energy and operational (MEP) efficiency.

Kenneth Webb
ACHA, AIA, LEED BD+C

Ed Hanzel

Steve Greulich

Jason Lukes
LEED AP

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MSA

Panel 2:

Healthcare Project Delivery Strategy

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Today's Program

Delivery Methods

Design / Bid / Build (Lump Sum)

Design-Build

Design / CM GMP

Integrated Project Delivery (IPD)

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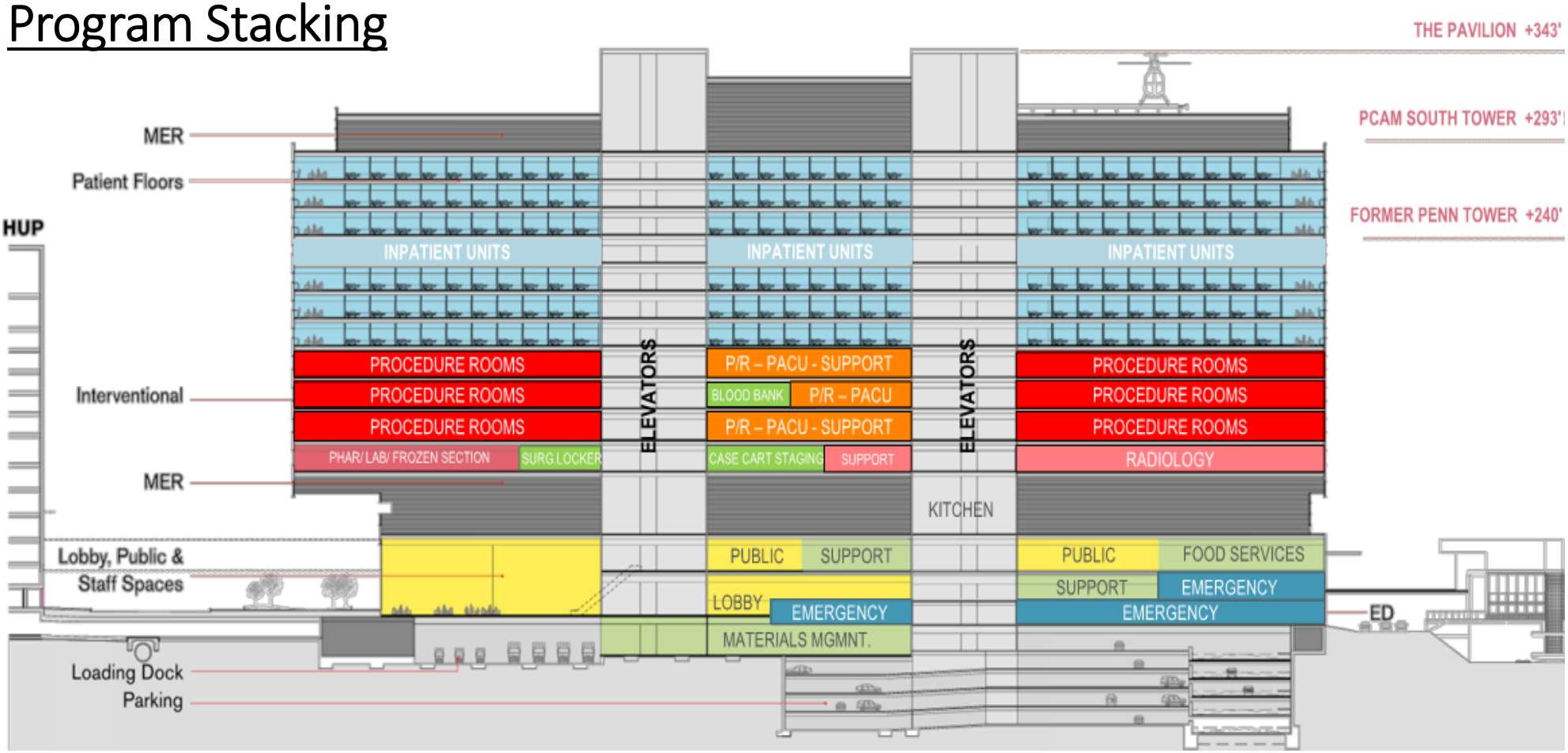
Program Stacking



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Key Stat's

- 1.5MSF
- 504 Patient Rooms
- 47 Operating & Procedure Rooms
- 61 ED Rooms
- 690 Parking Spaces

Integrated Team Selection

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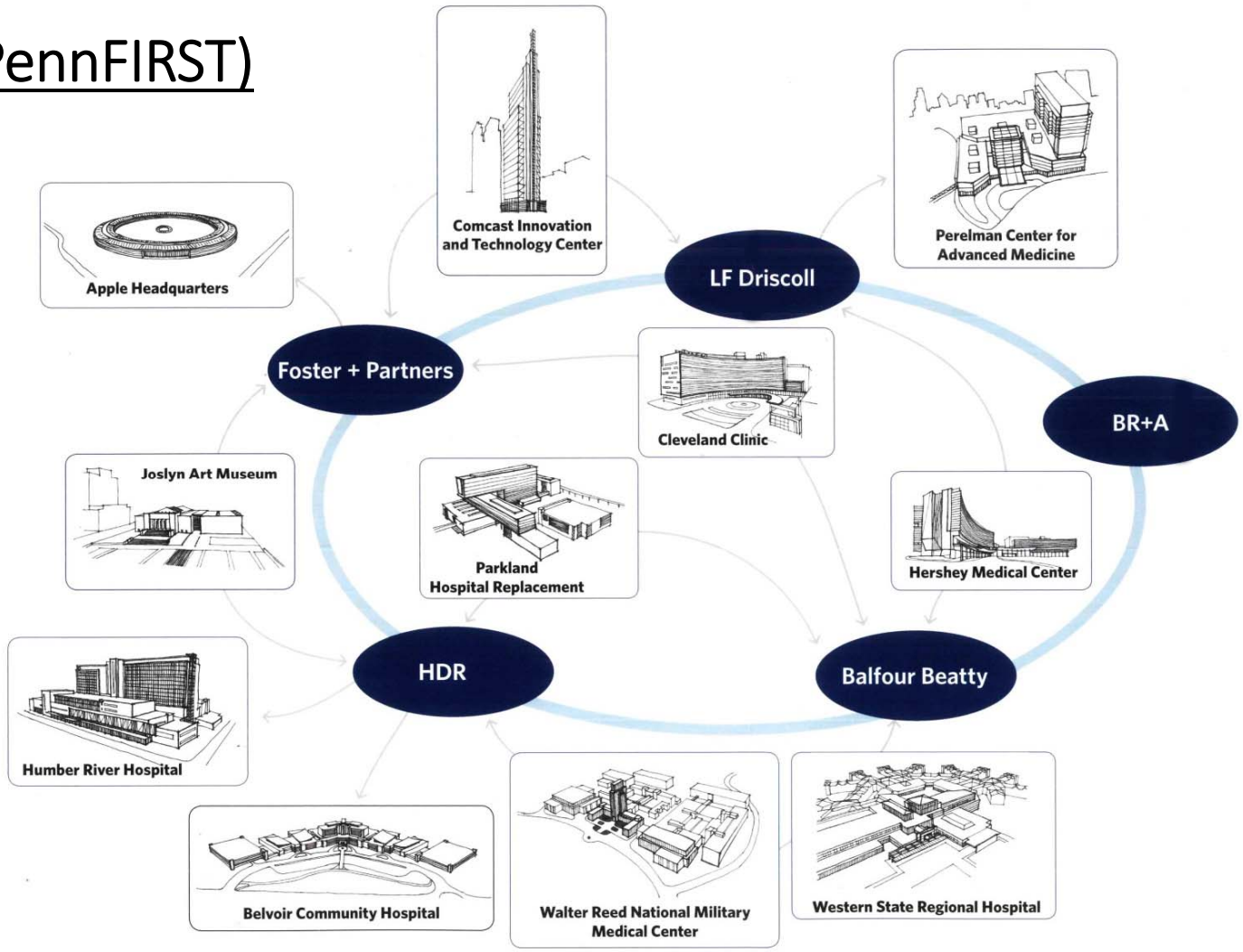
The Integrated Team (PennFIRST)



Themes of IPD

❖**Multi-Party Agreement**

❖ **Colocated Team (the Colo)**

❖**Real-Time Feedback**

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Sub-contracting

(Lump Sum / Design-Assist)

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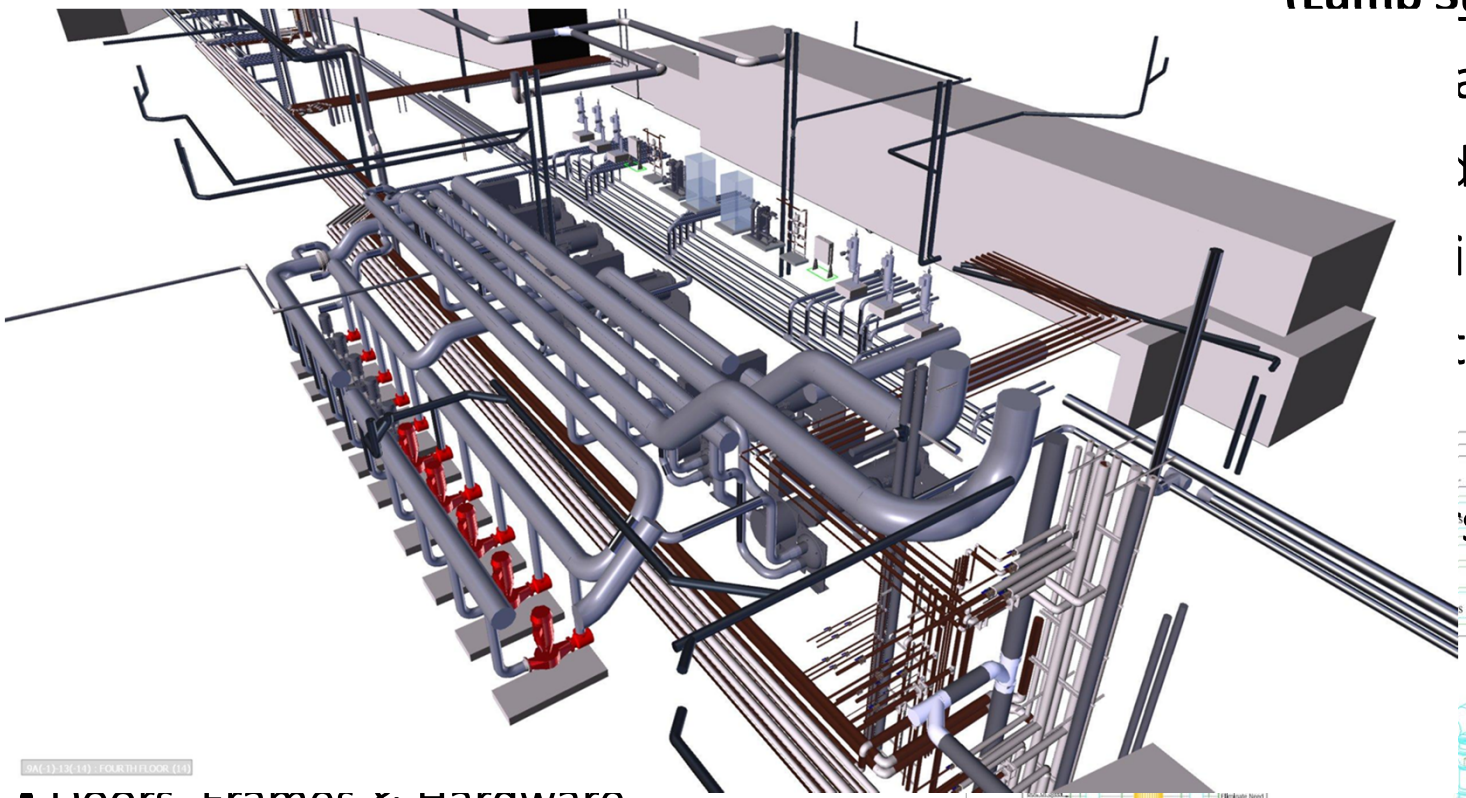

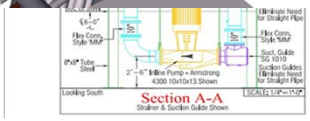

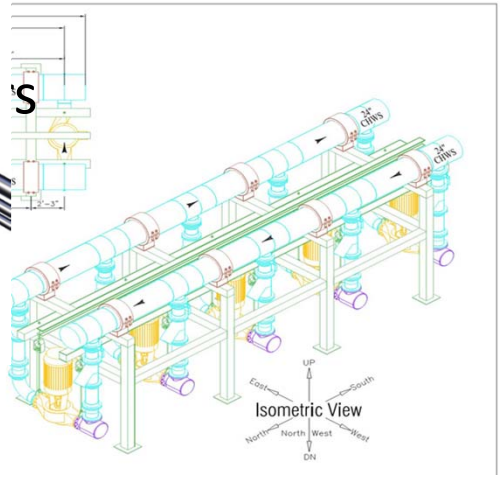

- Doors, Frames & Hardware

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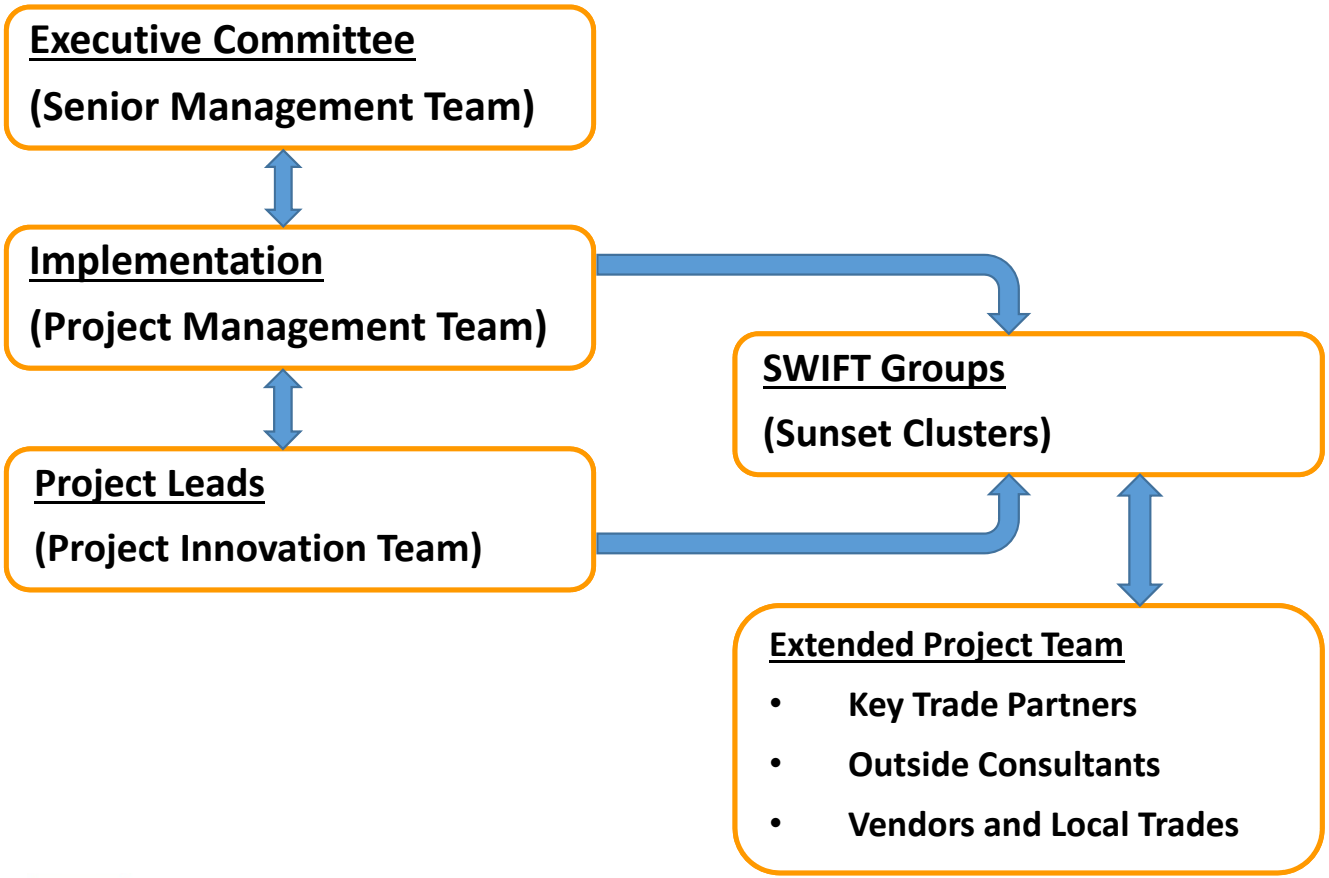
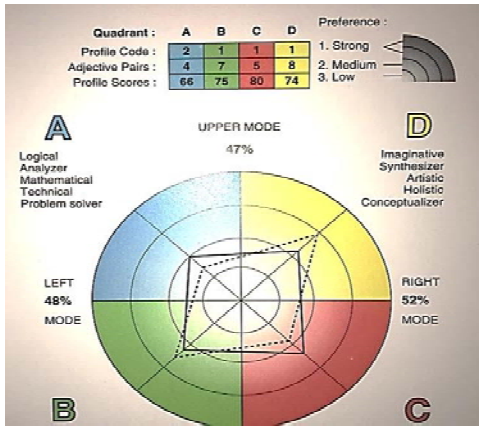
Team Structure and Organization



Project Innovation Teams

PIT 1: Site
PIT 2: Core / Shell
PIT 3: Building Systems
PIT 4: Clinical
PIT 5: Med Equip / FFE

Building the Team



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Project Guiding Principles

Design for Change

We measure the usable life of healthcare facilities in centuries, not decades. Medicine, care delivery, and technology are constantly evolving; spaces must flex to incorporate these new developments. Environments that are modular and adaptable are a necessity for success, not only upon delivery, but for generations to come.

Patient Experience

Patients are the reason for our existence and our motivation for excellence. They deserve care that transcends expectations. Spaces, operations, and technology are enablers for superior clinical outcomes. By focusing on fundamental human needs, we can enhance the experience for our patients, while satisfying our families, physicians, staff, researchers, faculty, and students.

Unrivaled Care

We hold ourselves accountable to the highest standards of professionalism, efficiency, and compassion. People, quality, and experience are the drivers for delivering superior levels of care. We attract the best and brightest minds to research and treat medicine's most complex challenges from around the world.

Innovation

Innovation is in our DNA. We strive to uphold our legacy as the first and the best, continually developing new solutions. Solutions must push beyond today's "cutting edge" to imagine bold new opportunities— knowing that today's possibilities become tomorrow's realities at an astonishing rate.

Investment in Community

We have been part of the Philadelphia landscape for hundreds of years. All of our efforts are investments in the health, wellness, and well-being of this community. As our community grows and changes, we must grow and change with them, anticipating their needs and desires.

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Covenant

PennFIRST New Patient Pavilion

A-3 #0055

A3 Topic: Conditions of Satisfaction

Scope Description: The purpose of this A3 is to assemble and affirm the Conditions of Satisfaction (CoS) for the Penn Medicine New Patient Pavilion project as collaboratively decided and agreed by UPHS and the partner firms known as PennFIRST.

The purpose of the CoS is to enable all the key stakeholders on the project to make correct decisions that are aligned with what the project team and owner have already defined as "value" to the project or our processes. The CoS also empower those those best equipped to take action, foster innovative solutions to complex problems, and drive speed and efficiency into the decision-making process while minimizing the known waste in more conventional processes. The CoS, as represented here, were included as Exhibit 7(d) "Project Goals", with the Initial Design Phase submission on 31 May 2016. It is anticipated that these will be updated and expanded as the design is further developed and with the revised Project Target Cost.

Lastly, the Conditions of Satisfaction are supported by the Guiding Principles (*below*) and the Penn Medicine NPP Covenant (*far right*) which have both previously been adopted and implemented by the project team and key stakeholders. The Guiding Principles are to be applied to any design or construction decision, while the Covenant represents how we will behave, interact, and treat one another in the process.

Implementation Team

Firm	Name	Signature	Date
UPHS	Dave Goodrich		6/16/16
HDR	Daryl Jackowski		6/16/16
Fowler + Partners	Chris West		6/16/16
BSA	Kurt Shearer		6/16/16
LF Driscoll	Gil Hensel		6/24/16
Balfour Beatty	Michael Rybit		6/16/2016
Southland Industries	Dave Millet		6/16/16

Category	Item	Conditions of Satisfaction (Contract Exhibit 7(d) "Project Goals")
Program (Quantitative)	1	504 Beds (using 24-bed units)
	2	50 Operating/Interventional Rooms 30 Observation Rooms 50 ED Beds 10 Modalities (Imaging)
	3	690 Parking Spaces +/- 2%
	4	Maintain integrity in the final design to within +/-5% of detailed program areas identified in Section 1.2, "Space Program"
	5	Connectivity to HUP and PCAM
	6	Accommodate museum loading dock
	7	Consider future growth to Lot 7
Design (Qualitative)	8	Incorporate new and emerging technologies that improve building performance and predictable patient outcomes.
	9	Providing flexibility in the design that supports easily adaptable spaces in the future that allows them to change their operational model.
	10	Implement Design for Manufacture and Assembly (DfMA) principles wherever possible to maximize efficiencies in the design, reduce project costs and onsite labor, and facilitate the prefabrication of subassemblies and building components offsite.
	11	Achieve LEED Gold
Execution (Qualitative)	12	Foster and encourage a safety culture on the project that minimizes recordable lost-time injuries, eliminates risks to the surrounding public, and minimizes potential impact to adjacent healthcare facilities or operations.
	13	Deliver the project below the PTC and achieve construction complete by Q4 2020.
	14	Achieve Construction Completion by Q4 2020.
	15	Reduce onsite labor by ~15% over traditional contracting methods through an aggressive offsite prefabrication strategy.
	16	Meet or exceed the goals of the City of Philadelphia Economic Opportunity Plan and the University of Pennsylvania Health System Economic Opportunity Plan
	17	Exemplify the PennFIRST Covenant and Guiding Principles at all times and at all levels of leadership on the project team.
Legacy	18	The NPP Project becomes a case study for the AEC industry and IPD as a contracting method
	19	Progress the Philadelphia and surrounding markets to embrace alternative delivery methods (IPD, Design/Build, Design-Assist) from a conventional CM/GC market.

Penn Medicine New Patient Pavilion

COVENANT

Vision
- We are a learning organization and share an inspiring vision with all of our stakeholders.
- We embrace process and keep it patientcentered.

Teamwork
- We have mutual respect for one another, honoring each other's opinions and knowledge.
- We never let a teammate fail.
- We have fun.
- We assume good will and have no secret agendas.
- We trust each other.
- We capitalize on our strengths and are aware of our blind spots.
- We consciously work to have "no me in IPD."
- We intentionally work to prevent a culture of blame and endeavor to create a Just Culture.
- We celebrate our successes.
- We work out our differences and we do not leave the room angry.

Listening and Communication
- We are transparent in thoughts and concerns.
- We actively listen and communicate...we participate in the conversation.
- We ask questions to clarify.
- We convey a sense of urgency because of the lives depending on the completion of this facility.

Innovation
- We make no assumptions.
- We raise the bar, and have the courage to encourage each other to do things we haven't done before.
- We keep an open mind.
- We vision through creativity.

Excellence
- We bring our "A" game to the project.
- We do each task with a sense of excellence, striving for eminence.

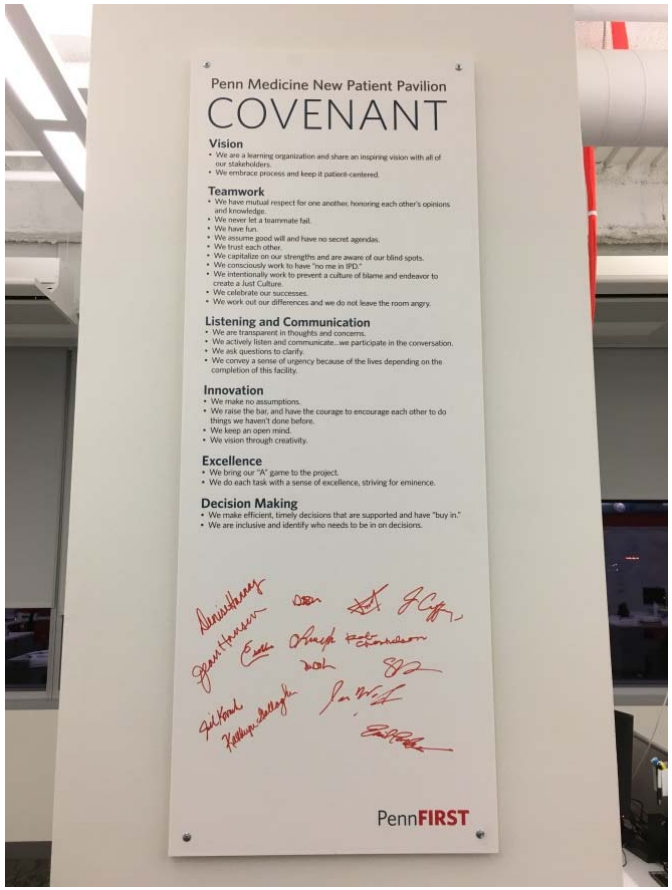
Decision Making
- We make efficient, timely decisions that are supported and have "buy in."
- We are inclusive and identify who needs to be in on decisions.

Created April 22, 2015, with Ann McGee-Cooper and Associates, Inc. at the SMART START® Session

PennFIRST Guiding Principles — **Enduring Legacy of Excellence**

Design for Change | Patient Experience | Unrivaled Care | Innovation | Investment in Community

Framework



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Colocation Objectives

Conceptual Schedule

WORKPLAN / KEY DATES

Facility Assessment

Kick off Meeting with Facilities
Understand Owner's Goals
Investigate / Document Existing Utility Infrastructure
Gather Data / Issue Existing Conditions Report

Concept Design

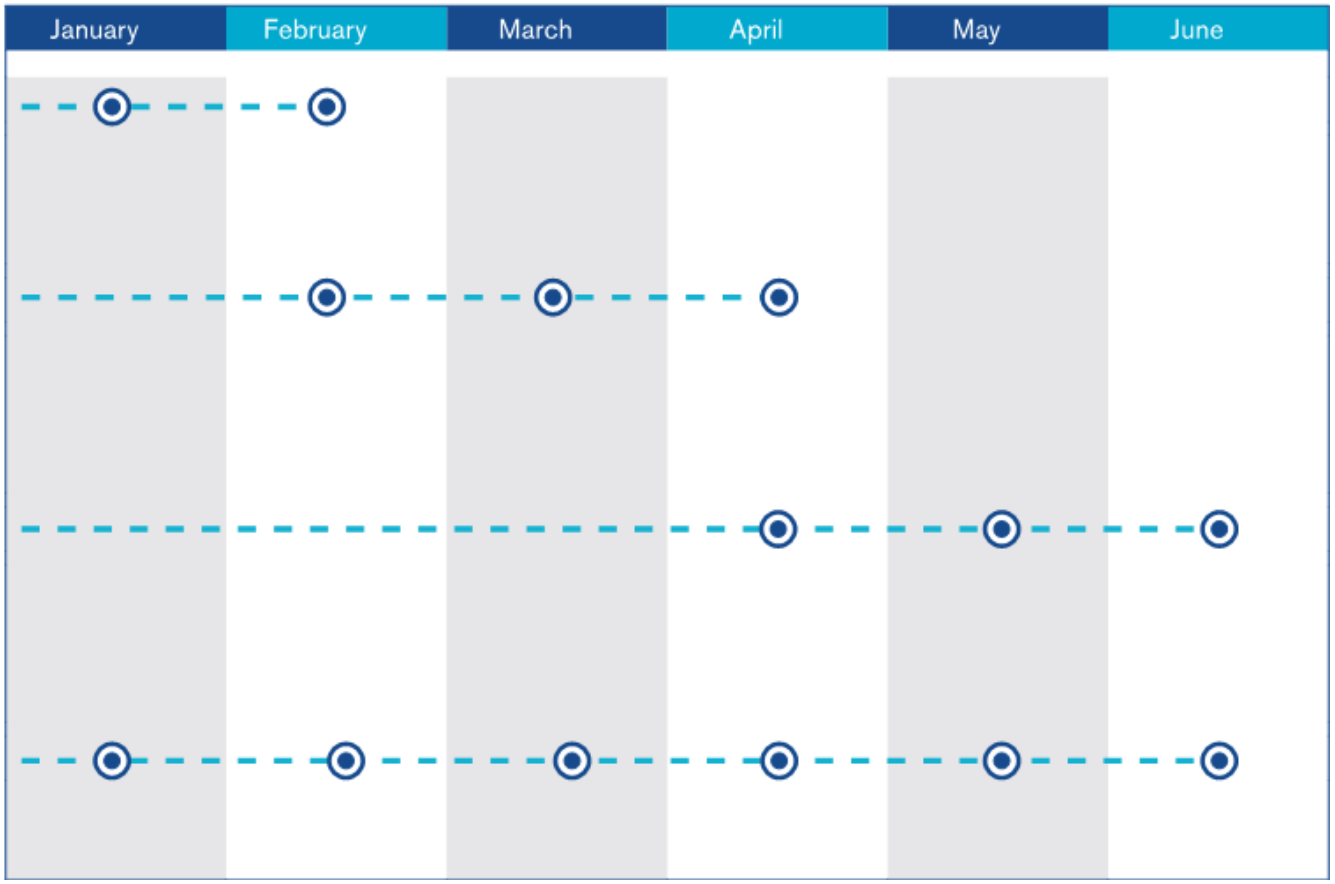
Participate in Programming Effort
Define MEP Systems Options
Develop MEP Spatial Impact to Building SF
Create MEP Basis of Design (BoD)
Create First Pass at Target Design Budget

Deliverables

Prepare BoD Package
Support Documentation
CON Submittal Package
Agreement on Target Design Budget
Initiate Trade Partner Selection Process

Micellaneous Activities

Participate in Design Team Meetings
Budget Tracking Meetings (Clusters)
Presentations to Owner



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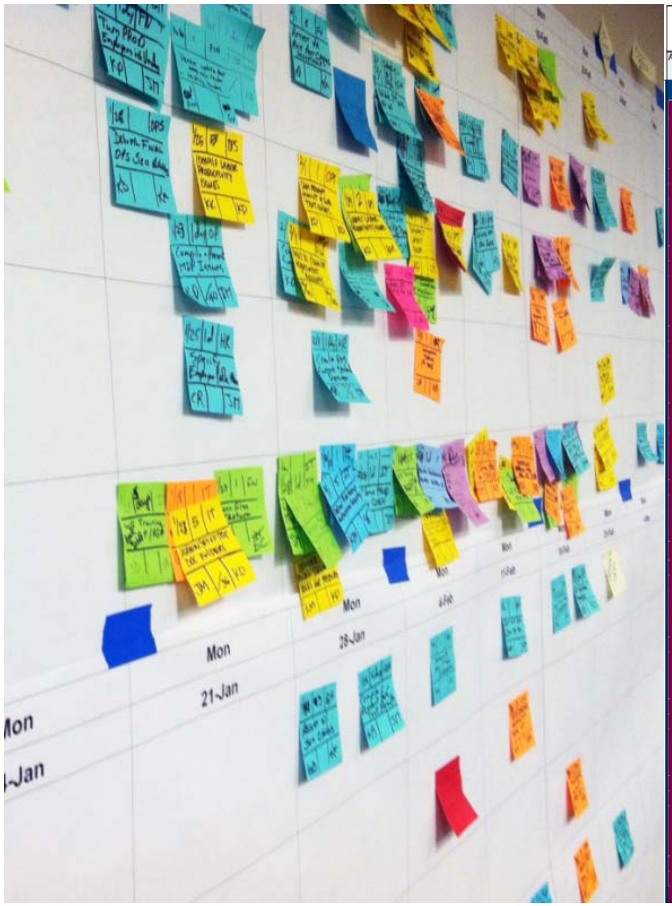
Pull Planning

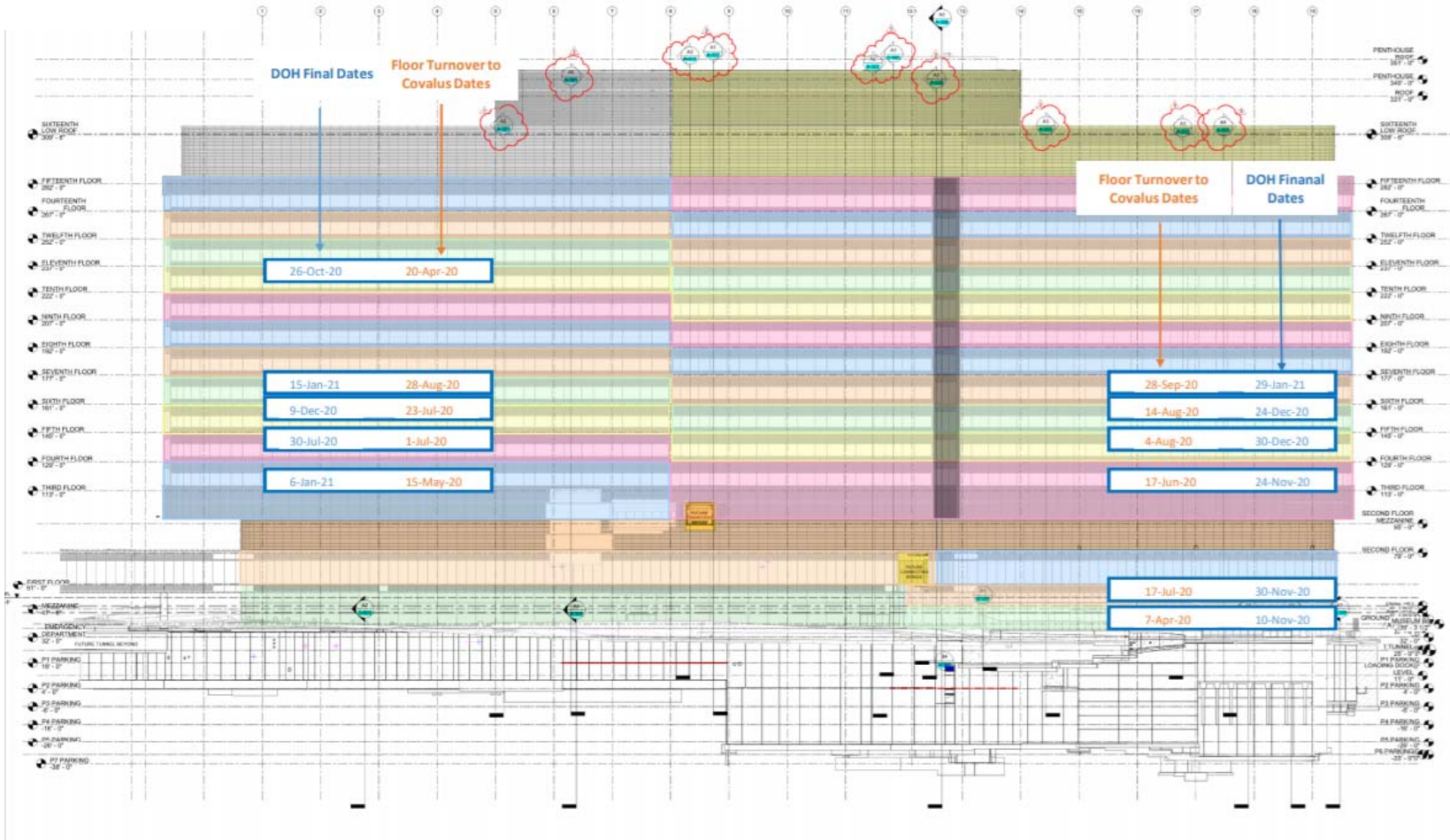


U25.0-NPP-IMS | PENNFIRST - NEW PATIENT PAVILION UPDATE 9.01.2017

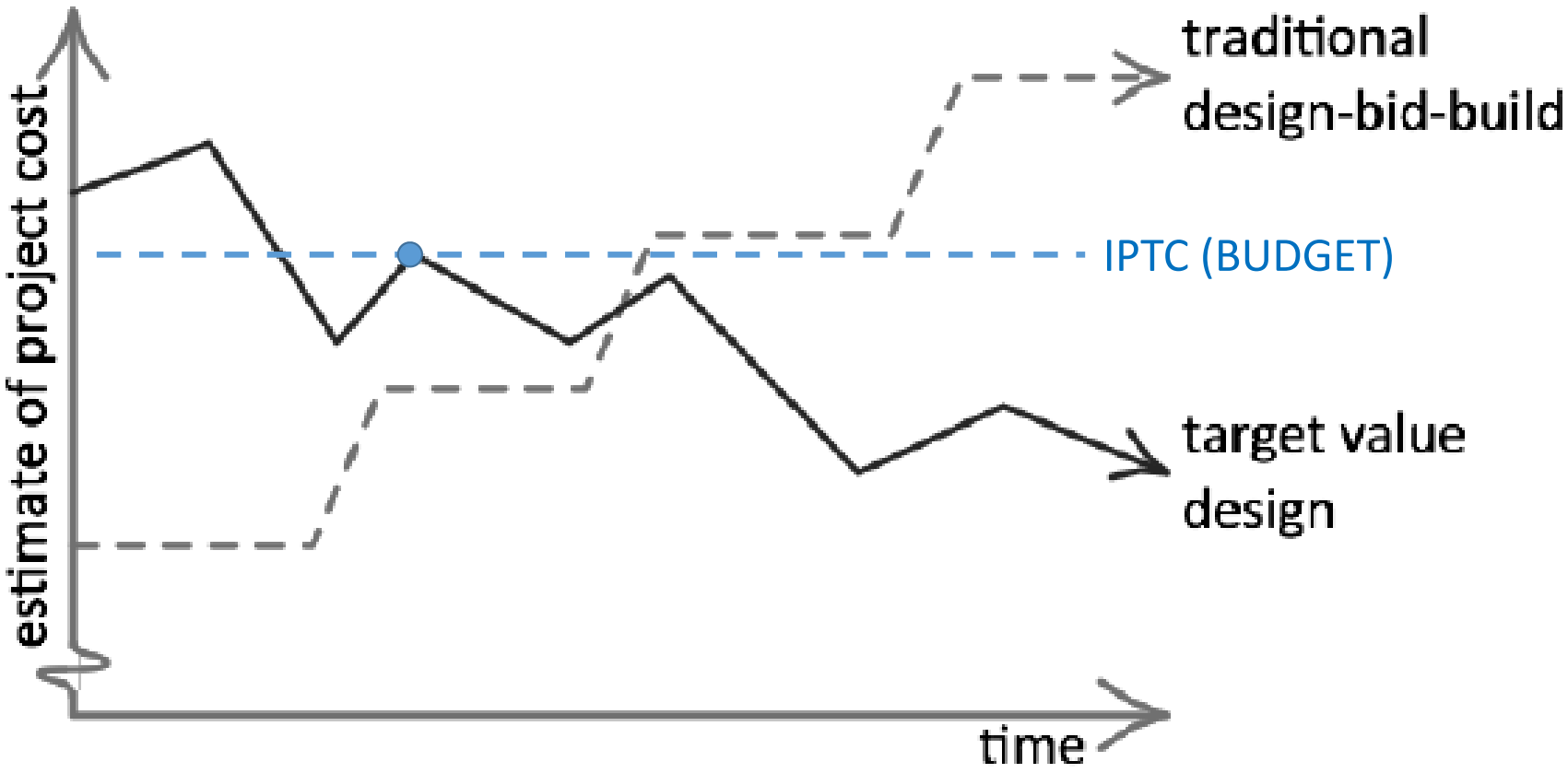
00: MILESTONE SUMMARY SCHEDULE BY YEAR

Activity ID	Activity Name	Start	Finish	Total Float
Total		07-Apr-15 A	28-Jun-21	0
2015		07-Apr-15 A	07-Apr-15 A	
START	CONTRACT EXECUTION	07-Apr-15 A		
2016		16-Apr-16 A	06-Sep-16 A	
MILE-P1-1360	ISSUANCE #1 - EXCAVATION		16-Apr-16 A	
MILE-P1-1290	ISSUE PROJECT TARGET COST	31-May-16 A		
MILE-P1-0000	START BIM CD PHASE	01-Jun-16 A		
MILE-P1-1280	PENN TOWER DEMO COMPLETE	08-Jul-16 A		
MILE-P1-1320	SOFT CONSTRUCTION START (MOBILIZE TO SITE)	01-Aug-16 A		
MILE-P1-1370	ISSUANCE #2 - EXCAVATION ADDENDUM COMPLETE		10-Aug-16 A	
MILE-P1-1380	ISSUANCE #3 - CAISSON CD, FOUNDATIONS AND STEEL MILL PROGRESS		31-Aug-16 A	
MILE-P1-1060	PILES/EXCAVATION START NORTH	06-Sep-16 A		
MILE-P1-1070	PILES/EXCAVATION START SOUTH	06-Sep-16 A		
MILE-P1-1350	CONSTRUCTION START	06-Sep-16 A		
2017		23-Jan-17 A	08-Dec-17	96
MILE-P1-1390	ISSUANCE #4 - FOUNDATIONS		23-Jan-17 A	
MILE-P1-1400	STEEL MILL ORDER		24-Jan-17 A	
MILE-P1-1165	START BLASTING / DEEP EXCAVATION	(JPCG)	08-Feb-17 A	
MILE-P1-1410	CORE AND SHELL PERMIT & BID SET		21-Mar-17 A	
MILE-P1-1150	START SUBSTRUCTURE CONCRETE NORTH	19-Apr-17 A		
MILE-P1-1510	COMPLETE NORTH MAT SLAB (EXCLUDING RAMP LEAVE-OUT)	09-Jul-17 A		
MILE-P1-1155	START SUBSTRUCTURE CONCRETE SOUTH	13-Jul-17 A		
MILE-P1-1490	START PRECAST NORTH	31-Jul-17 A		
MILE-P1-1310	ISSUE REVISED PROJECT TARGET COST	15-Aug-17 A		
MILE-P1-1450	ISSUANCE - LOWER LEVEL PARKING FITOUT COMPLETE		28-Aug-17 A	
MILE-P1-1145	EXCAVATION COMPLETE SOUTH	(JPCG)	22-Sep-17	138
MILE-P1-1140	START STRUCTURAL STEEL NORTH	23-Sep-17		60
MILE-P1-1470	START PRECAST SOUTH	02-Oct-17		18
MILE-P1-1500	ISSUANCE - CORE AND SHELL IFC		08-Dec-17	96
2018		12-Jan-18	04-Dec-18	298
MILE-P1-1430	ISSUANCE - INTERVENTIONAL PLATFORM		12-Jan-18	199
MILE-P1-1520	START CONCRETE SLAB ON METAL DECK NORTH	18-Jan-18		200
MILE-P1-1135	START STRUCTURAL STEEL SOUTH	02-Feb-18		6
MILE-P1-1420	ISSUANCE - LOGISTICS/ED/TUNNEL LEVEL FITOUT		09-Mar-18	97
MILE-P1-1440	ISSUANCE - PATIENT FLOOR		30-Mar-18	121
MILE-P1-1200	GARAGE FITOUT START	11-Apr-18		533
MILE-P1-1530	START CONCRETE SLAB ON METAL DECK SOUTH	24-Apr-18		206
MILE-P1-1220	ED/LOGISTICS FITOUT START	01-May-18		104
MILE-P1-1460	ISSUANCE - HUP TUNNEL / BRIDGES		15-May-18	146
MILE-P1-1540	ISSUANCE - PUBLIC SPACE PACKAGE	23-Jun-18		76
MILE-P1-1260	INTERVENTIONAL FLOOR FITOUT START	25-Jul-18		97
MILE-P1-1160	RIG AND SET EQUIPMENT MER ROOM 2ND FLOOR START	29-Aug-18		142
MILE-P1-1100	ENCLOSURE START NORTH	11-Sep-18		129
MILE-P1-1240	PATIENT FLOORS FITOUT START NORTH	12-Sep-18		154
MILE-P2-1360	INTERVENTIONAL FLOOR FITOUT START SOUTH	12-Sep-18		6
MILE-P1-1130	1ST CURTAINWALL PANEL SET NORTH	(ENCL)	09-Oct-18	115
MILE-P1-1010	PERMANENT POWER AVAILABLE @ PECO ROOM	11-Oct-18		308
MILE-P1-1120	1ST CURTAINWALL PANEL SET SOUTH	04-Dec-18		86
2019		09-Jan-19	25-Oct-19	45
MILE-P2-1070	PATIENT FLOORS FITOUT START SOUTH	09-Jan-19		63
MILE-P1-1030	STRUCTURAL STEEL TOP OUT NORTH		17-Jan-19	117
MILE-P1-1040	CONCRETE SLAB ON DECK COMPLETE NORTH		31-Jan-19	119

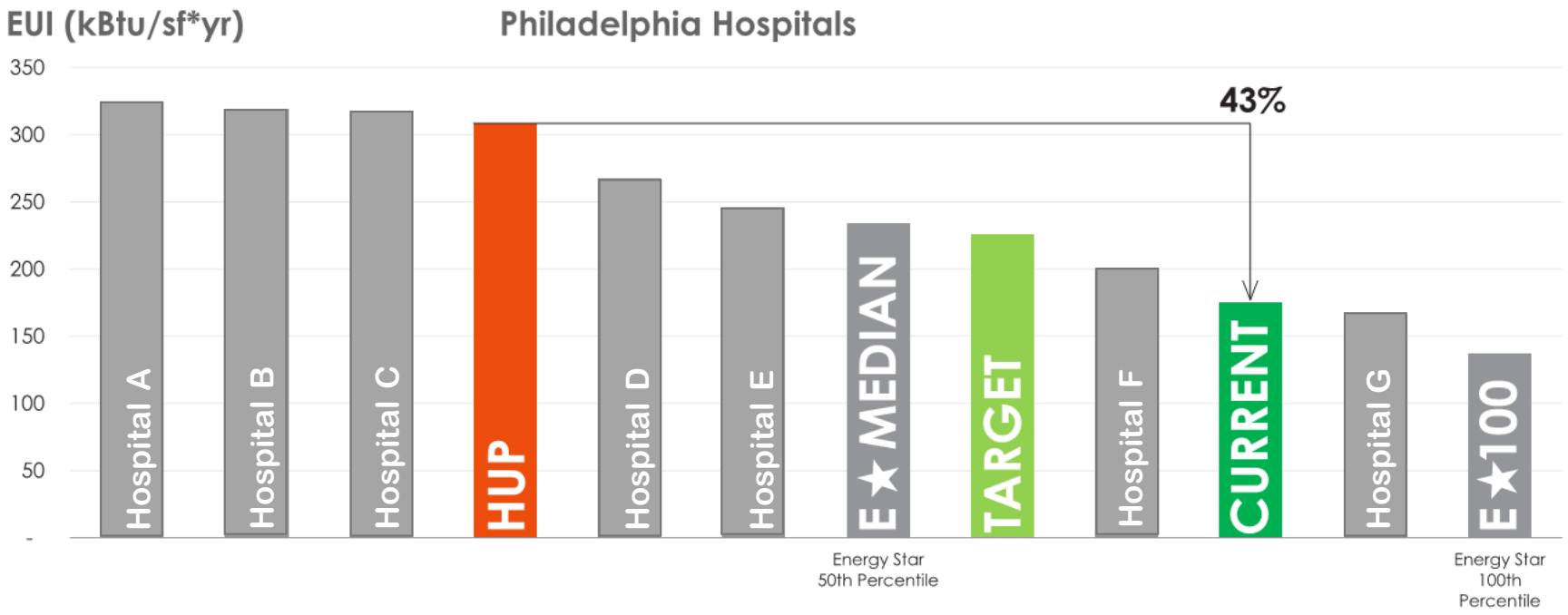
Graphic Scheduling



Target Value Design



Benchmarking and Goal-Setting



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Choosing by Advantages

DESIGN FOR CHANGE
BALANCING THE DEGREE OF FLEXIBILITY

BASELINE ASSUMPTION: UNIVERSAL FLEXIBILITY & MODULAR GRID PLANNING WILL BE USED

ACUITY ADAPTABLE
Provides the ultimate flexibility in room use. All patient rooms include a full patient bathroom with a shower and are designed to ICU standards, but not fully equipped unless designated an ICU room. Can minimize patient transfers and reduce LOS. Implications: Increased room width and structural bay size; limitations in mechanical system sustainable choices.

___ *Strongly Disagree*
___ *Disagree*
___ *Don't Know*
___ *Agree*
___ *Strongly Agree*

ACCESSIBLE BATHROOMS
Patient bathrooms are designed to maximize clearances whenever possible, however codes require only 10% to meet ADA/ANSI requirements. Designing all rooms ADA/ANSI will simplify patient placement. Implications: Larger Bathrooms; ADA toilet placement may be in conflict with desired nursing space at side of toilet.

___ *10% ADA Only*
___ *__% ADA Only*
___ *Don't Know*
___ *All ADA except at column conflicts*
___ *100% ADA/ANSI*

UNRIVALED CARE
PRIORITIZE THE INFLUENCE OF THE SPACE ON PATIENT OUTCOMES

BASELINE ASSUMPTION: MAXIMIZE PATIENT AND STAFF SAFETY AND STAFF EFFICIENCY. ALL ROOMS TO HAVE PATIENT LIFTS AND MINIMAL SOFT SURFACES (E.G., CURTAINS)

ROOM CONSISTENCY
Standardize location of all equipment and headwall devices in all rooms to improve efficiency, reduce medical errors, and improve patient safety. Same-Handedness (left-right) will further improve safety and efficiency. Implications: Improved construction efficiencies; (with same handed) additional plumbing required and improved acoustics.

___ *Mirrored rooms OK*
___ *Don't Know*
___ *Standardized access and headwall*
___ *Same-Handed access, headwall, and toilet door*

NURSE SERVERS
Provide staff access to supplies at patient room to improve efficiency and direct care time. Implications: Space requirements at corridor wall.
(Nurse Servers may increase logistics staff requirements.)
(Pass-through servers reduce disruptions to patients and reduce noise)

___ *None (Centralize Supplies)*
___ *Outside of room*
___ *Don't Know*
___ *Inside of room*
___ *Pass-through*

PATIENT EXPERIENCE
PRIORITIZE THE INFLUENCE OF THE SPACE ON PATIENT EXPERIENCE

ASSUMPTIONS: PATIENT AND FAMILY CENTERED; PATIENT ENVIRONMENTAL CONTROL

MAXIMIZE PRIVACY
Patients treated with dignity and with respect are more likely to respond favorably in HCAHPS scores. Providing appropriate patient and family privacy will reinforce their overall experience.

___ *Strongly Disagree*
___ *Disagree*
___ *Don't Know*
___ *Agree*
___ *Strongly Agree*

MINIMIZE NOISE
Reduced noise improves patient rest, reduces medication use, and reduces LOS.

___ *Strongly Disagree*
___ *Disagree*
___ *Don't Know*
___ *Agree*
___ *Strongly Agree*

NATURAL LIGHT AND VIEWS
Natural light and views to nature reduce patient stress, reduces medication use, and reduces LOS.

___ *Strongly Disagree*
___ *Disagree*
___ *Don't Know*
___ *Agree*
___ *Strongly Agree*

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Penn Medicine — PennFIRST

New Patient Pavilion at the Hospital of the University of Pennsylvania

"THE IDEAL PATIENT ROOM"

EFFICIENCY
For maximum efficiency, where should items such as supplies and medications be located? (please check one)

- ☐ *Within the patient room*
- ☐ *Right outside the patient room*
- ☐ *Right outside the patient room with a pass-through into the room*
- ☐ *A centralized location in the unit*
- ☐ *Not sure; Not applicable to my role*

VISIBILITY
How important is it for a staff member to see more than one patient while charting? (please check one)

- ☐ *Very important*
- ☐ *Somewhat important*
- ☐ *Not really important*
- ☐ *Definitely not important*
- ☐ *Not sure; Not applicable to my role*

CONSISTENCY
For maximum efficiency and safety, which of the following should be in the exact same location in all patient rooms? (please check all that apply)

- ☐ *Equipment*
- ☐ *Supplies*
- ☐ *Wall-mounted devices*
- ☐ *Door to the patient bathroom*
- ☐ *Does not matter*

BED LOCATION
Which bed location produces the highest patient satisfaction? (please check one)

- ☐ *Close to the family*
- ☐ *Close to the window*
- ☐ *Close to the door*
- ☐ *Close to the bathroom*
- ☐ *Does not matter*

Please rank the patient room attributes identified above from 1 to 4 (with 1 being the most important to you)

☐ *Efficiency* ☐ *Visibility* ☐ *Consistency* ☐ *Bed Location*

MOOD/FEEL
Which of the following interior design styles will maximize the patient experience? (please check all that apply)

- ☐ *Homey/Cozy*
- ☐ *Earth Tones*
- ☐ *Bright Accents*
- ☐ *Sleek/Modern*
- ☐ *Open/Airy*
- ☐ *Eclectic*

Other thoughts or comments:

What best describes your role?

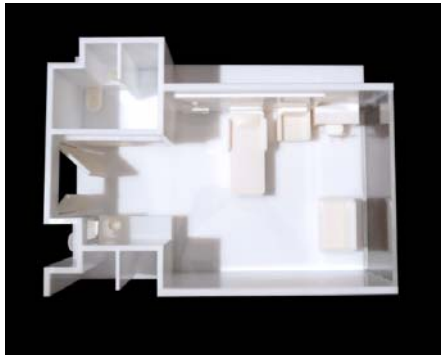
- ☐ Patient/Family/Visitor
- ☐ Nurse ☐ *ICU* ☐ *Intermediate Care* ☐ *Medical/ Surgical*
- ☐ Physician
- ☐ Support Staff; please specify _____
- ☐ Student
- ☐ Other; please specify _____

How long have you worked at Penn?

- ☐ I do not work here
- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ More than 10 years

If you are a care giver on a patient unit, on which unit(s) do you work ? _____

If you are not able to turn in your response, you could send them to Stephen Greulich via email at *stephen.greulich@uphs.upenn.edu*



Set-Based Design

Heating Plant Option 4

- Hybrid Plant + Low-Pressure Steam

District steam
@ 125 PSIG
350°F

Gas-fired low-pressure boilers for humidification

Dual-fuel boilers
@ 140-100°F

- Sterilization
- Domestic Hot Water
- Humidification
- Building Heat Loss
- Outside Air Preheat
- Terminal Reheat
- System Losses

Decision Making

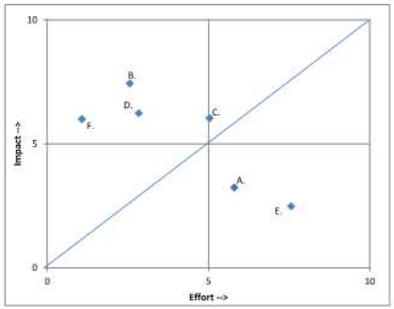
PennFIRST

MEP P-I-C-K Decision Matrix

District Steam Utilization

Created by: *Jason Lukes and Steve Viehl*

Updated: 160219



	Importance Factors	Performance	Sustainability	Flexibility	Simplicity	Resiliency	Raw Impact Score	Normalized Impact Score
	What are the most important Ojectives from 1 (low) to 10 (high) -->	9	7	1	3	5		
	Objectives							
A.	Full Utilization	5	1	3	7	1	81	3.2
B.	Sterilization	9	9	7	10	1	186	7.4
C.	Humidification	7	7	7	9	1	151	6.0
D.	Domestic Hot Water	9	6	7	7	1	156	6.2
E.	Heating Hot Water	3	2	7	3	1	62	2.5
F.	Backup	5	5	5	5	10	150	6.0
G.								
	Alternative							
							Score 0 - 10	

	Importance Factors	Space Required	Life Expectancy	First Cost	Maintenance/Operations	Noise and Vibration	Raw Effort Score	Normalized Effort Score	Net Effect	Comments
	<-- What are the greatest Challenges from 10 (high) to 1 (low)	9	3	7	5	1				
	Challenges									
A.	Full Utilization	10	0	1	9	3	145	5.8	Kill	Fully district service (baseline).
B.	Sterilization	3	1	3	2	3	64	2.6	Proceed	Multiple points of service.
C.	Humidification	6	3	5	5	3	126	5.0	Investigate	Clean steam generator assumed at this point.
D.	Domestic Hot Water	1	3	5	3	3	71	2.8	Proceed	Compare to direct-fired water heaters, which require storage.
E.	Heating Hot Water	9	7	7	7	3	189	7.6	Kill	Condensing boilers would be more efficient.
F.	Backup	1	1	1	1	3	27	1.1	Proceed	Few challenges to hinder this one.
G.										
							Score 10 - 0			

Notes

1. Topic is how best to utilize a connection to Veolia district steam.
2. Steam is available at a minimum of 125 PSIG and is fairly reliable.
3. Capacity of district steam appears to be adequate for full building utilization, if required.
4. Note, the question is not "should be use gas-fired instead", but "where should we use steam".
5. In general, options are scored relative to one another; exceptions are noted in comments within individual cells.

Multi-Disciplinary Pre-Fabrication Mockup

Rack Installment

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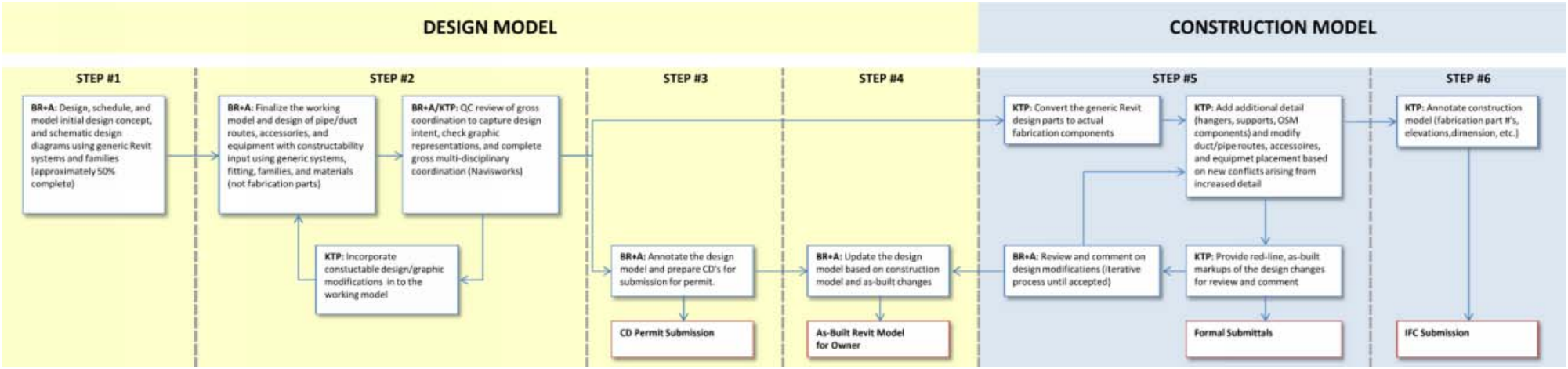
Project Delivery

an **AIA** Knowledge Community

Modeling Workflow



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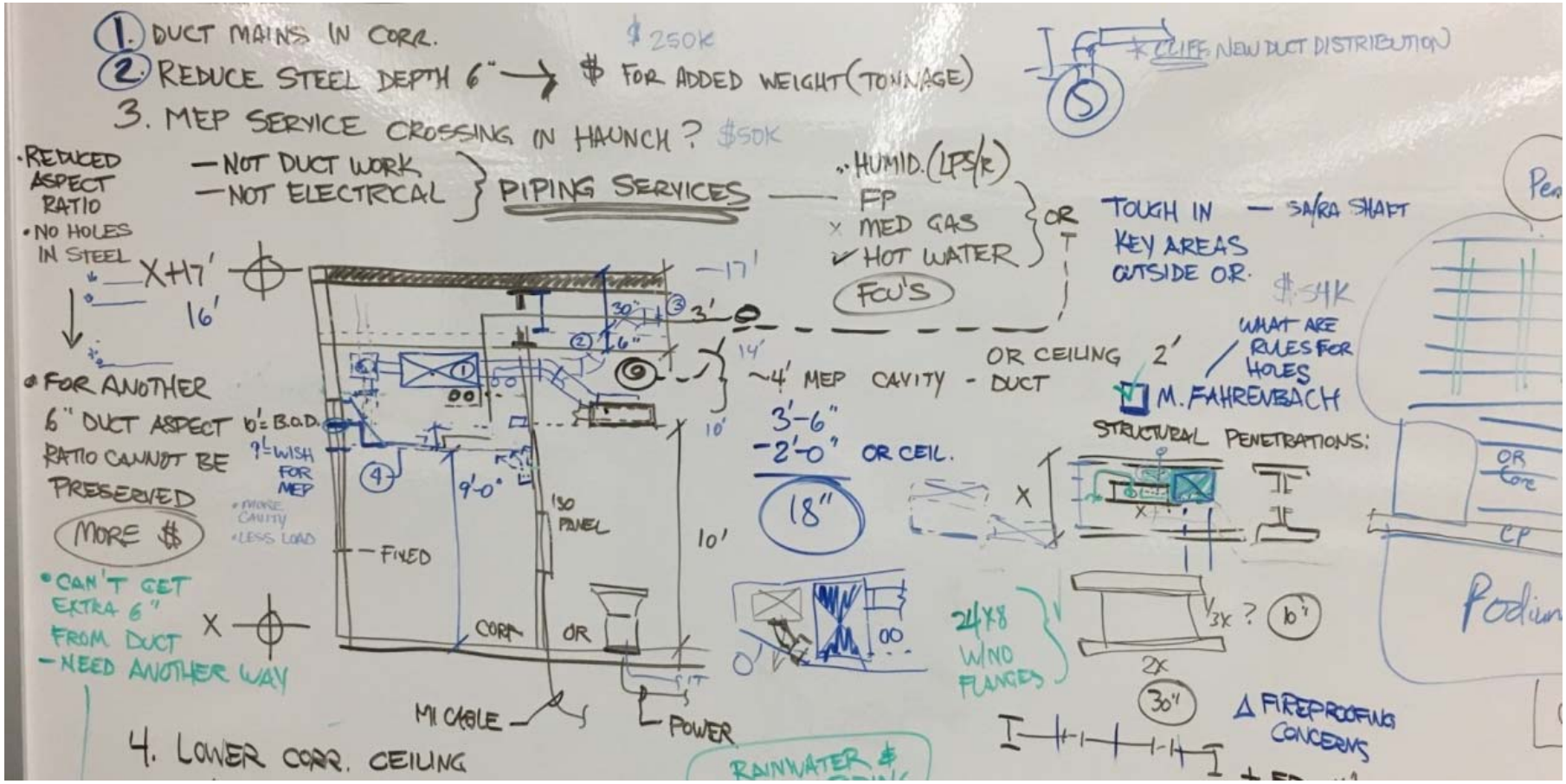
Key Trade Involvement



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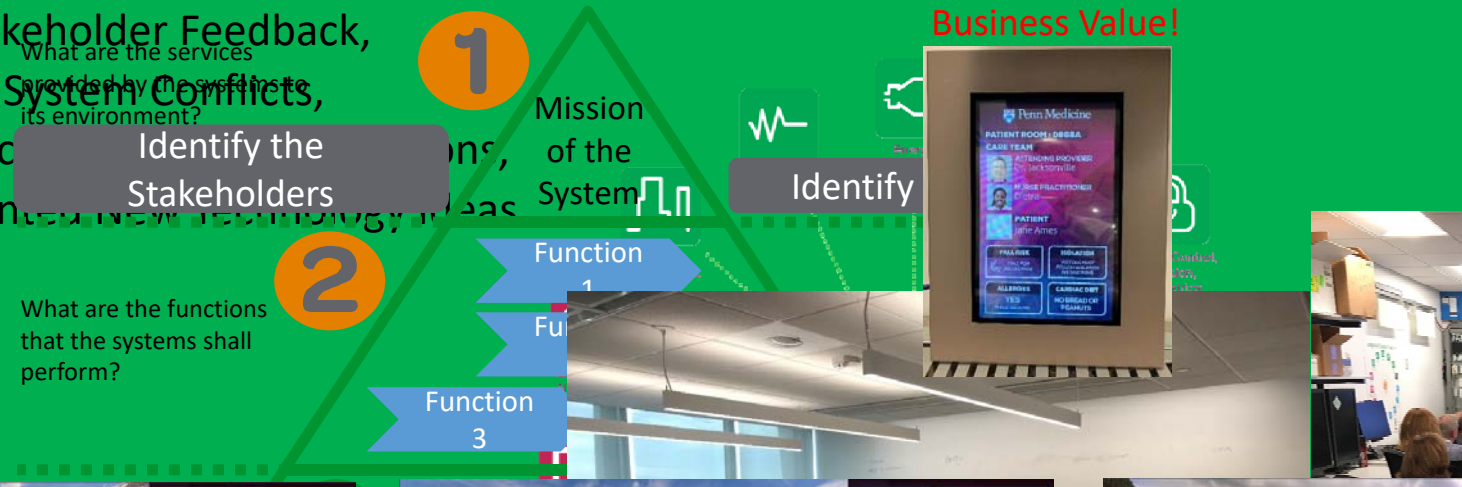
Design For Innovation!

Results:

- Reduction in CapEx and OpEx Cost,
- Good Stakeholder Feedback,
- Reduced System Conflicts,
- Staff Educ[illegible]ons,
- Implemented New Technology Ideas



Q & A