

23RD ANNUAL



23RD LCI CONGRESS
OCTOBER 19-22

W6C: Expanding TVD Beyond Construction Costs for Biopharmaceutical Manufacturing Projects

Michael Greening, Genentech

Jason Brenner, XL Construction

LEARN BY DOING FROM THOSE WHO DO

October 20th, 2021



Health precautions to keep everyone as safe as possible at Congress:

- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is being structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.
- Ultimately, our collective health and safety at Congress is up to all of us. Thanks for your support!



AGENDA

- BUILDING THE PROGRAM
- BUILDING THE TOOLS
- EXECUTING THE PROGRAM
- RESULTS

Genentech B50 Clinical Supply Center



PROJECT SUMMARY

Key Info	Qty
Volume (\$M)	\$>200M
GSF (sf)	78,300
Delivery Method	TVD
Precon Duration	Q3 2019 – Q2 2020 (9 mo)
Construction Start	Q2 2020 – Q3 2021 (15 mo)



Project Health Check	Status
Budget	👍
Schedule	👍
Client Satisfaction	👍

Category	Detail
Bldg. Type	Steel, Curtain Wall & Metal Panel
Function	Single Use Facility, Cell Culture
Product	Clinical Supply Center

BUILD THE PROGRAM

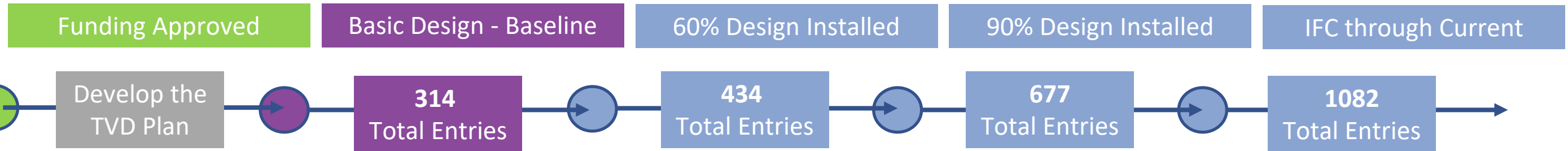


START WITH ALIGNMENT

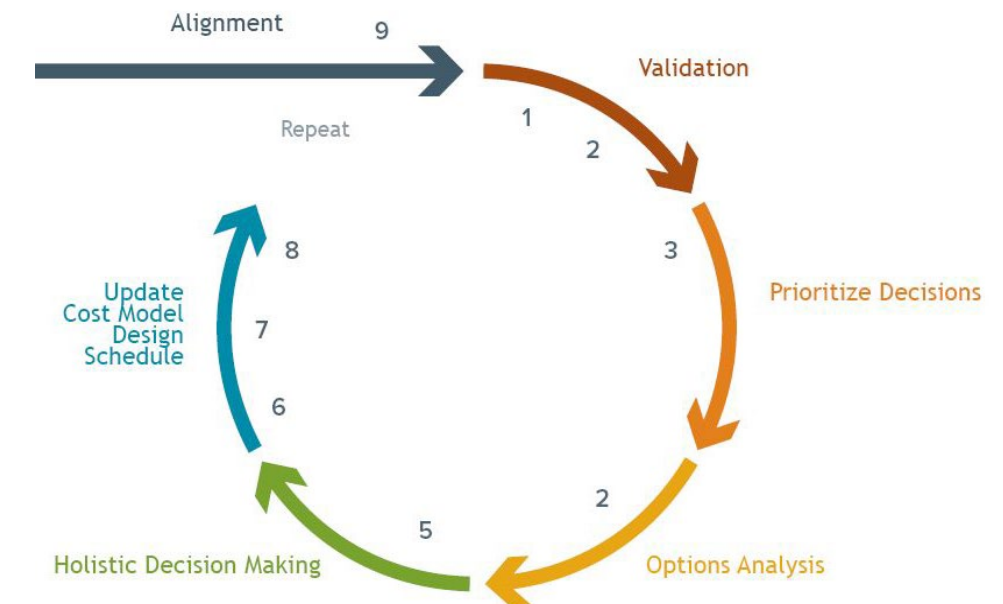
- Business & Engineering Alignment (BEAM)
- Use CBA approach to select CM with "Best Value"
- Engage a Lean coach (XL provided this capability)
- "One Team, One Voice" - internally and externally aligned
- Deliberate “onboarding” of new team members to ensure continued alignment
- "The Opportunity" = sharing of “Owner Allowances and Scope”
- Unlocking 50% of the value in biotechnology projects



BUILDING THE TVD PROGRAM...It's an evolution!



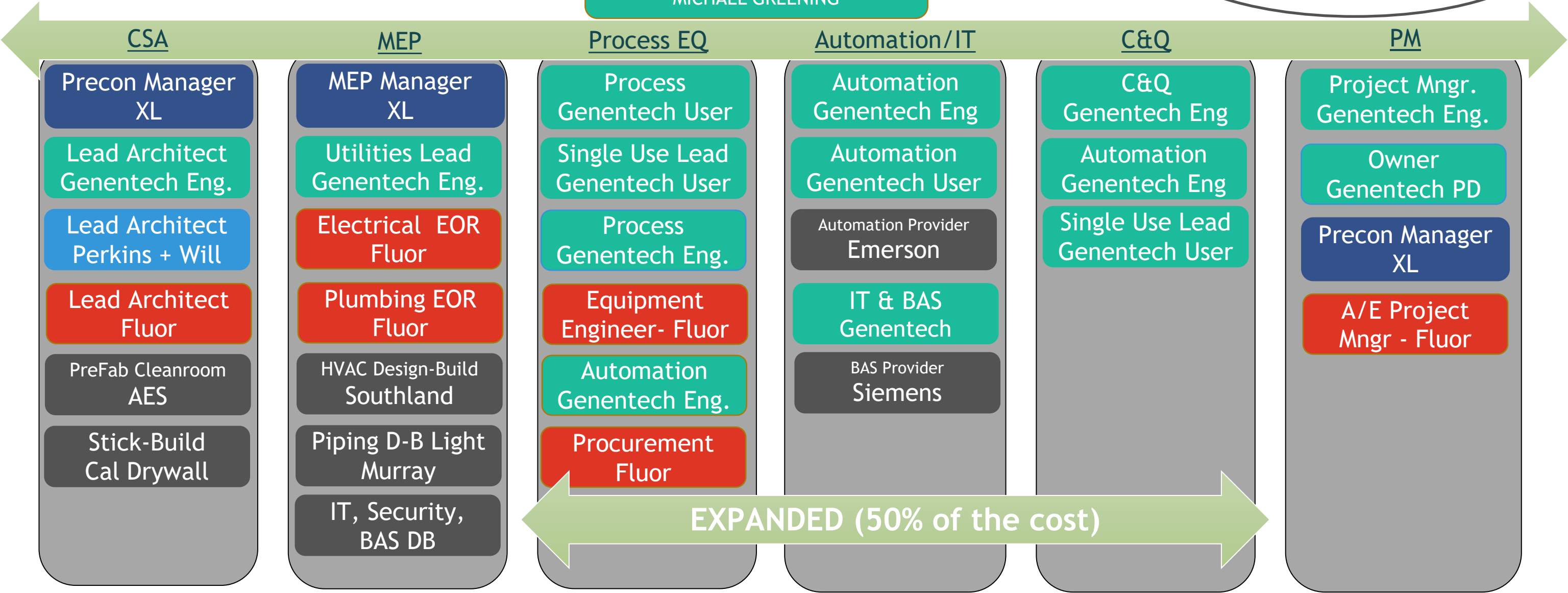
- Consider change management, be agile, building a program is a journey
- Set a strategy and align Project Implementation Teams (PITs)
- Select PIT leader based on “best fit” (skill and experience), not function to avoid silos
- Engage PIT in understanding budget, setting target, seeking “quick-wins”,
- Cadence of TVD approvals, milestones for regular budget
 - TVD update/alignments
- Encourage early adopters



TEAM STRUCTURE

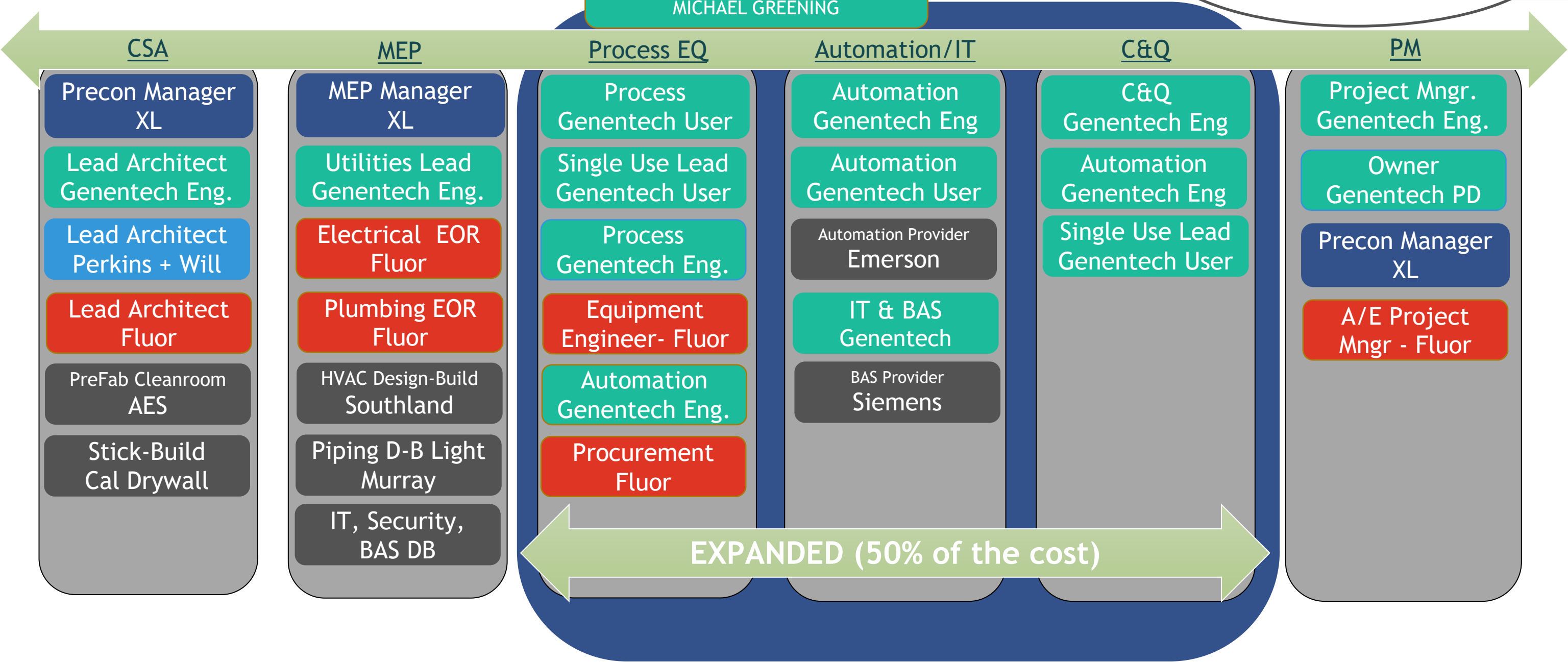
Overall Project
\$ >200M

GNE Project Director
MICHAEL GREENING



TEAM STRUCTURE

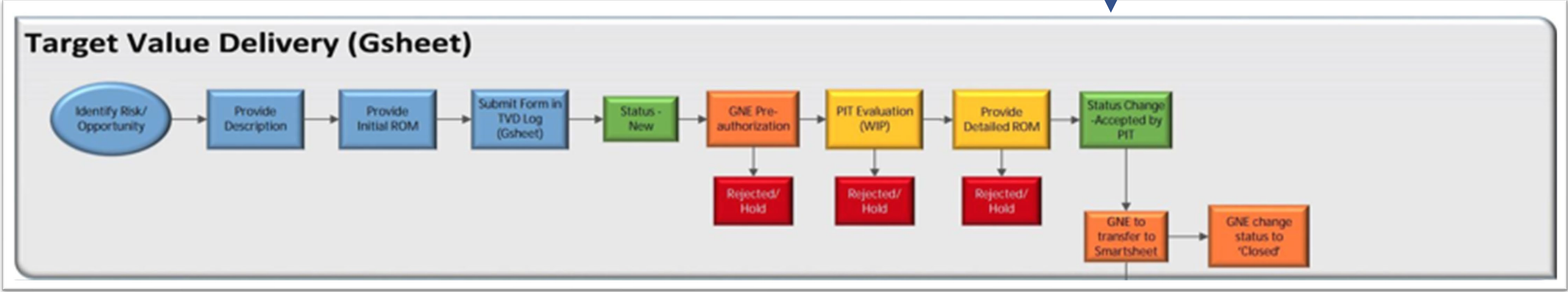
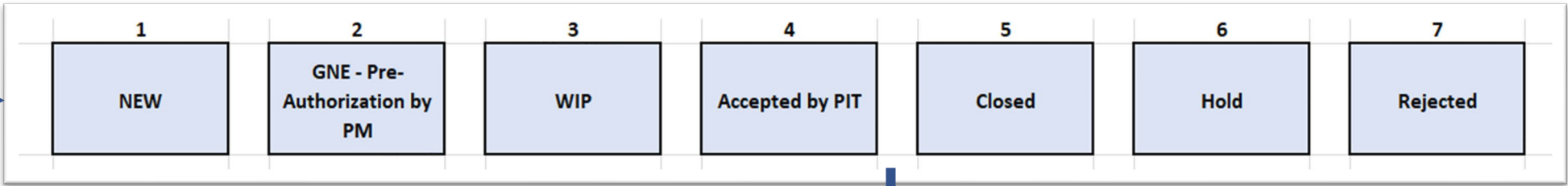
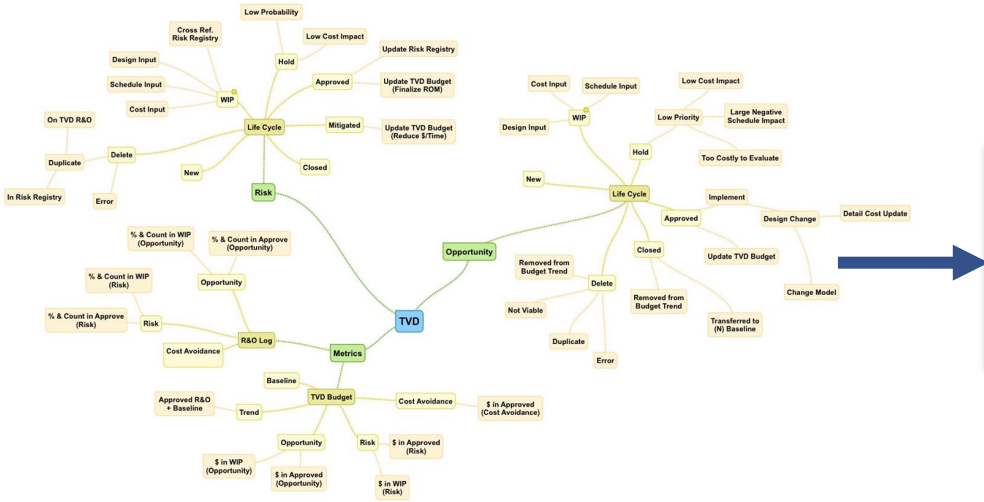
Overall Project
\$ >200M



BUILD THE TOOLS

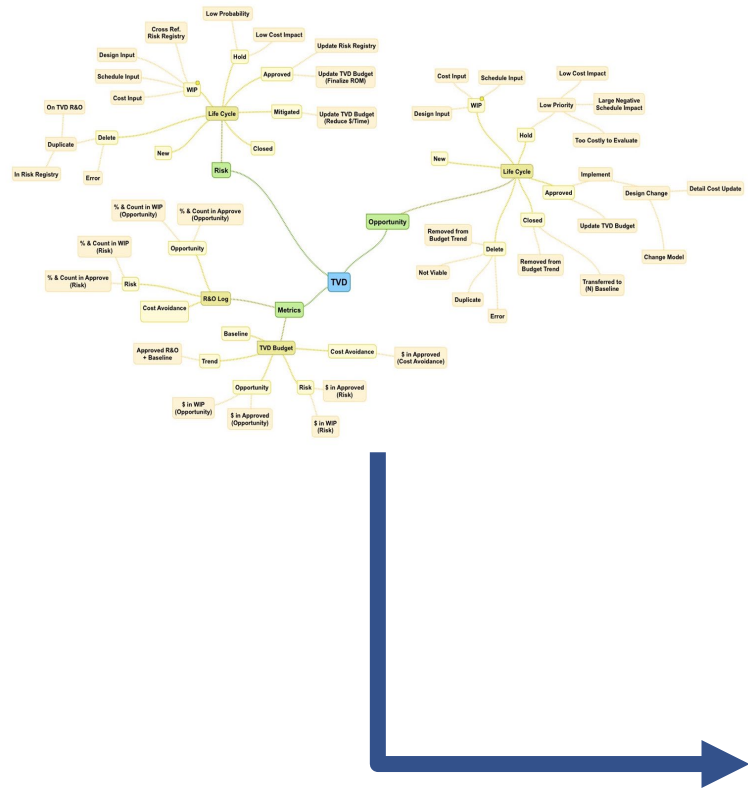


TVD LOG – the EVOLUTION



TVD LOG – the Evolution

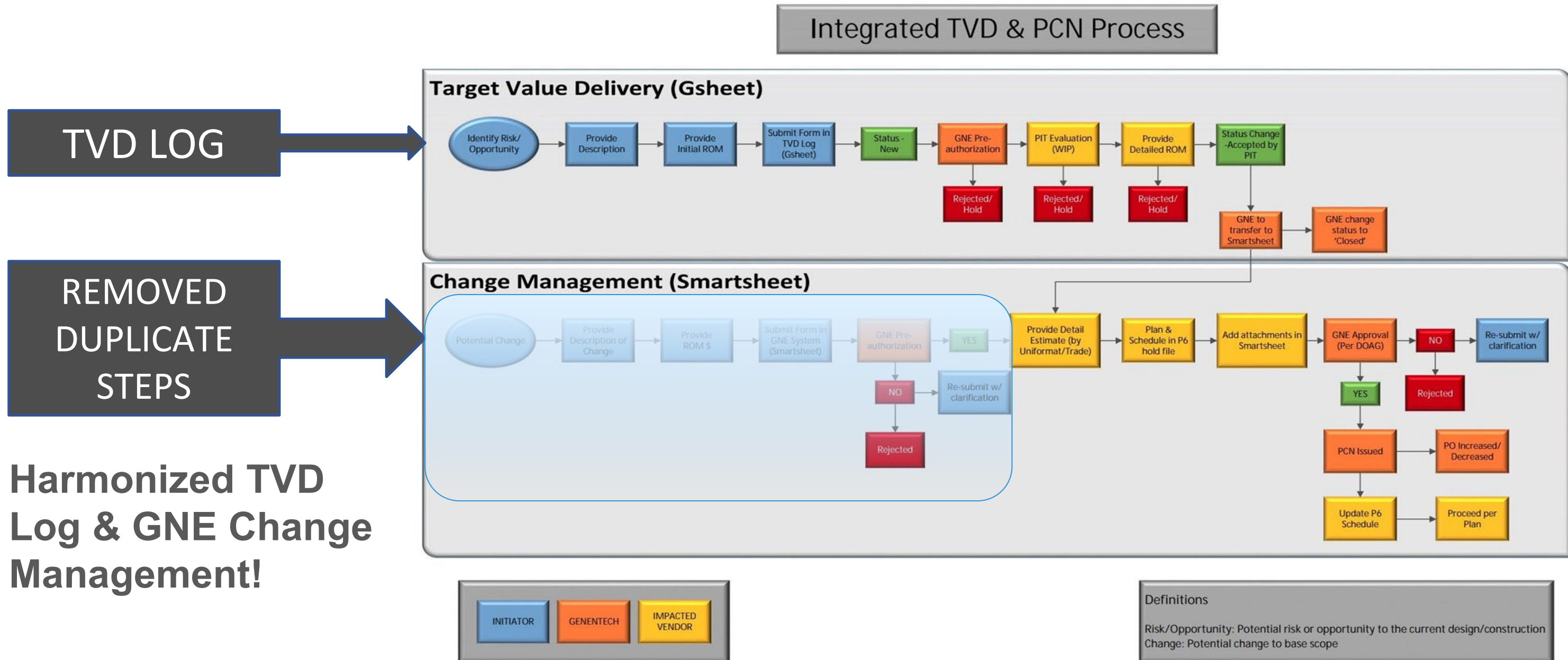
• Continue



RO #	Brief Title	Scope Description	Project Implementation Team	Life Cycle	Updated in BD R2 Estimate	Rough Estimate (Absolute Value)	Design	CSA	MEP
RO0210	HHW System	Remove Steam and add boilers for heating hot water systems. Move from Service Yard to L2 Mechanical Room	Process Equipn	5. Closed	Yes	\$25,000			\$3,038
RO0212	Reduction of finish on Pool Hold Bins	Mechanical polish requirement - willing to accept off the shelf bead blast finish	MEP	4. Accepted by PIT	No	\$135,000			
RO0226	VE Idea - Revise Flooring Type CO09	In lieu of solid color urethane flooring, provide clear (or pigmented) sealed concrete.	MEP	5. Closed	Yes	\$25,000			
RO0234	Utility Panel Branch Size	Reduce branch size from 3/4" to 1/2" for O2, CO2, IA, PA	MEP	5. Closed	Yes				-\$42,343
RO0236b	Elevator Engineering	Engineering for two elevators by Fluor. If OTIS engineers, there is a potential reduction in this add from \$15k to \$6k by Otis.	CSA	5. Closed	No	\$6,000		\$15,000	
RO0238	Bulk Chemical Delivery	Provide bulk tanks (2), transfer pumps (2), transfer piping, automation, instrumentation, local panel, curb running outside of containment (outside yard staging area). Potential use of waste pit for overflow containment from trucks	MEP	5. Closed	No	\$65,000	\$100,000	\$30,000	\$330,000
RO0239	LEED	LEED Support and Administration/Documentation and engineering.	GSA	3. WIP	No	\$100,000			
RO0240	Standard surface finish for ja	A surface finish of 35 Ra was originally requested for the	MEP	6. HOLD	No	135000			
RO0243	(E) 10" Water Line Seepage	Existing 10" Water Line located at Forbes and Kauffman is currently leaking. Scope is unknown but XL will budget for hand digging and investigation for repairs to be done by Cal Water. Assumed work to be done on OT.	MEP	3. WIP	No	\$100,000			
RO0245	Remove Outside Venting of BSC	Vent BSC's locally instead of to the outside (note: BSC quantities changes/developed)	MEP	3. WIP	No	\$30,000			\$30,000
RO0246	Additional Layer of Vapor Barrier Membrane at Exterior Metal Studs	CS Erector Shop Drawing Comments: Add breathable membrane (Grace VPS) with 2-1/2" wide strips of Perm-A-Barrier centered over exterior metal studs.	GSA	5. Closed	Yes	\$33,240		\$33,240	
RO0250	New Modalities Scope	New design of New Modalities of drawing dated 4/2/20, email from Mike G dated 4/3/20.	MEP	5. Closed	Yes	\$1,300,000	\$50,000	\$372,837	\$888,720
RO0251	Incoming Electrical Power Feed & Pipe Redesign	Redesign power and piping to the building to avoid underground/buried utilities.	MEP	3. WIP	Yes				
RO0252	Change Equipment Drains	Change all ED-1 to be FD-2	MEP	1. New	No	\$50,000			
RO0253	Server Room Load	Server Room load increased	MEP	1. New	No	\$175,000			



TVD Integration into GNE Change management (1x Tool)

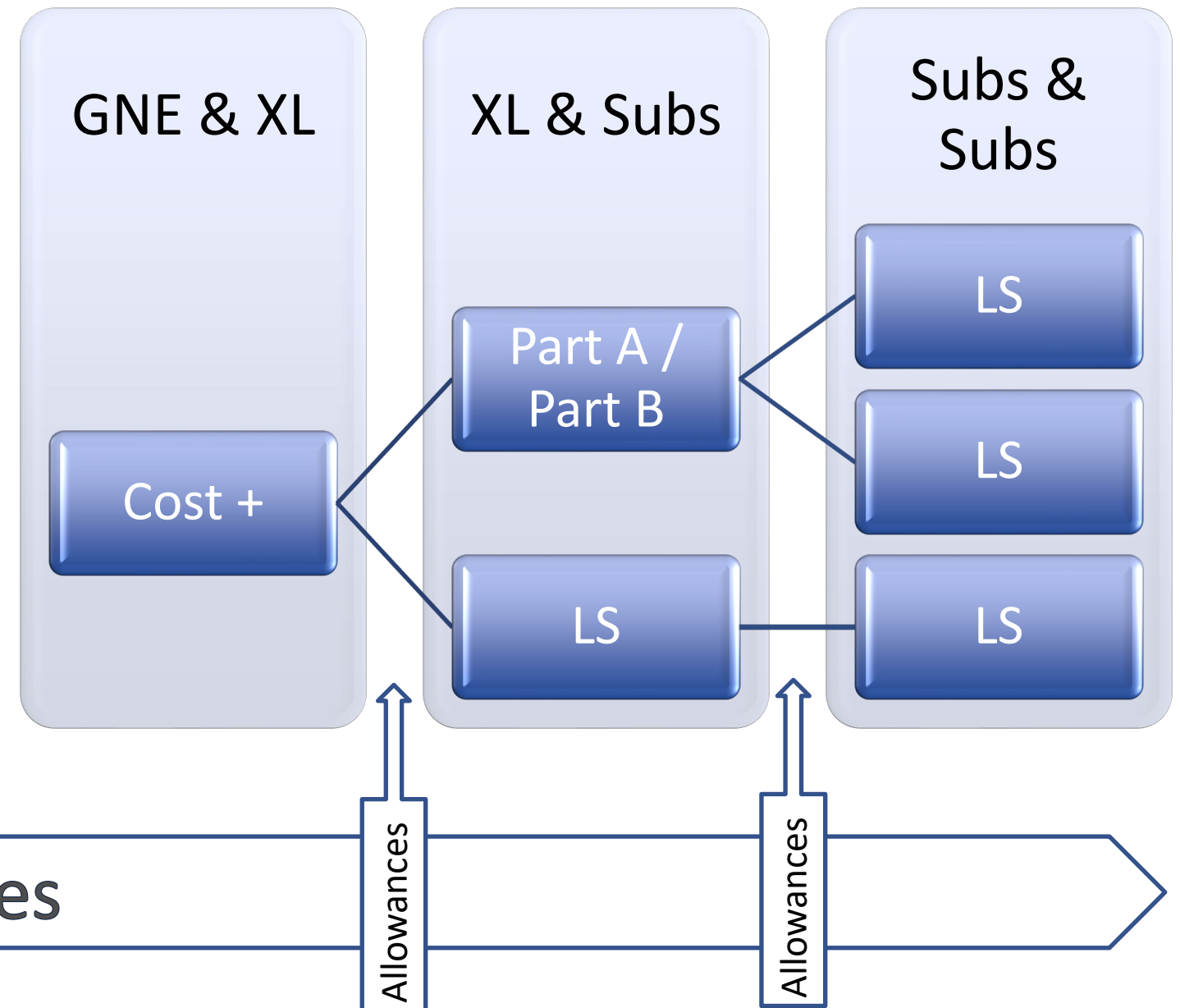


EXECUTE THE PROGRAM









Contracting Strategy – Prime Contract

- Map it out!
- Must enable the right behaviors
- One size does NOT fit all
- Lump Sum, GMP, Cost +
- **GNE/XL Pivoted to Cost +**
- Be open and honest!



Contracting Strategy – Key Trade Partners






- Best Value Selection Process
- **Part A / Part B Approach**
- Procurement Group buy in
- Be open and honest!

Part A	Scope / Service
	Preconstruction
	BIM
	Subcontractor General Conditions
	Labor Rates
	Productivity
	Overhead & Profit

Part B	Scope / Service
	Cost of Work
	Allowances

Contracting / Estimating Strategy for Owner Costs

- Firm budget pricing for equipment
- T & M for Engineering, Automation, C&Q, Genentech Internal
- Allowances developed using:
 - Benchmarking (Science)
 - Risk Model (Science)
 - Judgements (Art)

Part A	Scope / Service
	Labor Rates
	Deliverable List
Part B	Scope / Service
	Cost of Work
	Allowances
	Budget Equipment Quotes

>50% of the Opportunity is here

Design & Engineering Matrix

- GNE / Fluor / XL Completed A3
- Hybrid Approach to Design
- Defined down to System Level
- **Matrix backbone to alignment**

A3		
Title: Implement Design-Assist methodology for Engineering Design of SSF SUT CSC key work packages	Date & Rev: 24Oct19 Rev: 04	Sponsor: Todd Dando Leader: Marc Lampron Team member(s): Mike Greening, Scott Wiley, Jason Brenner, Greg Elliott, Kevin Ng, Juan Suarez
Problem Statement/Business Purpose: The current process for engineering design is for Engineering service provider to fully develop design (concept through detailed design), and then pass this design on to equipment suppliers and trade contractors. This process requires redesign, reviews, approvals. <ul style="list-style-type: none"> • Main business drivers to adjust process: <ul style="list-style-type: none"> • Increase velocity of design process • Reduce cost of design (only design once) • Increased ownership of design (accountable party designs) 		Improvement Proposal: The desired Target State for the SSF CSC project is to have a well-understood Engineering Design Development strategy, that leverages the skills, knowledge and techniques of the Engineering Designer(s) for the conceptual/basic design of the facility, with Trade partner development of detailed design, to ensure designing "one-time", accelerate the overall design process while also ensuring real-time constructability optimization. <ul style="list-style-type: none"> • This strategy shall have well-defined Engineering LOD's for specific work packages aligned with permitting strategy requirements and timeline, clarity on Eng-of-Record responsibilities, clear hand-offs for Design-Assist, and clarity on quality review processes. timing
Current State: There is a misalignment regarding the intended Engineering Model to be deployed for the Project. <ul style="list-style-type: none"> • The Owner, Engineering Company and Constructor have different interpretations of Design-Assist. • These different interpretations are resulting in lack of common understanding for the following: <ul style="list-style-type: none"> a) The Level-of-Design (LOD's) required for work packages b) Engineer-of-Record Responsibilities c) Permitting requirements d) Management and federation of BIM computer model 		Implementation Plan (Who / What / When): <ul style="list-style-type: none"> • Fluor to document Design-Assist approach deployed for East Bay project (a hybrid Design-Assign approach) – by 30Oct19 • XL to meet with certain key Trade partners (Acco, Murray, Rosendin, Cupertino) to understand East Bay approach, and also to document standard approach • Fluor and XL to collaboratively discuss, and bring forward alternative recommended approach, for each work package – 30Oct19 • Fluor to develop proposal for Engineer design, identifying each work package with associated LOD, including timing and Eng-of-Record provisions – early Nov 19
Goal(s) of Improvement: The goal is to increase the velocity of the overall project design effort, by designing "one-time-only", with the Trade partners performing the detailed designs, as appropriate. <ul style="list-style-type: none"> • Project impact should be a reduced design duration, and a more representative, first-time BIM computer model 		Follow-up / Control Plan: <ul style="list-style-type: none"> • Follow-up Design-Assist meetings, for Design-Assist Action Planning • Incorporation of Action Plan activities (including dependencies, such as permitting, Trade awards, etc.) into the SSF CSC planning and project schedule • Revision of Engineering deliverables and design schedule to adapt to agreed Design-Assist methodology. 1
Root Cause Analysis: The root cause preventing the rapid adoption of the Design-Assist model appears to be grounded in the desire the ensure a rigorous approach to design management oversight, following a traditional approach.		

Revision of Engineering Deliverables...to adapt to agreed Design Assist methodology

Engineering Matrix – Extension into BIM Ex Plan

Note how the boundary of responsibility shifts between disciplines.

Discipline	Basic Design		Detailed Design	Construction / Install
Civil	Civil Consultant (LOD 350)			Grading Contractor
Structural	Fluor BD Package	Fluor (LOD 200)	Structural: Fluor (LOD 300)	Structural Steel Contractor (LOD 400)
			Foundation: Fluor (LOD 300)	Concrete Contractor
Architectural	Fluor BD Package	Exterior Shell and Admin Space: Perkins & Will (P&W) (LOD 200-400)		Architectural Contractor (LOD 400)
		Interior Package (remainder): Fluor (LOD 200-300)		
		Clean Room (LOD 200)	Interior Clean Rooms: Clean Room Panel Manufacturer (LOD 400)	
Process	Fluor BD Package (LOD 200)		Fluor (LOD 300)	Not Applicable
Mechanical	Fluor BD Package	Performance Spec: Fluor		Equipment Suppliers (LOD 400)
Piping	Fluor BD Package		General Arrangements: Fluor (LOD 250)	Equipment Rigging Contractor
			Pipe & Model: Fluor (LOD 250)	Piping Connection & Isos: Piping Contractor (LOD 400)
Instrumentation	Fluor BD Package		Fluor (LOD 350)	Electrical Contractor
Electrical	Fluor BD Package		Fluor (LOD 300) - Main Power Distribution	Electrical Contractor (LOD 400)
			Fluor (LOD 300) - Remaining Electrical	
HVAC/Utilities	Fluor BD Package		Duct: HVAC Contractor (LOD 300)	Duct Plans: HVAC Contractor (LOD 400)
			Equipment Specification: HVAC Contractor (LOD 300)	HVAC Supplier / Contractor
Other Building Systems	Fluor Plumbing BD Package		Fluor Plumbing (LOD 300)	Plumbing Contractor
	Fluor Sprinkler Criteria (LOD 100)		Sprinkler Contractor (LOD 400)	
	Fluor Aux Sys (LOD 100)		Specialty Design-Build Contractors (LOD 400)	

RESULTS



EXPANDED TVD!

Overall Project
\$ >200M

GNE Project Director
MICHAEL GREENING

CSA

Precon Manager
XL

Lead Architect
Genentech Eng.

Lead Architect
Perkins + Will

Lead Architect
Fluor

PreFab Cleanroom
AES

Stick-Build
Cal Drywall

MEP

MEP Manager
XL

Utilities Lead
Genentech Eng.

Electrical EOR
Fluor

Plumbing EOR
Fluor

HVAC Design-Build
Southland

Piping D-B Light
Murray

IT, Security,
BAS DB

Process EQ

Process
Genentech User

Single Use Lead
Genentech User

Process
Genentech Eng.

Equipment
Engineer- Fluor

Automation
Genentech Eng.

Procurement
Fluor

Automation/IT

Automation
Genentech Eng

Automation
Genentech User

Automation Provider
Emerson

IT & BAS
Genentech

BAS Provider
Siemens

C&Q

C&Q
Genentech Eng

Automation
Genentech Eng

Single Use Lead
Genentech User

Project
Management

Project Mngr.
Genentech Eng.

Owner
Genentech PD

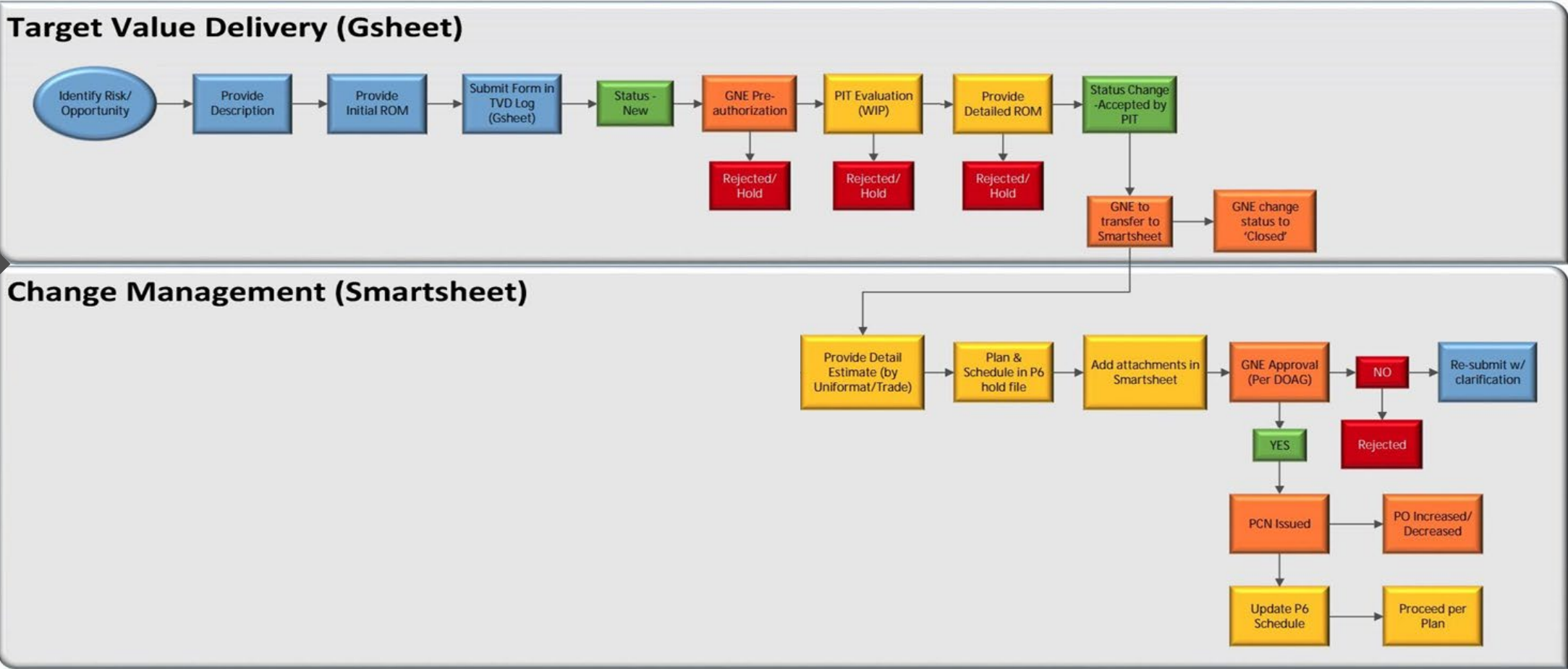
Precon Manager
XL

A/E Project
Mngr - Fluor

EXPANDED (50% of the cost)

TVD INTEGRATED INTO OWNER CHANGE MANAGEMENT!

Integrated TVD & PCN Process



CONTEMPORANEOUS
CHANGE
MANAGEMENT



Definitions

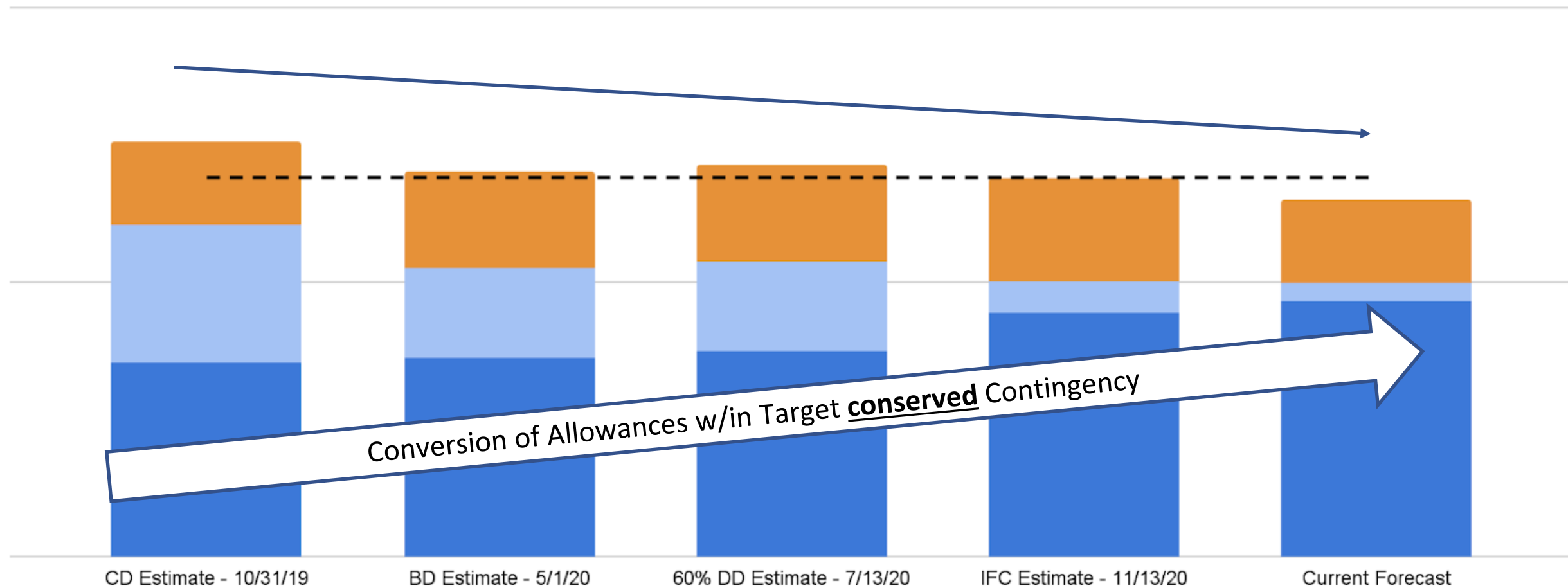
Risk/Opportunity: Potential risk or opportunity to the current design/construction

Change: Potential change to base scope

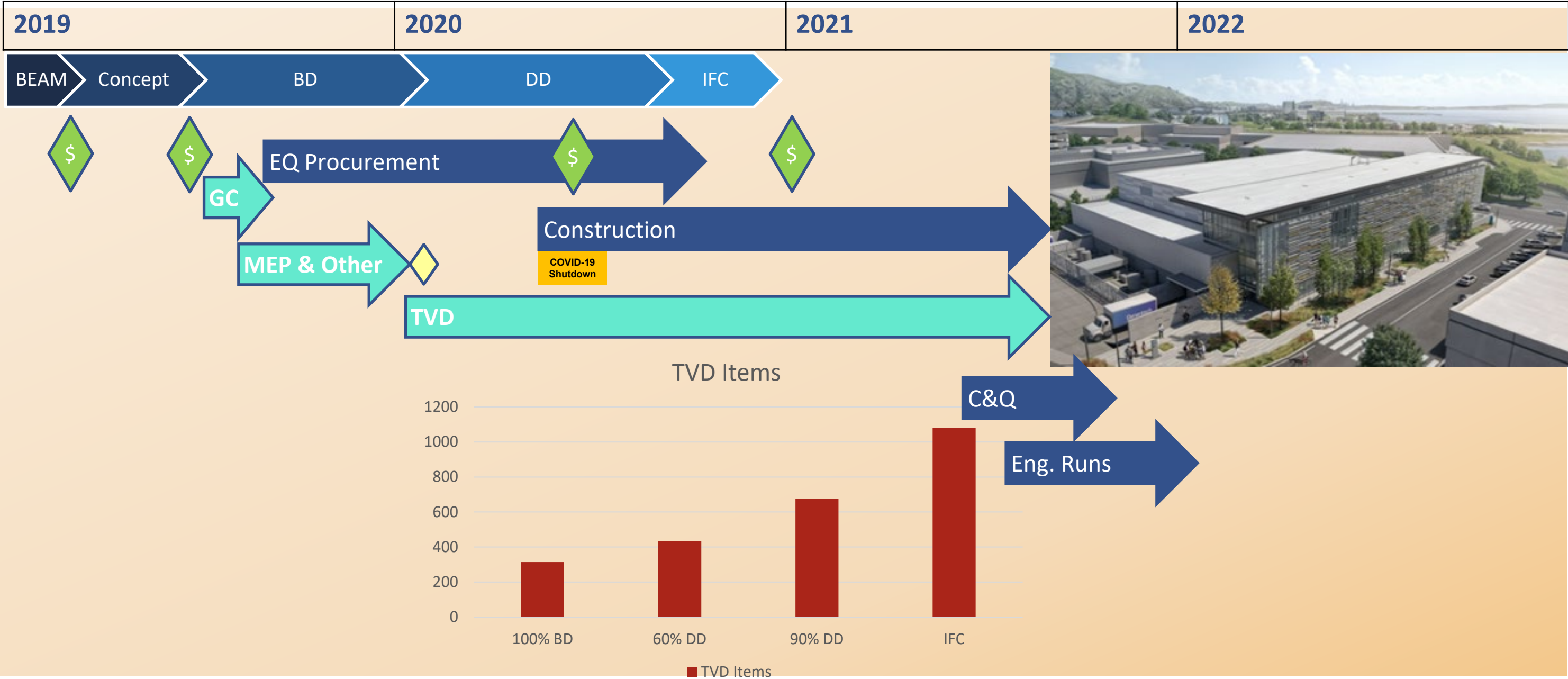
COST PERFORMANCE DATA – IT WORKED!

Target Value Delivery - Cost by Phase

— Target Contingency Allowances Base Scope



Project Schedule Summary



Summary

- Establish culture and open relationships
- Include PITS accountable for Owner Budgets
- Integrate TVD into change management
- Regular cadence in Obeya setting
- Your targets and expectations
- Create real value!



ACKNOWLEDGEMENTS

FLUOR®



Perkins&Will

SIEMENS



Contact Us

Michael Greening

Genentech

[linkedin.com/in/michael-greening-3687824](https://www.linkedin.com/in/michael-greening-3687824)

Jason Brenner

XL Construction Inc

[linkedin.com/in/jason-brenner-3b29524](https://www.linkedin.com/in/jason-brenner-3b29524)



23RD LCI CONGRESS
OCTOBER 19-22

Thank you for attending this presentation. Enjoy the rest of the 23rd Annual LCI Congress!

BACK UP SLIDES

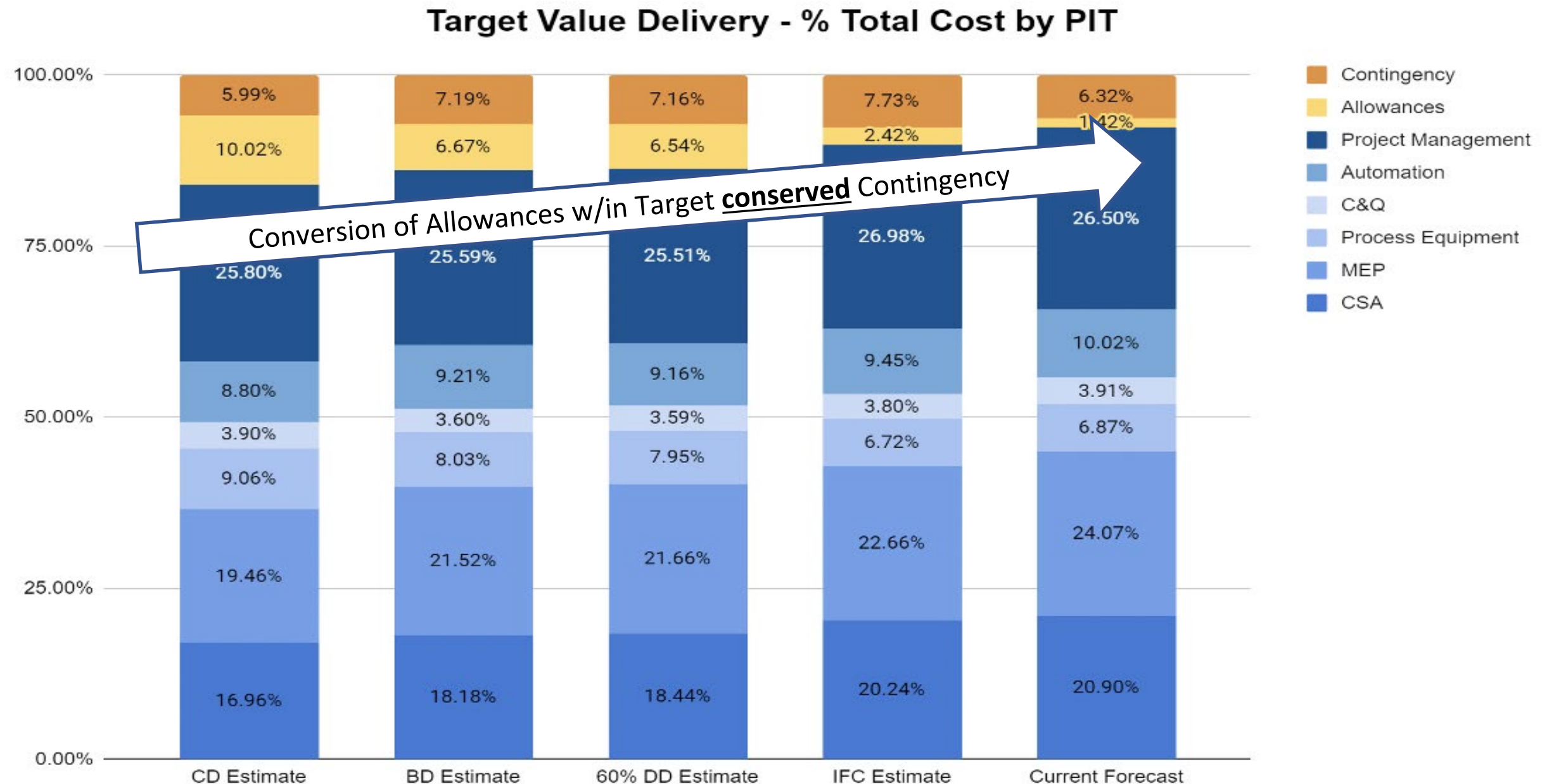


WEEKLY RHYTHM – EXPANDING THE TEAM

- Project was managed using t-week duration sprints
- PIT Leads accountable for weekly updates:
 - Task status / at risk items
 - TVD life cycle status
- Genentech Process Equipment, Automation/IT Leads accountable for reporting out
- C&Q report out by Genentech
- We selected the most suitable person for the role, not the historical functional leader



COST PERFORMANCE DATA – PITS over TIME



Leadership & Culture Setting the Stage for Innovative Execution

- **Align team early, continuously, and deliberately to embed values**
 - Day 1 – Business & Engineering Alignment (BEAM), aligned project leadership with business executives
 - Internal user and engineering team alignment outcome: operating agreement
 - XL lean coach facilitated integrating operating agreement to all parties
 - Deliberate “onboarding” of new team members to ensure continued alignment
- **“One Voice, One Team”**
 - User team lead and project manager developed a contract to act in unison
 - Using CBA, Genentech sought out a CM that provided “Best Value”
 - Shared knowledge of “Owner Allowances”, known scope / opportunities

Glossary of Acronyms

- TVD – Target Value Delivery
- BEAM – Business & Engineering Alignment
- PITs – Project Implementation Teams

