

USACE CONTINGENCY DEVELOPMENT INLAND WATERWAYS USERS BOARD

BOARD MEETING #87



Michael P. Jacobs

Chief, Cost Engineering MCX

25 May 2018

"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."

Risk Based Contingency Development



US Army Corps
of Engineers®



RISK BASED CONTINGENCY: HOW DID WE GET HERE?

- Busted Budgets
- Busted Schedules
- Inaccurate Contingencies
- Challenges with the Process
- Process Bottlenecks



US Army Corps
of Engineers ®



TOP REASONS FOR MAJOR COST VARIATIONS

Early planning level to construction award:

Definition and Packaging of Product \$\$\$

Clear Scope of Work \$\$\$

Accurate Contingency Levels \$\$\$

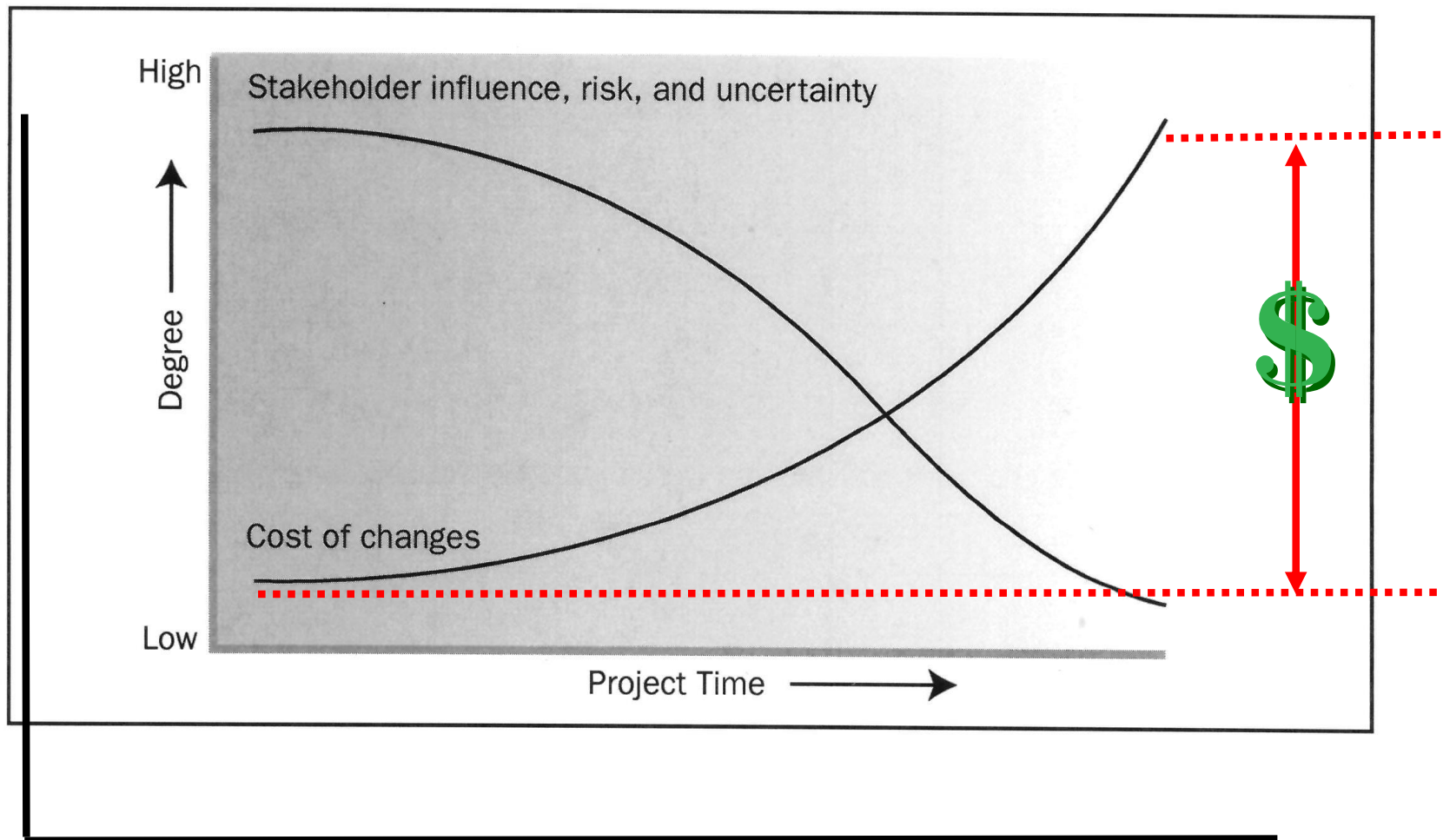
Defined Acquisition Strategy \$\$\$

Accurate Quantities \$\$\$

Estimate Details \$\$\$

Other \$\$\$





COST & SCHEDULE RISK ANALYSIS (CSRA)

- Technique used to improve development of contingencies
- Formal analysis required on all projects requiring authorization and anticipated to be \$40 Million or more in total project cost
- Relies on qualitative and quantitative studies
- OUTPUT quality is limited by INPUT quality (inputs are estimates and schedules)



US Army Corps
of Engineers ®



GOAL

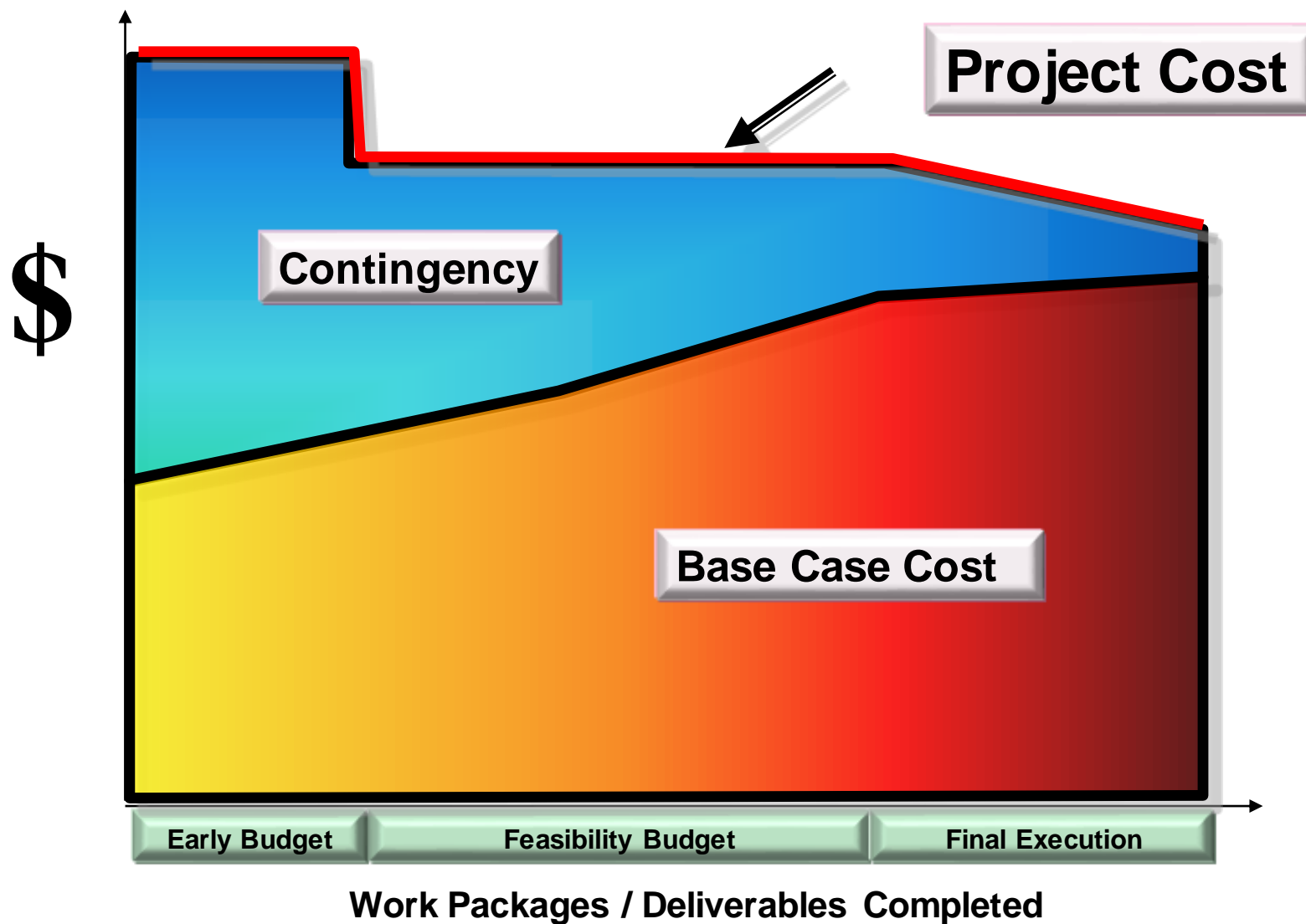
- Develop the Risk Register for the Project in order to:
 - ▶ Provide a means to communicate the projects risks effectively
 - ▶ Identify issues that need mitigation
 - ▶ Develop an accurate range Cost and Schedule for the project!



RISK ANALYSIS PROCESS

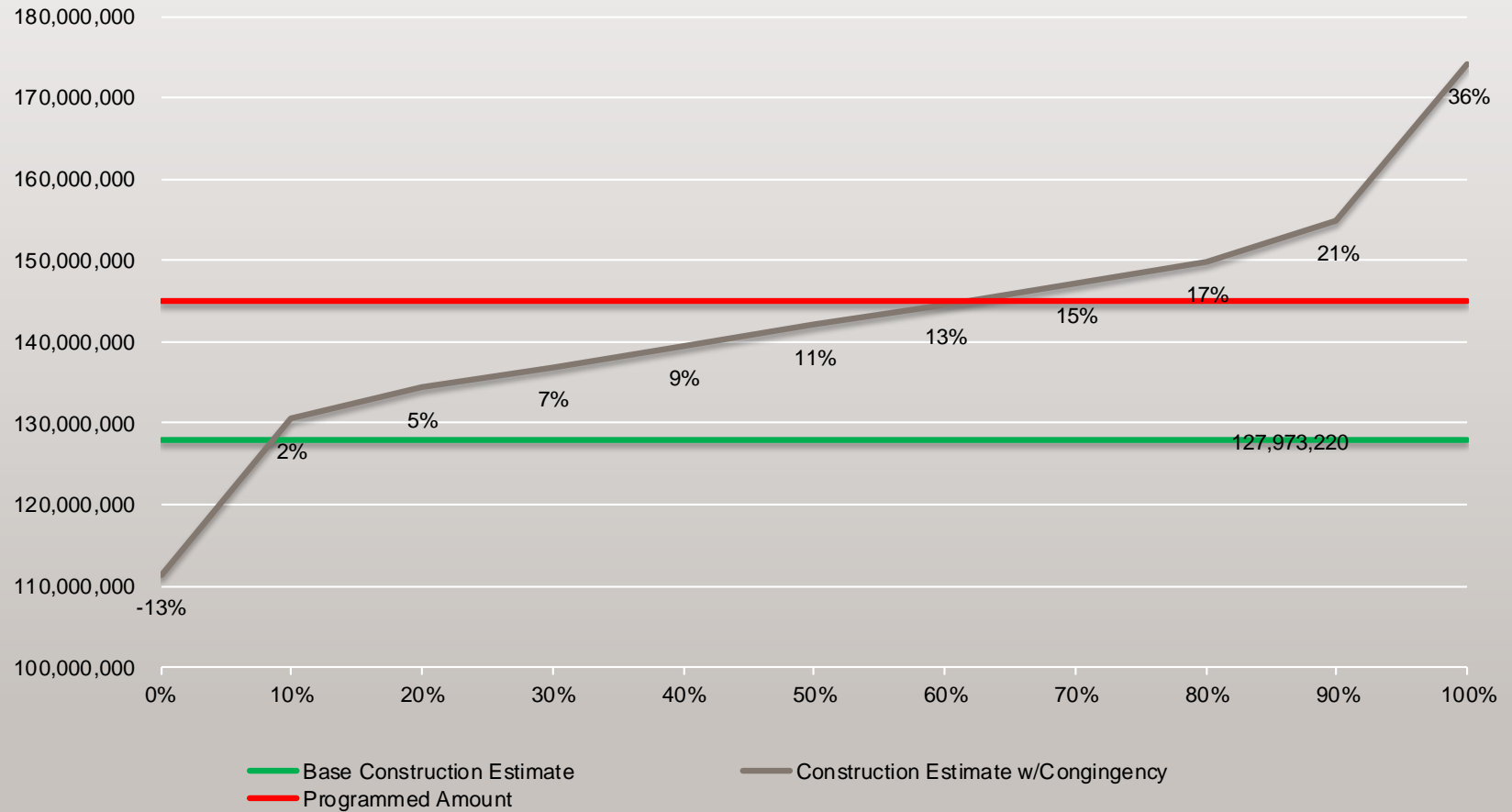
- The Team Develops the Risk Register
- Develop Cost and Schedule Model
- Identify Sensitivity of Risk Elements
- Identify Risk Mitigation Efforts
- Confidence Levels and Contingency
- Communicate
- Monitor and Act



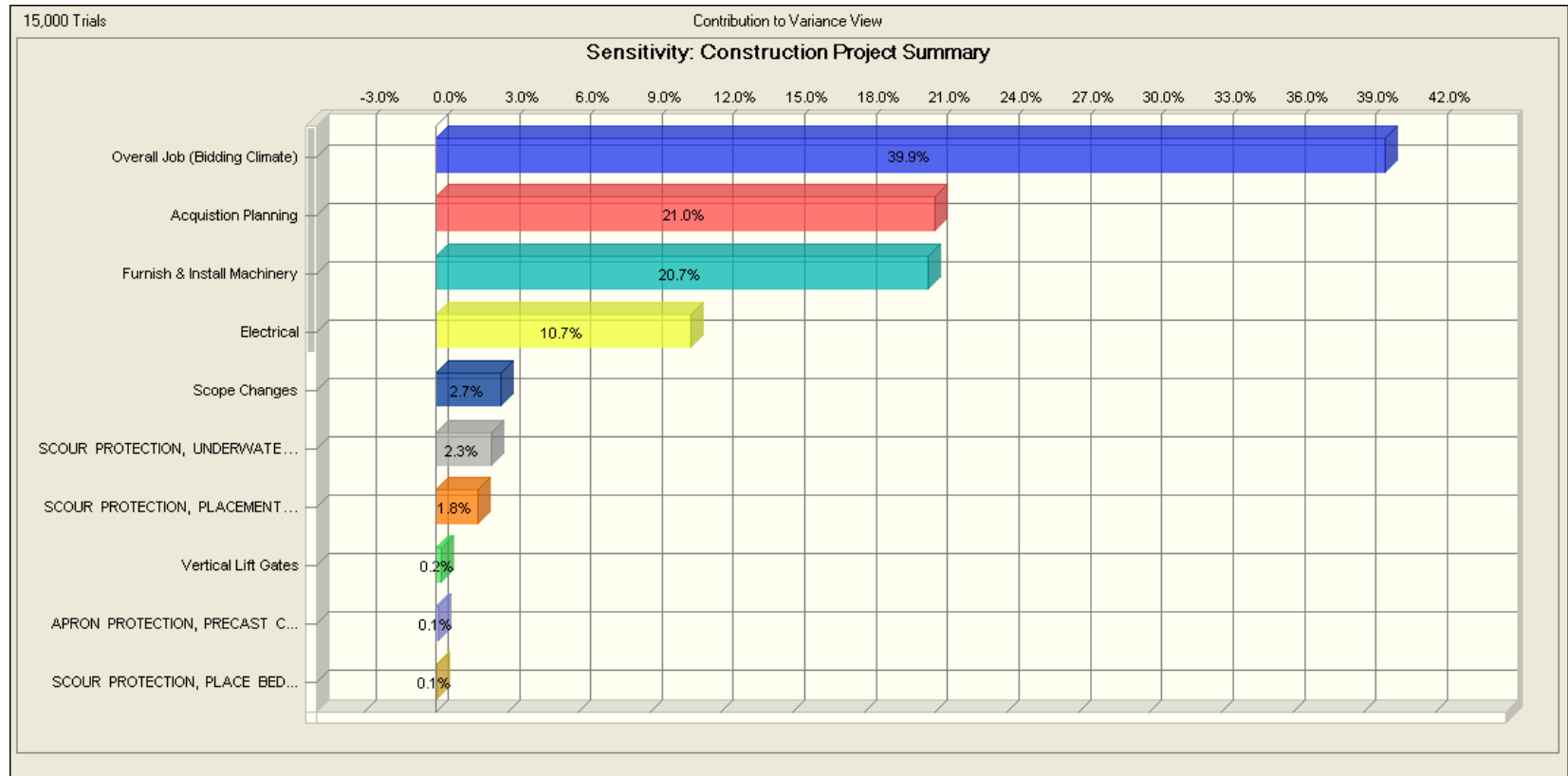


S CURVE EXAMPLE

Cost Contingency

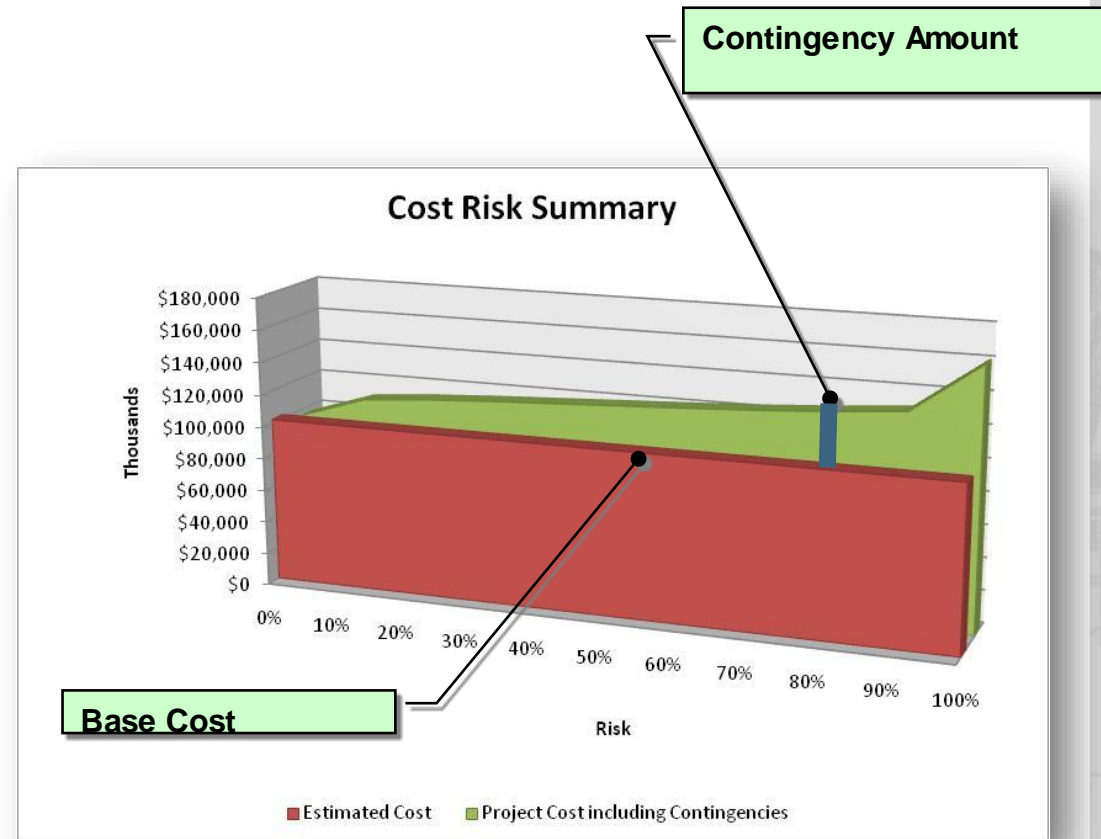


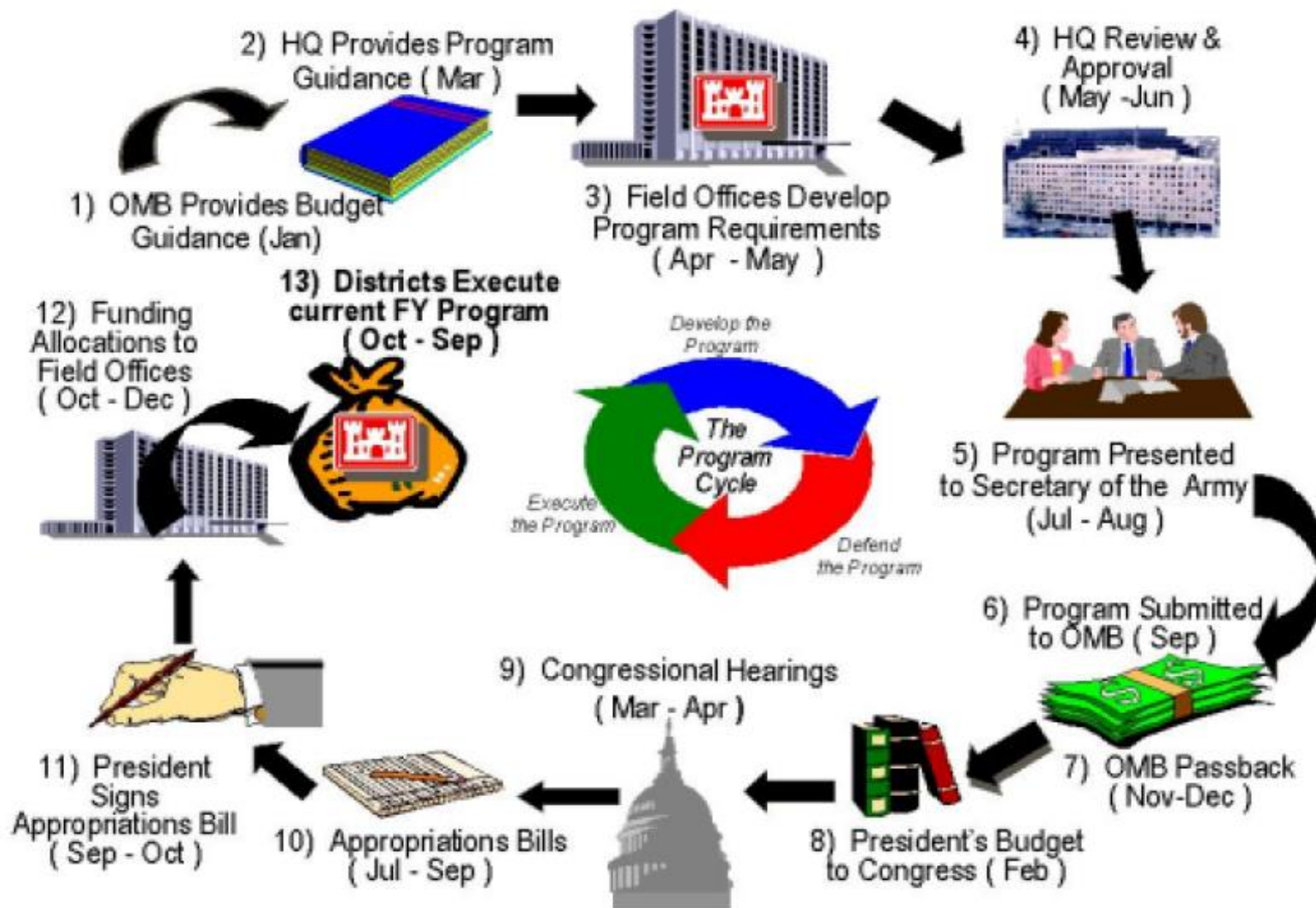
SENSITIVITY REPORT



RISK COMMUNICATION

- Recommended Project contingency and corresponding confidence levels are presented to the PM.
- PM and District Management will decide what confidence level would be acceptable for the project.





US Army Corps
of Engineers ®



| Various Cost Product Reviews - Minimum Requirements | | | | | | |
|--|--|------|---------------------------|--|---------------------------|--|
| Review includes main report and appendices, scoping documents/technical details and assumptions, estimate, risk analysis, project schedule, total project cost summary (TPCS). HQ or MSC may require more stringent review policy of products. | | | | Review Requirements | | |
| To ensure the total project cost estimate is based on the current design and acquisition strategy, the Total Project Cost updates must be performed when major project revisions affect quantities, cost, schedules, and risks. For cost engineering products where development price levels are older than 2 years, escalation application is not appropriate, since national indices may not reflect a local project's actual construction costs and risks, which are dependent on location specific cost drivers (availability of skilled labor, materials, market conditions, competitive bidding, etc.). Critically important is to assure cost products reflect current project details, which may have changed resulting in new cost, schedule, or risk values. | | | | | | |
| Product | Min. Cost Estimate Class | DQC | ATR | Assignment of Reviewer | Cost MCX Certification | IEPR (In accordance with CW Review Policy) |
| Decision Documents | Varies | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Cost Reports to MSC and or HQ (Products which leave the District) unless specifically identified below. | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| CAP | | | | | | |
| Alternative Estimates | Class 4 | Reqd | Reqd | ATR Cert Reviewer | Not Required ² | N/A |
| Feasibility Report TSP | Class 4 | Reqd | Reqd | ATR Cert Reviewer with Cost MCX issuing final Cost Cert. | Reqd | Varies |
| NON-CAP | | | | | | |
| Alternative Estimates (SMART Milestone #1) | Class 4 | Reqd | Reqd | NWW Cost MCX | Not Required ² | Varies |
| TSP (SMART Milestone #2) | Class 4 | Reqd | Reqd | NWW Cost MCX | Not Required ² | Varies |
| Civil Works Review Board (SMART Milestone #4) | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Engineering Documentation Reports | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Design Documentation Report (DDR) | Class 3 | Reqd | Varies | NWW Cost MCX | Varies | Varies |
| Design Deficiency Report | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| General Reevaluation Report | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Limited Reevaluation Report | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Re-Authorization | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Major Rehab Report (Hydropower) | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Dredge Material Management Plan | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Shoreline Management Plan (w/ EIS) | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Shoreline Management Plan (w/o EIS) | Class 3 | Reqd | Reqd | NWW Cost MCX | Reqd | Varies |
| Master Plan (w/EIS) | Varies | Reqd | Reqd | NWW Cost MCX | Varies | Varies |
| Master Plan Update (w/o EIS) | Varies | Reqd | Varies | NWW Cost MCX | Varies | Varies |
| Annual Work Plan Budget Submission (AWPBS) to HQ-PM | | | | | | |
| For AWPBS, given all the following conditions a) The Price Level of the estimated cost is within two years. b) NWW Cost MCX Cost Certification has been issued within two years. c) The cost office along with PDT has analyzed the latest project details. d) the cost product escalated to current price levels accurately depicts project cost, schedule and risk with only minor changes other than escalation. e) approved by the Chief Cost Organization. and f) the TPCS includes a clear description of what changes have been made to the current certification (see required statement below). | Combination of Class 3 and Class 2 depending on phase and design level | Reqd | Not Required | N/A | Not Required | N/A |
| For AWPBS, does not meet conditions above. | same as above | Reqd | Reqd | NWW Cost MCX | Reqd | N/A |
| For Internal Cost Controls - Yearly Update of TPCS, CSRA and Schedule (Current Working Estimate) | same as above | Reqd | Not Required ² | N/A | Not Required ² | N/A |
| Design Implementation Documents | Class 2 | Reqd | Reqd | ATR Cert Reviewer | Not Required ² | N/A |
| Contract IGE | Class 1 or Class 2 depending on acquisition type | Reqd | DQC can suffice for ATR | N/A | Not Required ² | N/A |
| Contract Modifications | Class 1 | Reqd | DQC can suffice for ATR | N/A | Not Required ² | N/A |
| Required Statement for AWPBS meeting conditions above. | | | | | | |
| "A Current Cost MCX Cost Certification is within two years of this Budget Submittal, and the estimate price level is within two years. Use of cost indexes are used to update the total project cost estimate in accordance with ER 1110-2-1302 guidance. The cost PDT member has confirmed the current indexed cost estimate accurately depicts total project cost, scope and technical assumptions/conditions have been reviewed." This statement along with signature from the cost chief are required to be submitted with the AWPBS package. | | | | | | |

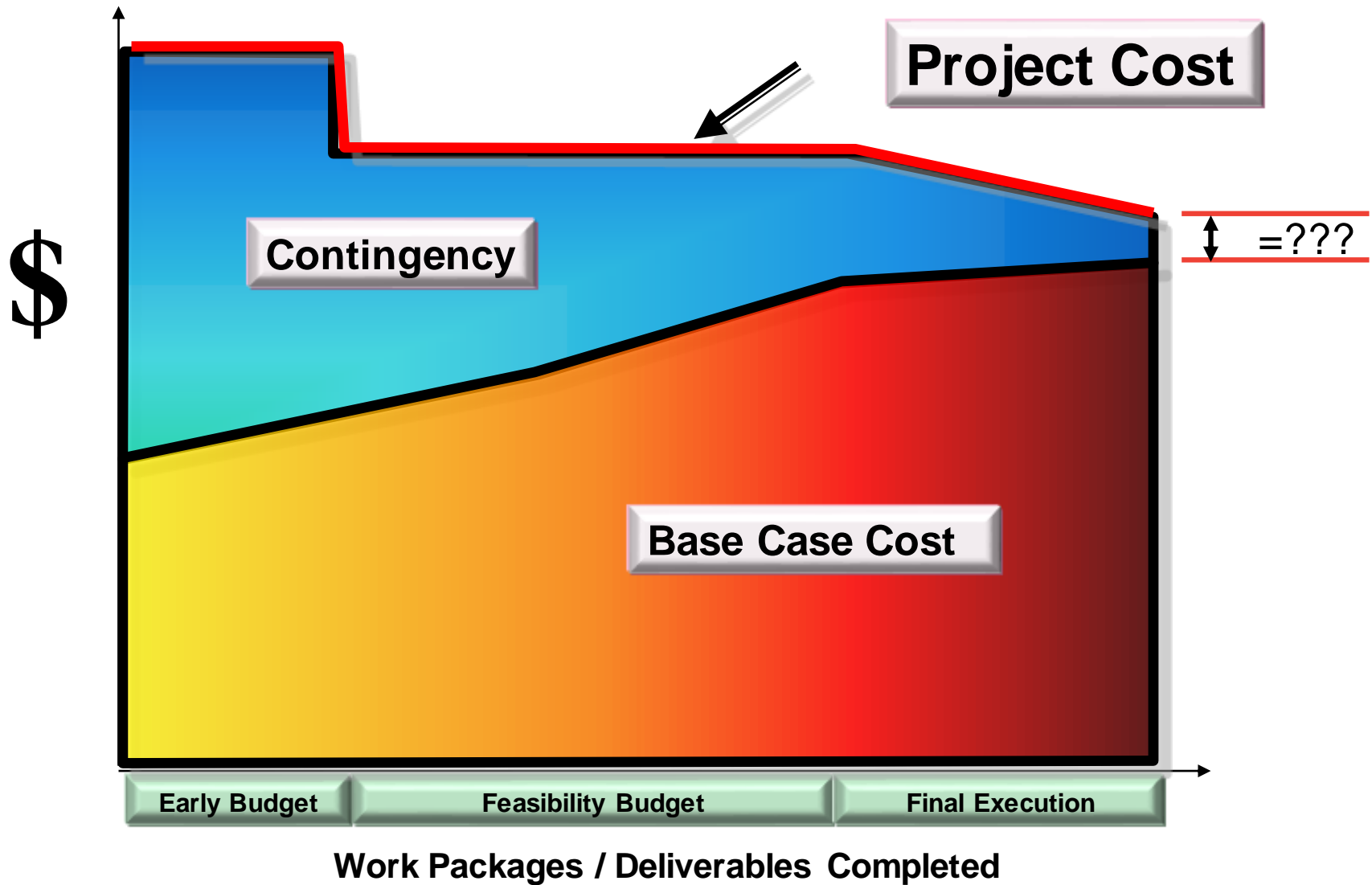
USACE Budget Submission Requirements

Certification <2 years old

- Current Estimate
- Current Schedule
- Current CSRA



US Army Corps
of Engineers®



SUMMARY

- Requirement to certify estimates no greater than every 2 years should see a natural decline in contingency level.
- 80% Confidence Contingency level is overall a conservative approach. It can also vary significantly based on the current state of the project.
- Due to the general large size of most Trust Fund Projects and the funding level required for efficient annual funding “reducing/reallocation” of contingency may not be viable until very late in the construction of ongoing projects.



QUESTIONS?

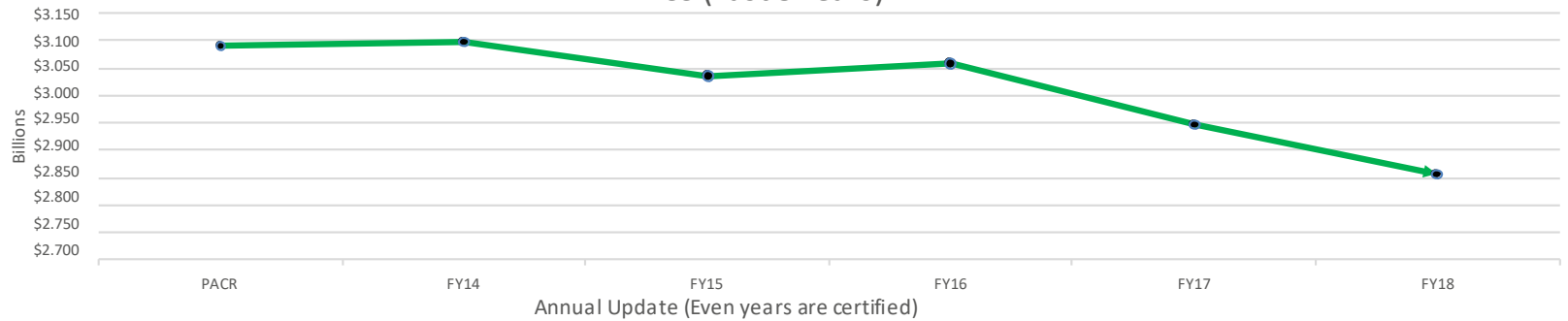


BACK UP SLIDES FOR DISCUSSION AS NEEDED

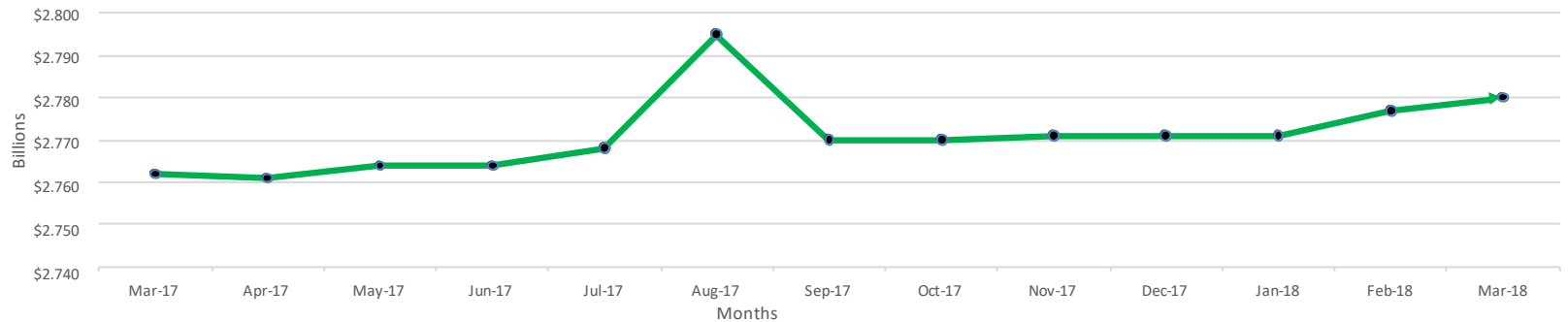


12 Month & 5 Year Cost Trends OLMSTED

TPCS (Last 5 Years)



TEP (Last 12 Months)



BUILDING STRONG®
and Taking Care of People!

