



Highway Division

Major Projects Discussion - Continued

January 17, 2018

Highway Division Major Projects Discussion - Continued

Construction Phase Cost Controls

- This presentation continues the topic of cost controls on Highway Division Major Projects, first broached at November 7, 2017 CPC meeting
- Based on CPC feedback, a policy to establish specific thresholds for Board Review of additional fund requests on Highway projects during **construction** phase is proposed as follows:
 - *Policy: if a project exceeds its original budget, including contingency, by more than the following conditions, Highway Division will seek the Board's approval for additional funding.*
 - › Projects \$15 million to \$50 million – 10% of project cost, including budgeted contingency
 - › Projects \$50 million or greater – \$5M above project cost, including budgeted contingency
 - *Policy applies to all projects with an estimated cost of \$15 million or greater for consistency with the current Board of Directors' delegated signatory authority.*
 - *As part of the approval process, Highway Division will:*
 - › Detail what caused the original budget to be exceeded
 - › Steps that have been taken to limit the cost increase and/or time delay
 - › Impacts are to the existing or proposed schedule, residents and other stakeholders
 - › Identify the source of the additional funds and any resulting trade-offs

Highway Division Major Projects Discussion - Continued

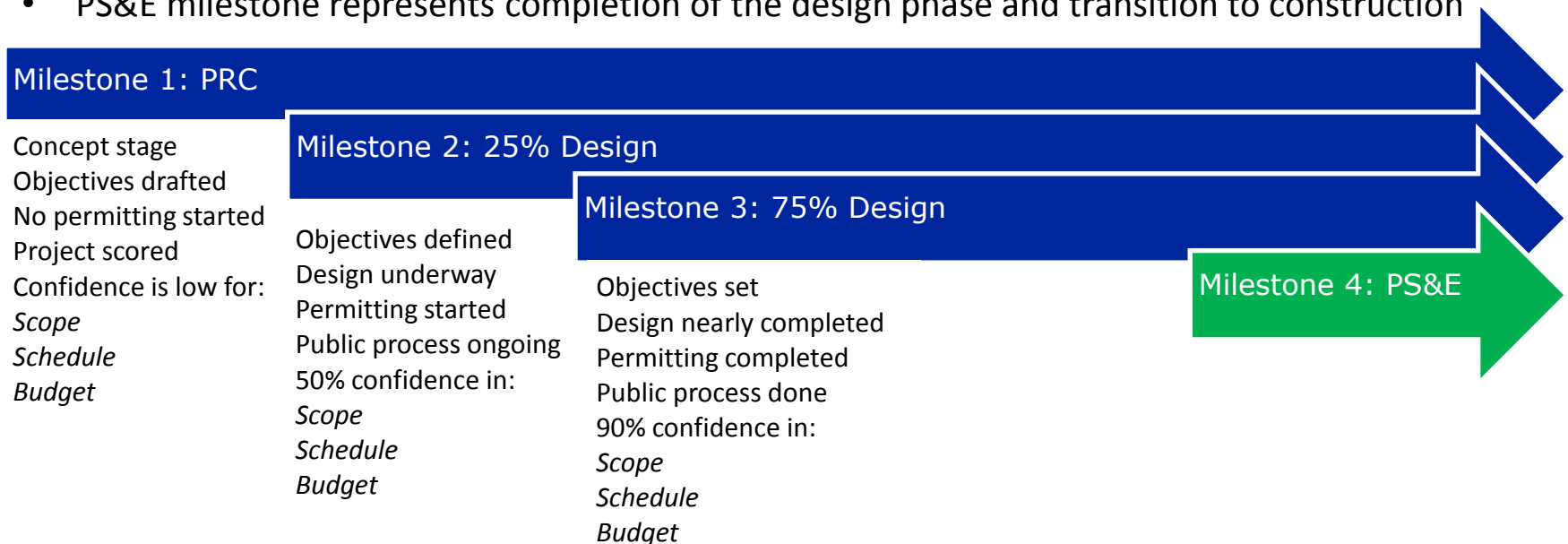
Today's Agenda

- Review details of cost estimating for Highway Division projects
- Provide historical data on project cost increases
- Propose a policy to codify Board oversight of projects during Design Phase

Highway Division Major Projects Discussion - Continued

Design phase is the advancement of the scope, schedule and budget for individual projects from concept (PRC) to final design (Plans, Specifications and Estimate (PS&E))

- Highway Division uses a series of milestones to advance projects from concept to final design
- Guidelines are used to advance the scope, schedule and cost estimate at each milestone
- Each stage has inherent confidence levels
- PS&E milestone represents completion of the design phase and transition to construction



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Historical data on cost increases during design phase

- Over 1,200 projects analyzed (2010 to present)
- PRC estimates inflated to year of advertisement, compared to Final estimate
- Average change shown, grouped roughly by CIP Program (Bridge Program broken out for capital and maintenance)

Program	# Projects	Average Increase
ROADWAY RECONSTRUCTION	113	22%
MULTI USE PATH	16	16%
FACILITIES	77	12%
INTERSTATE DOT PAVEMENT	41	11%
BRIDGE CAPITAL	114	10%
BRIDGE MAINTENANCE	210	8%
ROADWAY MAINTENANCE	506	6%
NON INTERSTATE DOT PAVEMENT	127	4%
ITS	30	4%

- Internal guidance provided to Designers & Project Managers in Summer with recommended design contingency % for Bridge and Roadway Projects.

Highway Division Major Projects Discussion - Continued

Major Components of Highway Division Project Costs - Items on right are recent process improvements which are intended to account for risk/uncertainty

Construction Estimate

- AKA Office Estimate
- At conceptual design, based on aggregate cost factor (e.g. cost/unit area)
- As design progresses, based on unit costs and quantities of work items

Allowance Items

- Includes Traffic Police
- Based on Guidance from Construction Section

Construction Contingency

- % of office estimate, for use in quantity overruns

Inflation

- FHWA Recommends 4%, compounded annually to the mid point of construction
- TIP currently used 4% to year of Advertisement
- Cash flow system calculates 4% to midpoint of construction

Design Contingency

- Based on Historical Data, to account for risk in design
- Value decreases as design becomes better defined

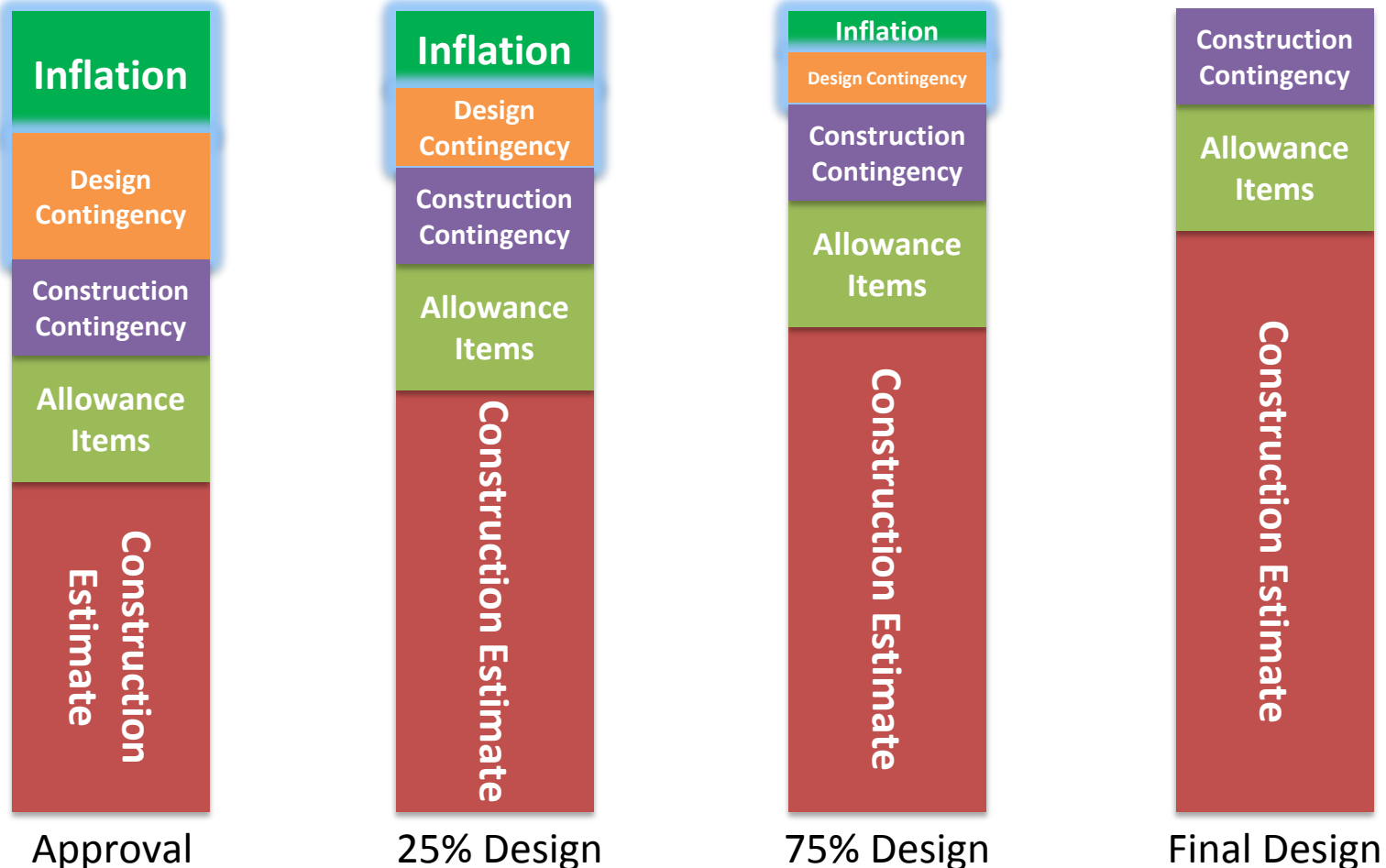
Utility Contingency

- Line item for conceptual cost of utilities
- Attributed to utilities once specific scope is identified, or removed

Introduced in Summer 2017

Highway Division Major Projects Discussion - Continued

Design Contingency (and Utility Contingency), along with inflation, are included to approximate actual construction costs during design development. As uncertainty & time are reduced, so too are these factors



Highway Division Major Projects Discussion - Continued

Utility Relocation Costs & Contingency

- First introduced with the Accelerated Bridge Program, MassDOT reimburses 50% of the cost to relocate utilities on Highway Division Projects on an incentive basis
 - › Incentive: Payment made only if relocation work is performed within agreed upon schedule
- Schedule based on durations provided by utilities during project development
- Utility relocation reimbursement agreements are handled under contract with each respective utility, separate from the construction contract
- Utility Contingency instituted for two purposes
 - › Ensure amount programmed in TIP includes utility costs (avoid amendments)
 - › Account for Utility Costs in overall Project budget at early stage

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Policy for Board review of Highway Projects during design phase

Applicable to projects with estimated costs (total construction contract) in excess of \$50 million

- Highway Division to present project to Board upon receipt of approved 25% submission
 - › Demonstrate appropriate scope has been chosen for project
 - › Demonstrate project design encompasses intended scope
 - › Demonstrate confidence in cost estimate
 - › Demonstrate funding in place (finance plan where applicable)
- Highway Division to notify board in the event that subsequent design submission exceed 25% stage estimate by 10% or more