

NCHRP Synthesis 38-01 Quality Assurance in Design-Build Projects AASHTO SOC 2008

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Quality Assurance Practices

- ❖ Synthesis Scope: to address how QA is conducted in the following DB delivery methods:
 - Design-Build
 - Design-Build-Maintain
 - Design-Build-Operate-Maintain
 - Finance-Design-Build-Operate-Maintain
- ❖ Major thrust: define proper level of owner quality management activities.





Literature Review

- ❖ Lots written about QA – very little written about QA in the DB context.
- ❖ Major theme: “the fox may be guarding the henhouse.”
- ❖ Content analysis of DOT DB policy documents – either silent or overly general on QA in DB.
- ❖ Almost nothing written on the subject of design quality in DB.





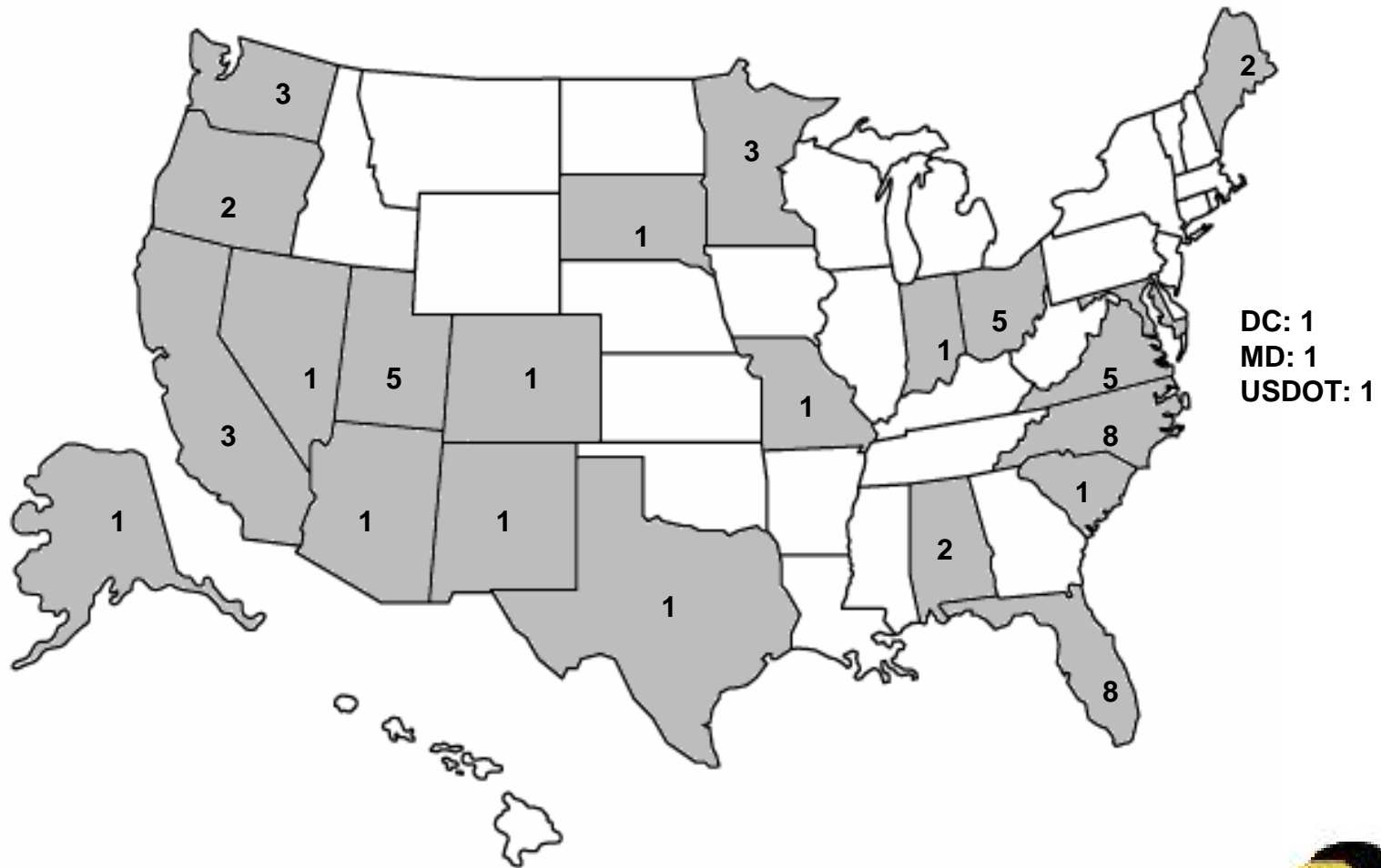
38-01 DB RFP Content Analysis

- ❖ 60 transportation DB RFPs from 24 states, 1991 - 2006
- ❖ Majority since 2000
- ❖ 16 roadway projects
- ❖ 13 bridge projects
- ❖ 23 combined roadway/bridge
- ❖ 8 other





DB RFP Geographic Distribution





38-01 RFP Content Analysis

- ❖ Quality by Qualifications: 33
- ❖ Quality by Specified Program: 14
- ❖ Quality by Evaluated Program: 8
- ❖ Quality by Performance Criteria: 3
- ❖ Quality by Warranty: 1
- ❖ Quality by Performance Criteria: 0





38-01 RFP Content Analysis

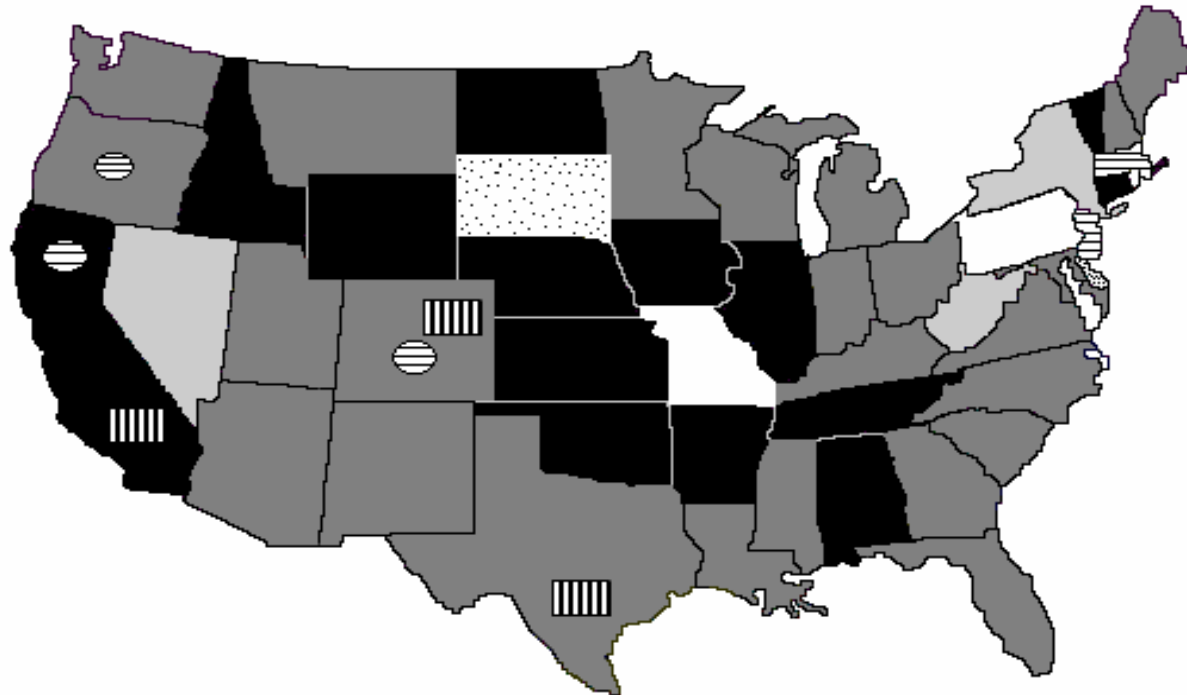
- ❖ RFP division of quality management responsibilities:
Verification and acceptance testing

DOT QA only	31
Design-builder QA only	2
DOT & 3rd party	2
DOT & Design-builder	1
Design-builder & 3rd party	1
Can't tell from RFP	23





Survey Responses



AK HI DC

DOT NO DB	
DOT Future DB	
DOT Yes DB	
Other Response	

DOT Partial Response	
Non-DOT Agency Yes DB	





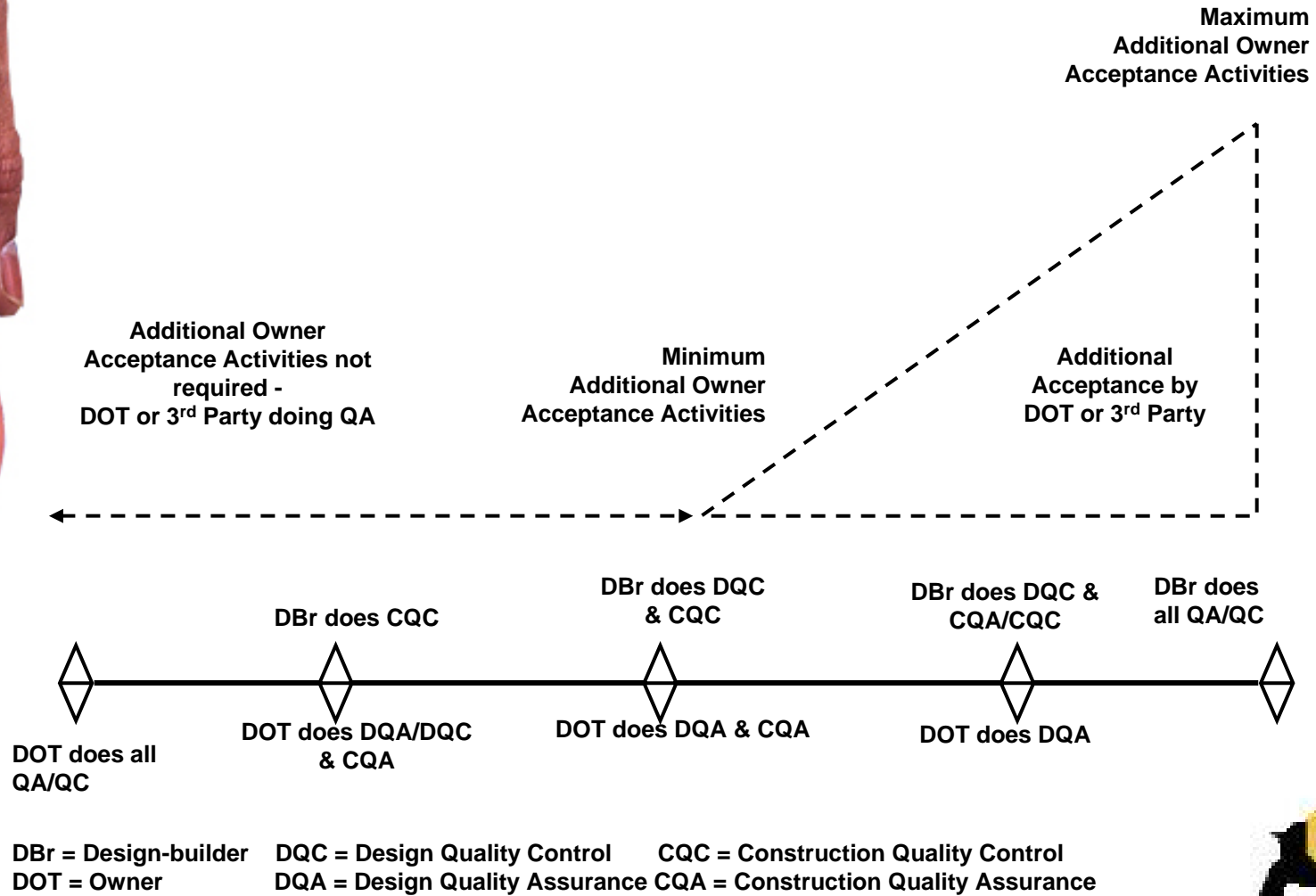
DB Project QA Model

- ❖ Owner's responsibilities in DB termed "project quality assurance" or PQA
- ❖ Includes for BOTH design and construction:
 - Oversight
 - Independent assurance
 - Verification
 - Acceptance
- ❖ Owner delegates the specific responsibilities for design and construction QA & QC in its RFP.



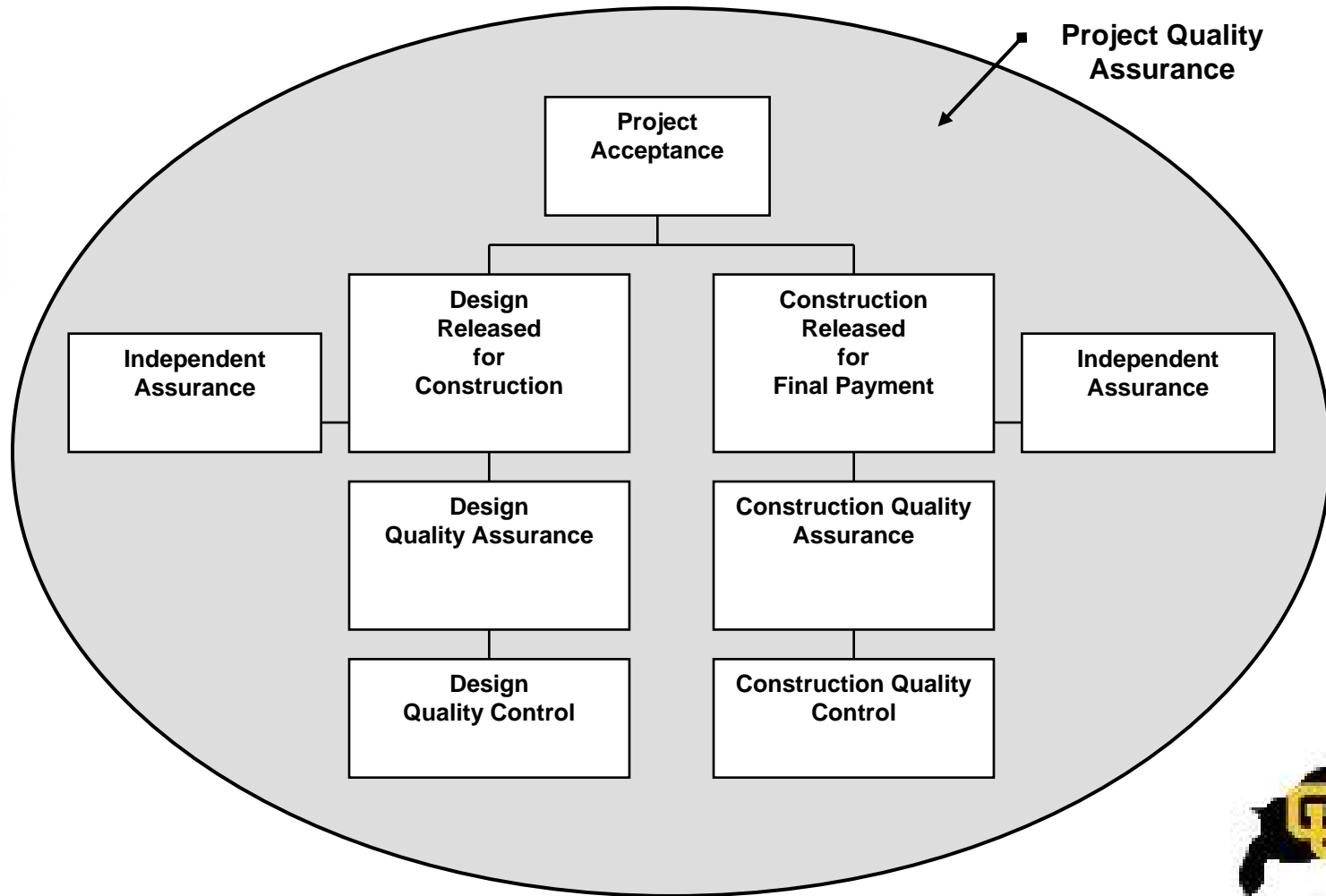


Quality Management Spectrum





Design-Build Project Quality Assurance Model





Possible DB Quality Management Organizations

	Design QA	Design QC	Construction QA	Construction QC	Comments
Type 1	DBr	DBr	DBr	DBr	DOT oversight of design and construction
Type 2	DBr	DBr	DOT or 3 rd	DBr	DOT and 3 rd party share construction QA
Type 3	DBr	DBr	DBr and DOT	DBr	DOT and DBr share construction QA
Type 4	3 rd	DBr	3 rd	DBr	3 rd party QA; DBr QC
Type 5	3 rd and DBr and DOT	DBr	3 rd and DBr and DOT	DBr	QA is shared; DBr QC
Type 6	DOT	DBr	DBr	DBr or 3 rd	DOT Design QA only
Type 7	DBr	DBr	DOT	DBr or 3 rd	DOT oversight of design
Type 8	DOT	DBr	DOT	DBr	DOT QA; DBr QC
Type 9	DOT	DBr	DOT or 3 rd	DBr or 3 rd	3 rd party is involved in construction QA or QC
Type 10	DBr and DOT	DBr	DOT	DBr	DOT & DBr share Design QA only
Type 11	DBr and DOT	DBr	DBr and DOT	DBr	DOT & DBr share QA
Type 12	DOT	DOT	DBr	DBr	DOT oversight of construction
Type 13	DOT	DOT	DOT	DBr	DBr Construction QC only; traditional DBB QM
Type 14	DOT	DOT	DOT	DOT	Force account project done with DOT forces

NOTE: DBr = Design-builder; DOT = Department of Transportation (i.e. the project's owner); 3rd = Third party (independent firm retained to conduct QA and QC or independent assurance responsibilities)





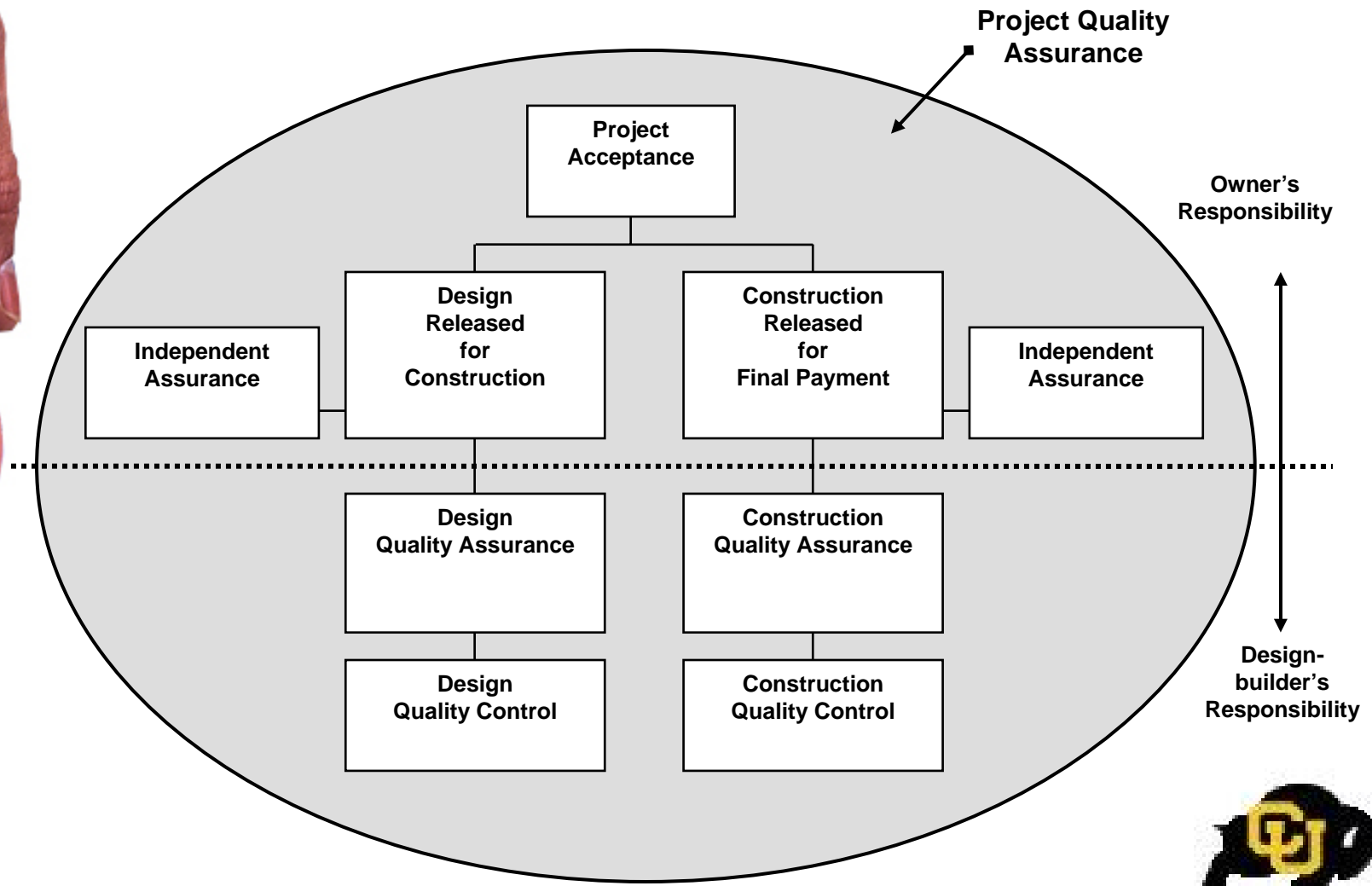
Possible QA Responsibility Assignment

Responsible Entity		Design	Construction
Design-Builder's Project Quality Manager	Design-Builder's Construction Quality Manager	Coordination/ communication as required	Construction Quality Control: the responsibility of the <i>Construction Quality Manager</i> .
	Design-Builder's Design Quality Manager	Design Quality Control: the responsibility of the <i>Design Quality Manager</i>	Construction Quality Assurance: the responsibility of the <i>Design Quality Manager</i>
Department of Transportation plus 3 rd party quality consultants (if required)		Design Quality Assurance: verification and reviews by the <i>DOT and/or 3rd party quality consultants</i> . Includes over-the-shoulder reviews, compliance checks, and audits.	Project Quality Assurance: audits and inspections of the construction performed by the <i>DOT and/or 3rd party quality consultants</i> . Includes testing, audits and independent verification/ acceptance.



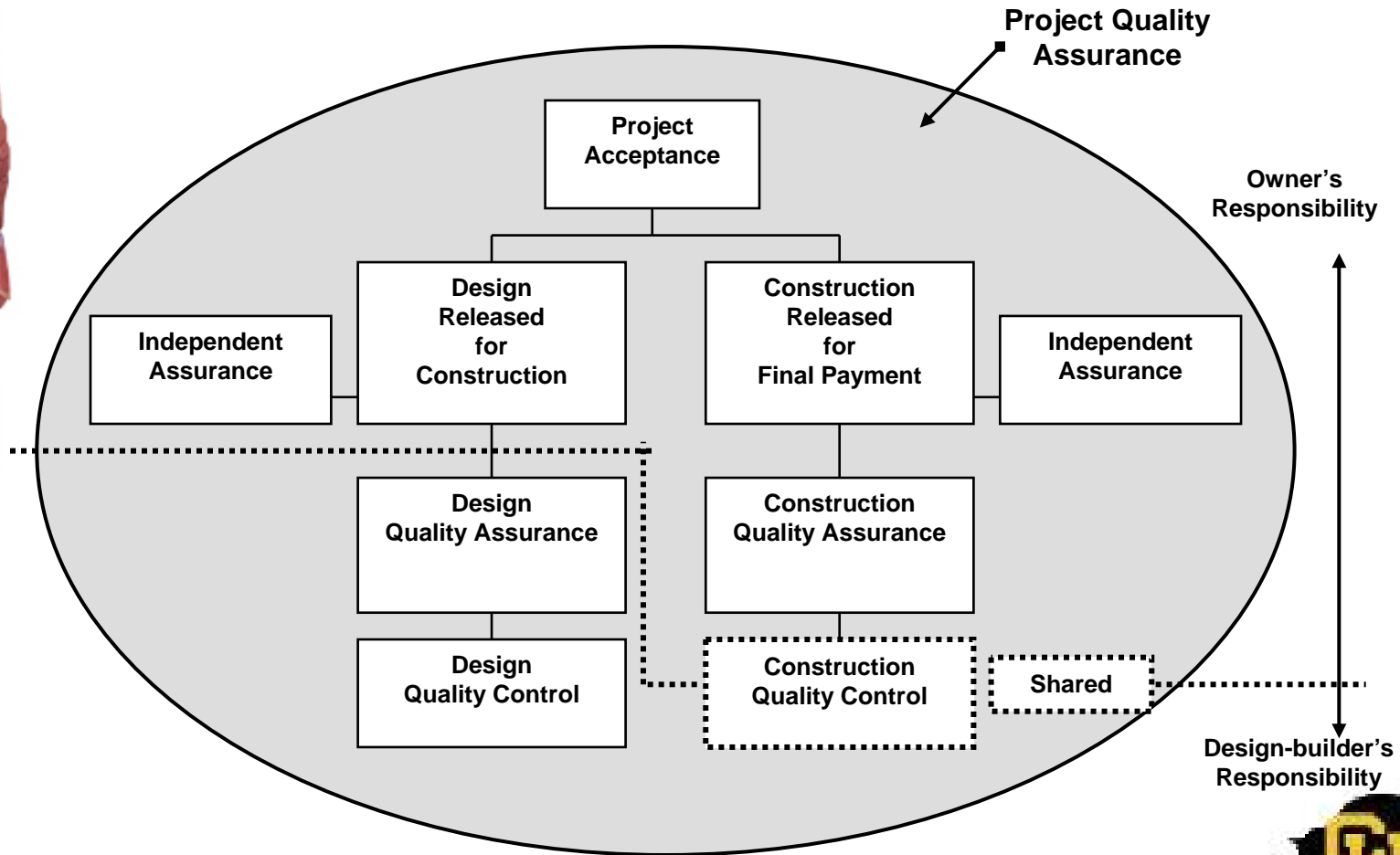


Type 1 QA Organization



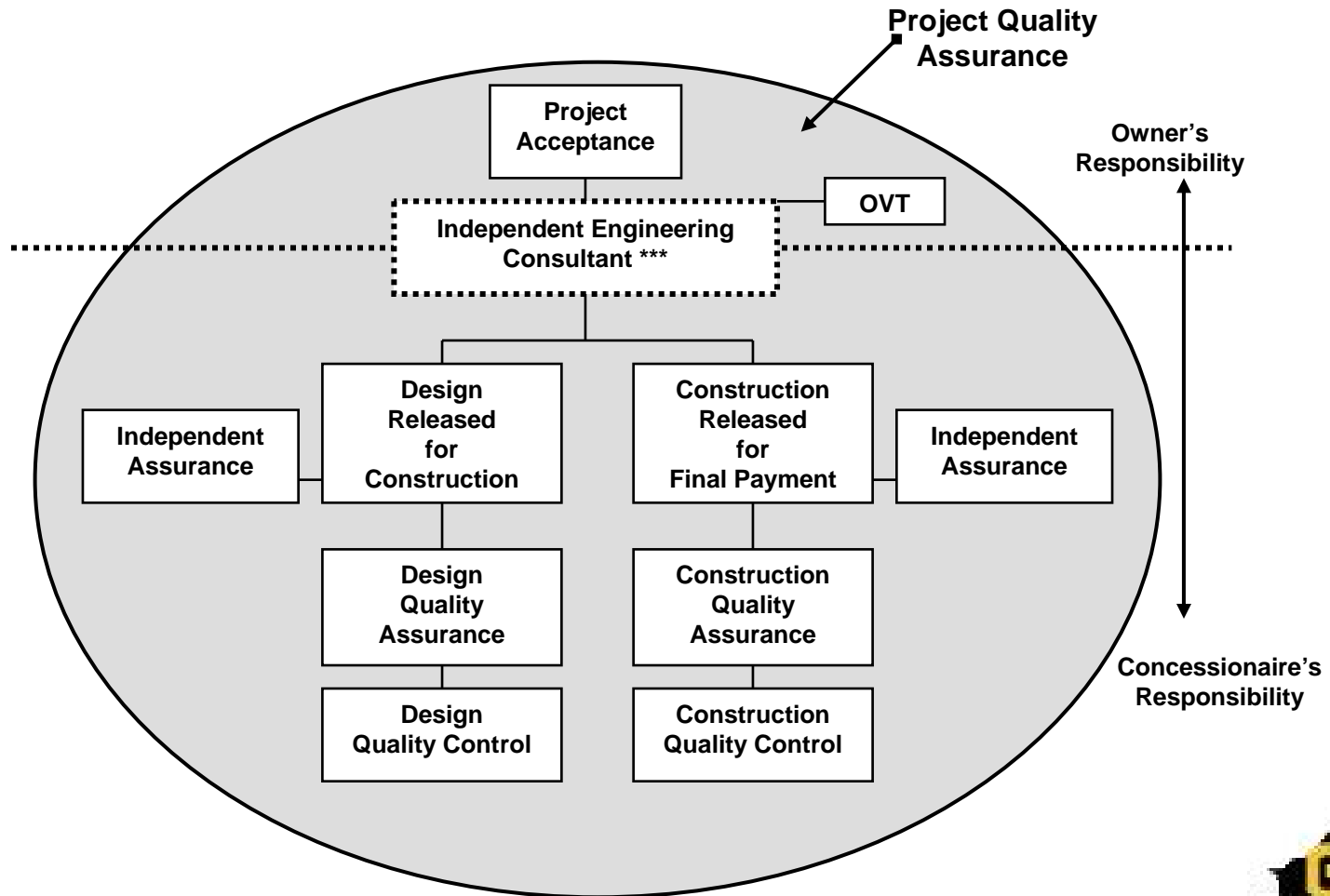


Type 7 QA Organization





QA Organization for PPP



*** The Independent Engineering Consultant is jointly hired by the owner and the concessionaire but 100% of the Owner Verification Testing (OVT) is paid for by the owner.





Conclusions

- ❖ DB solicitation documents and DOT DB policy documents should contain specific guidance regarding QA.
- ❖ New set of quality management activities – PQA
- ❖ Need to use a 2-step DB selection process to promote quality through quality-focused submittals in both steps
- ❖ 90% of DB RFPs used a best-value award. Allows quality to be emphasized through weighting scheme





Conclusions

- ❖ Design quality management is not receiving sufficient emphasis in DB.
- ❖ DOTs incorporate standards specs and allow the design-builder to optimize means and methods.
- ❖ Perception that DB will degrade quality persists and should be considered when DOTs develop their DB quality management programs.





Summary

- ❖ DOT cannot transfer its ultimate responsibility for quality through its DB contracts...therefore, each project's PQA plan should be established at the earliest stage of project development
- ❖ Final report should be published in the next couple months.
- ❖ Will be available free on the TRB Synthesis web site.

