The State of Transportation Project Delivery in North America

.....and what we can do about it

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SASHTO 2014

New Orleans

SASHTO
NEW ORLEANS, LOUISIANA
2014

PSMJ | Resources, Inc.®

How Well Do You Think We Are We Doing At Managing Transportation Projects?

According to a 2007 AASHTO report:

54 % of projects exceeded the original bid

19 % exceeded the original bid by >10%

On larger projects (>$5M)

82 % exceeded the original bid

30% exceeded the original bid by >10%

Only 53 % of all projects were delivered on time

On larger projects (>$5M), only 35 % of projects were delivered on time.

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Why Do Projects Fail?

Over ½ blamed on *"construction surprises"*

- *Sub-surface conditions*
- *Utility relocations*
- *Environmental Issues*

Lack of regularly scheduled oversight procedures

- *Scope*
- *Budget & Schedule*
- Risk

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What Really Controls Project Costs?

Construction Cost Growth is Not only the Problem…

But a Symptom of pre-construction shortcomings!

Courtesy: Resolution Management Consultants

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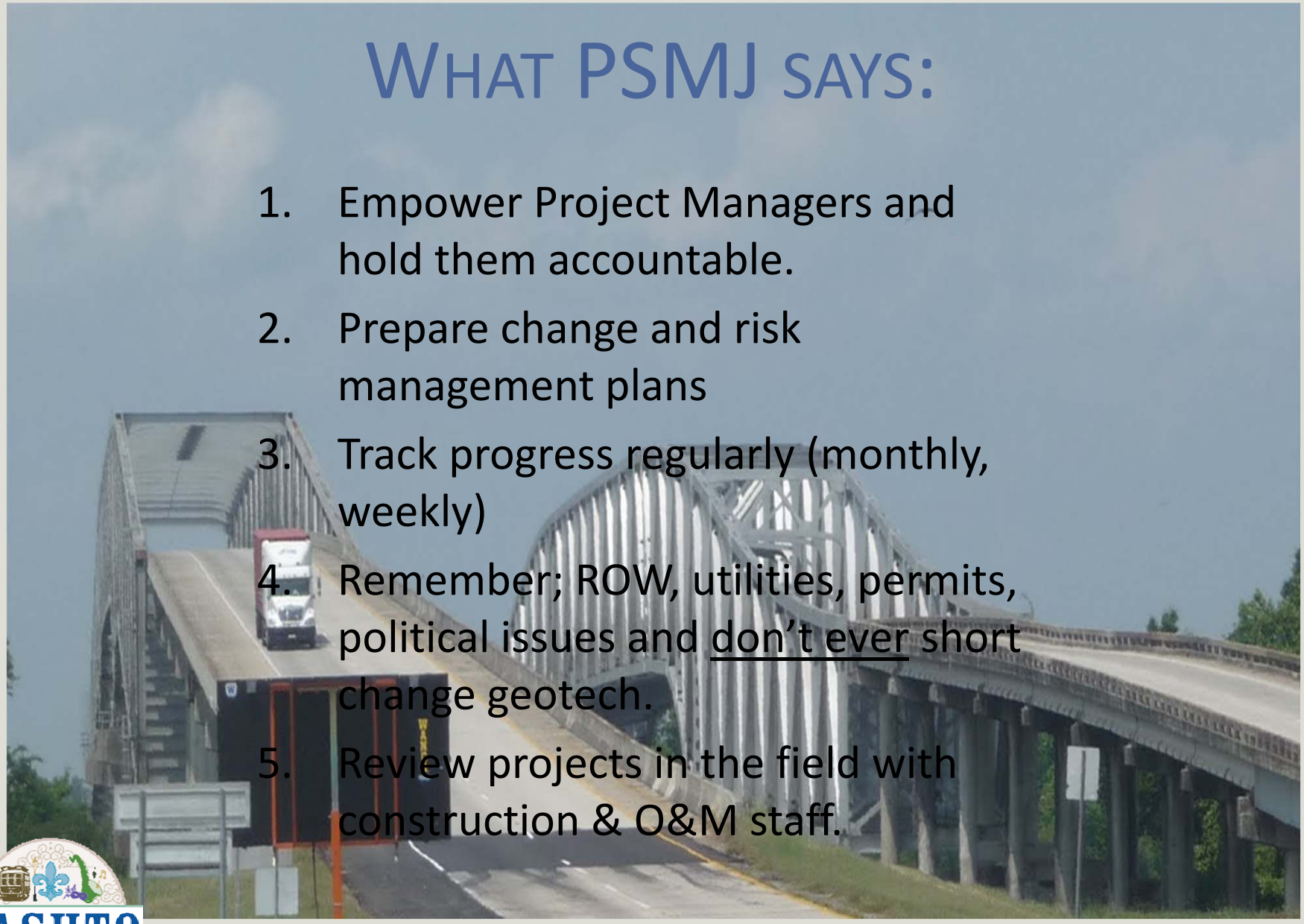
7 BEST PRACTICES

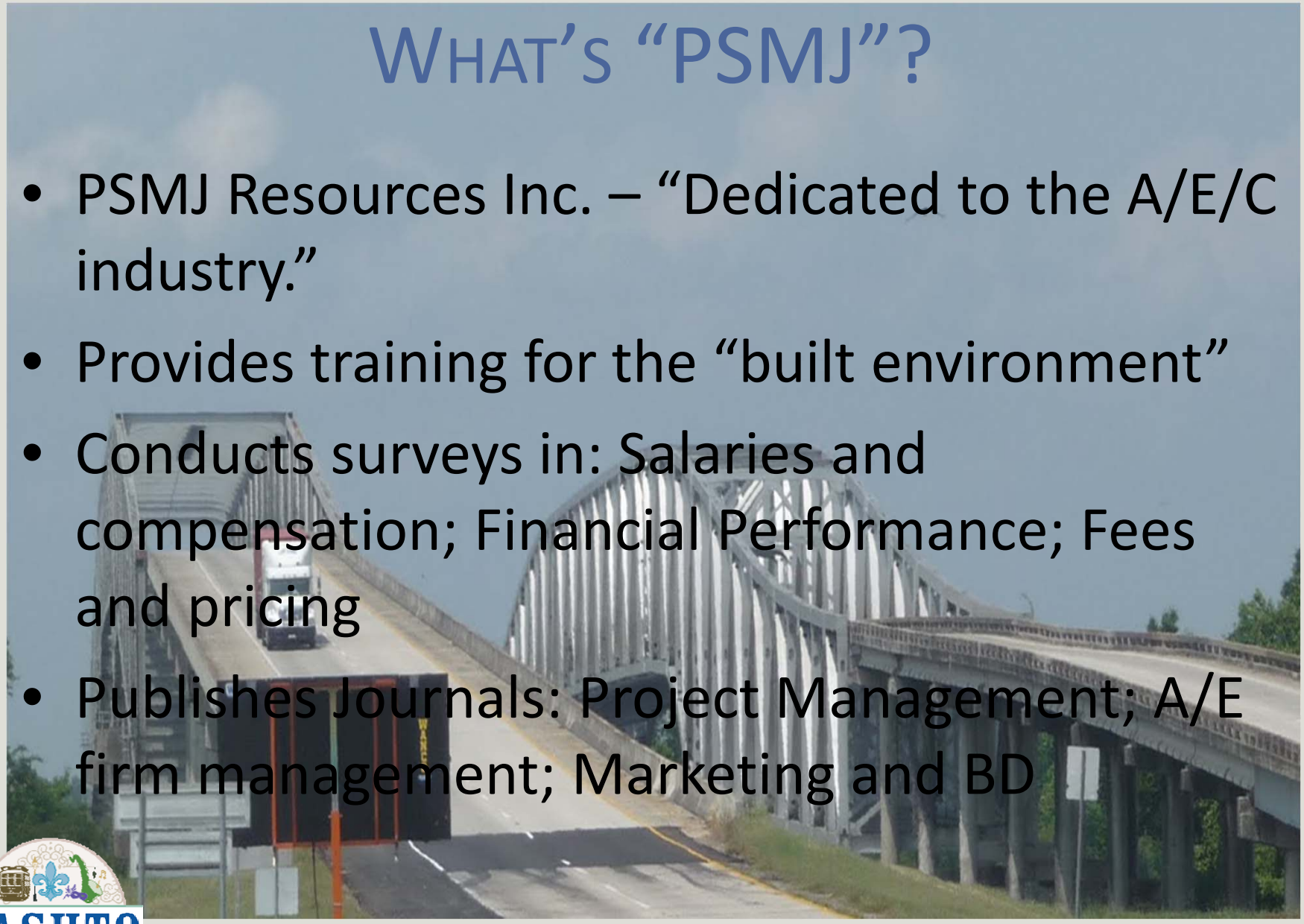
1. Build a PM Culture
2. Integrate Phases
3. Formal release for construction process
4. Manage ROW, Utilities Permits like design
5. Establish a PM status reporting system
6. Don't rely on software
7. *Develop Risk and Change management plans*

WHAT PSMJ SAYS:



1. Empower Project Managers and hold them accountable.
2. Prepare change and risk management plans
3. Track progress regularly (monthly, weekly)
4. Remember; ROW, utilities, permits, political issues and don't ever short change geotech.
5. Review projects in the field with construction & O&M staff.

WHAT'S "PSMJ"?



- PSMJ Resources Inc. – "Dedicated to the A/E/C industry."
- Provides training for the "built environment"
- Conducts surveys in: Salaries and compensation; Financial Performance; Fees and pricing
- Publishes Journals: Project Management; A/E firm management; Marketing and BD

REMEMBER THE 7 BEST PRACTICES

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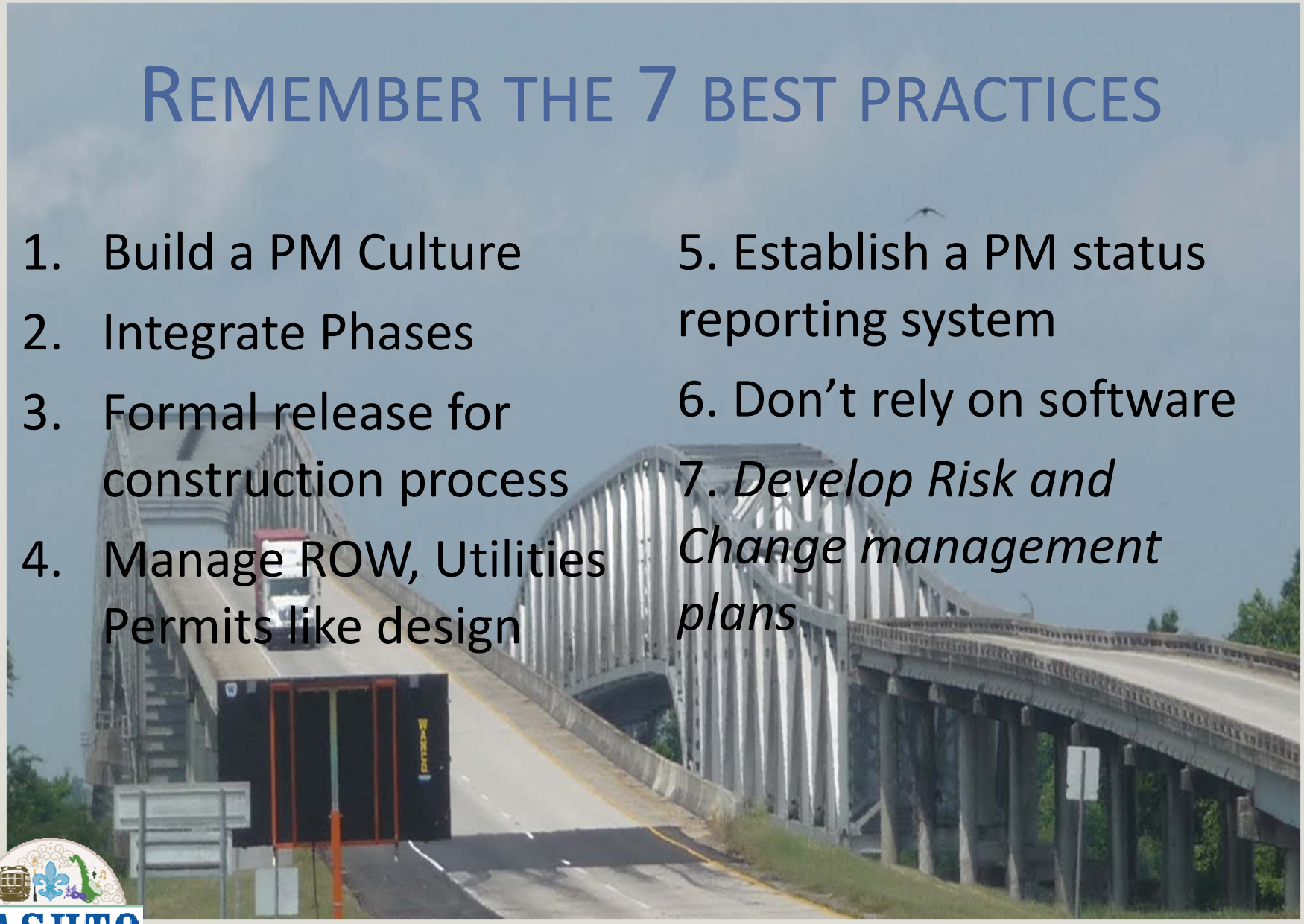
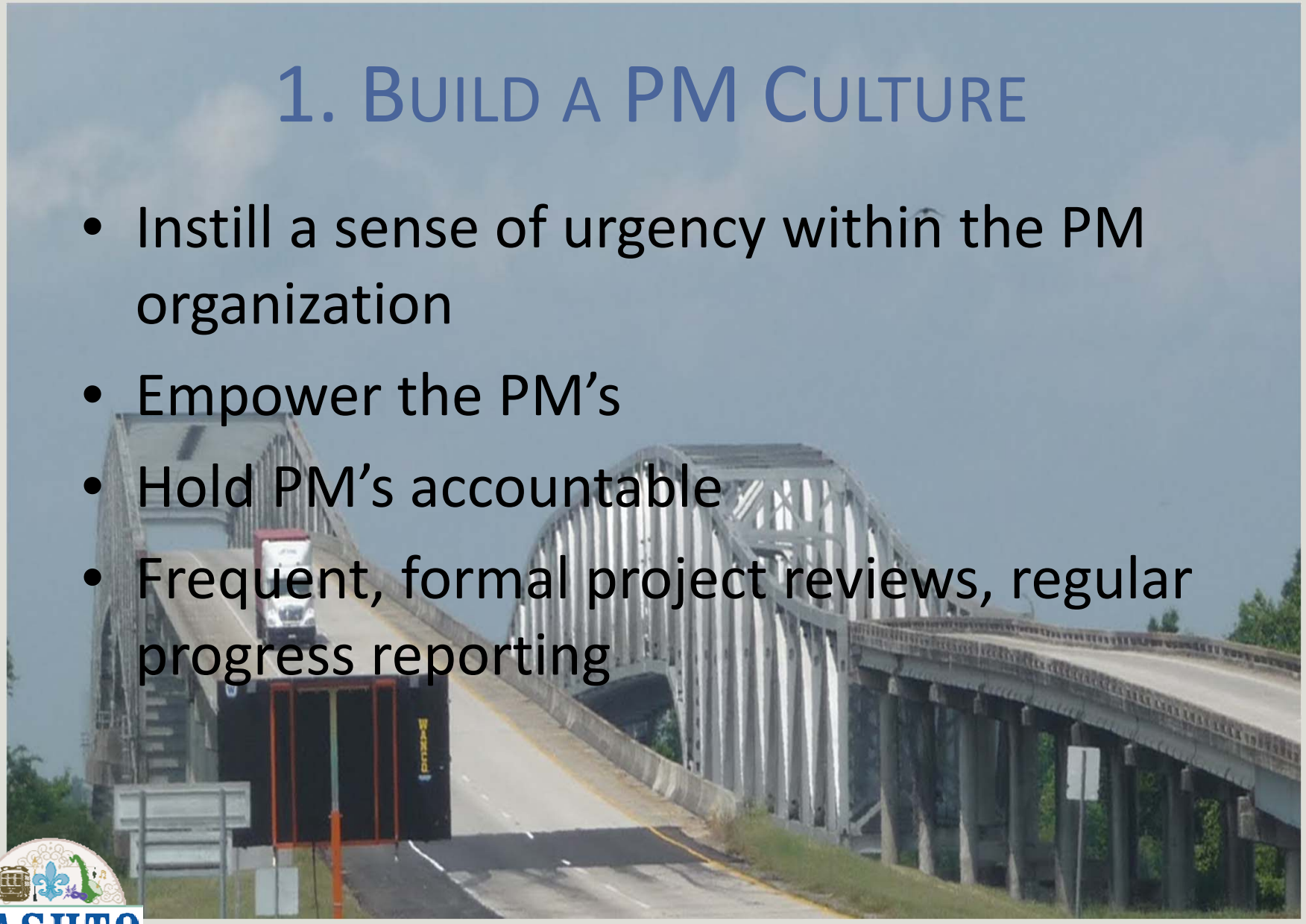


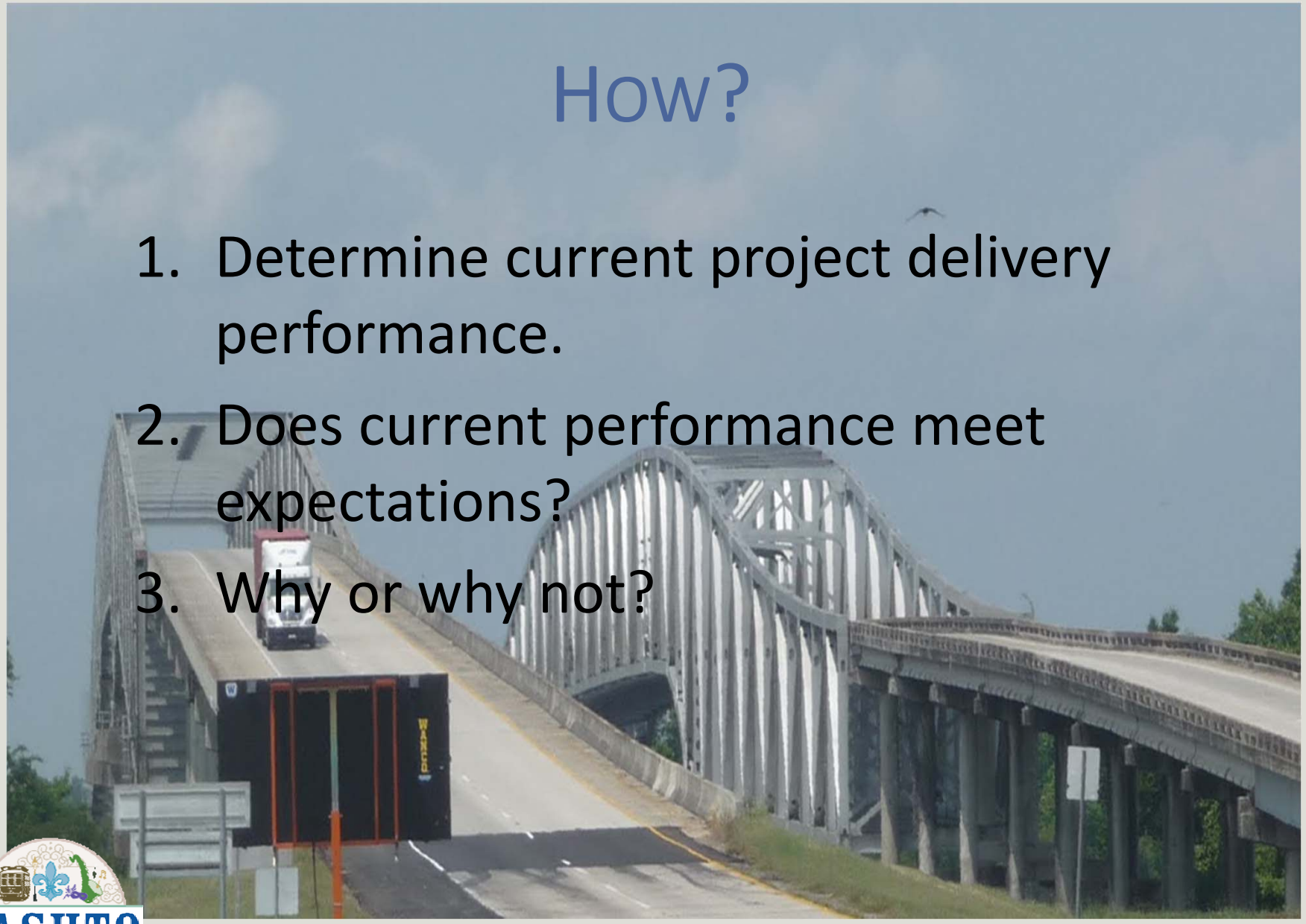
1. Build a PM Culture



- Instill a sense of urgency within the PM organization
- Empower the PM's
- Hold PM's accountable
- Frequent, formal project reviews, regular progress reporting

How?

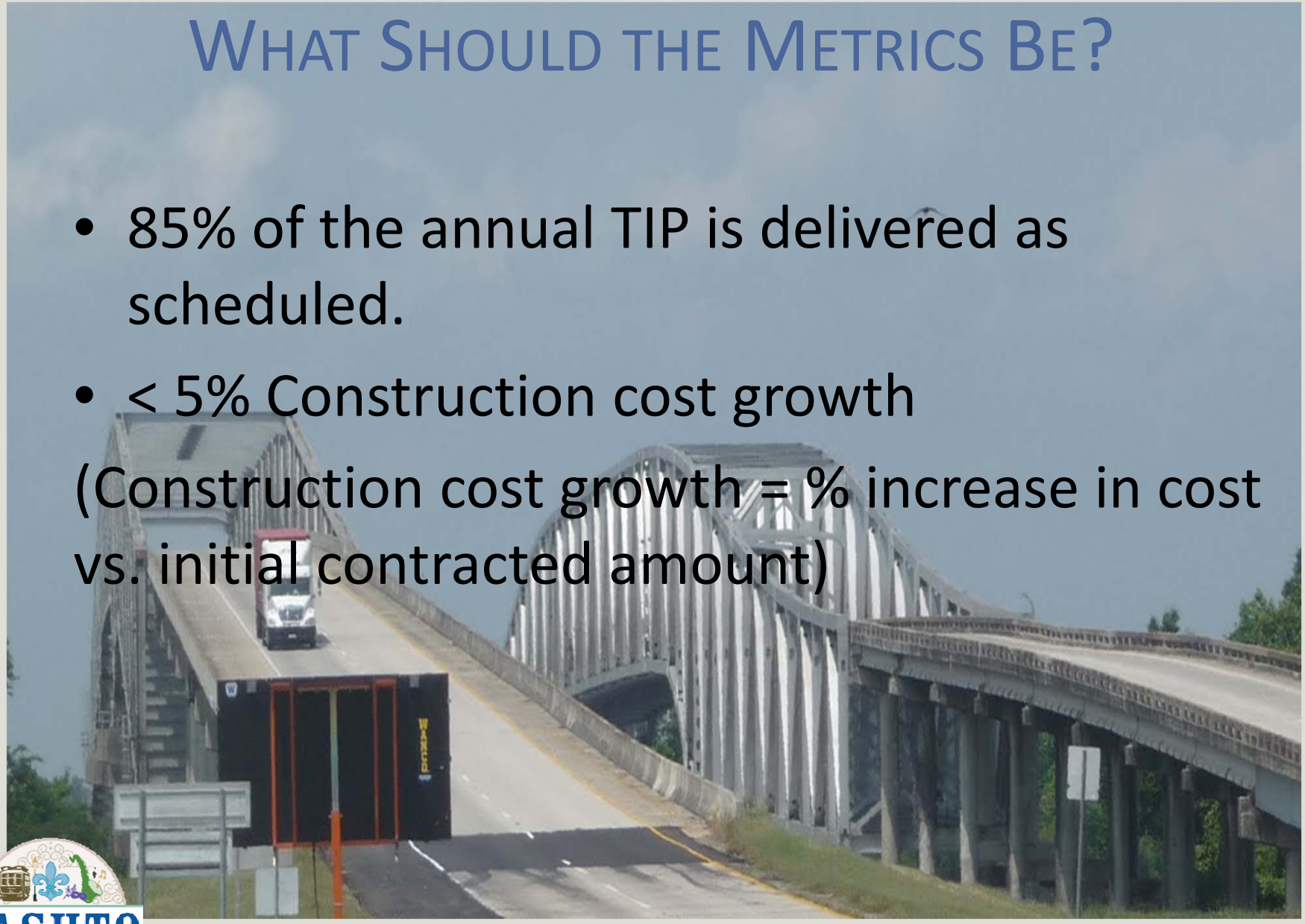
1. Determine current project delivery performance.
2. Does current performance meet expectations?
3. Why or why not?



What Should the Metrics Be?

- 85% of the annual TIP is delivered as scheduled.
- < 5% Construction cost growth

(Construction cost growth = % increase in cost vs. initial contracted amount)



Construction Cost Growth

Causes:

Scope changes: We want something different than the contract docs.

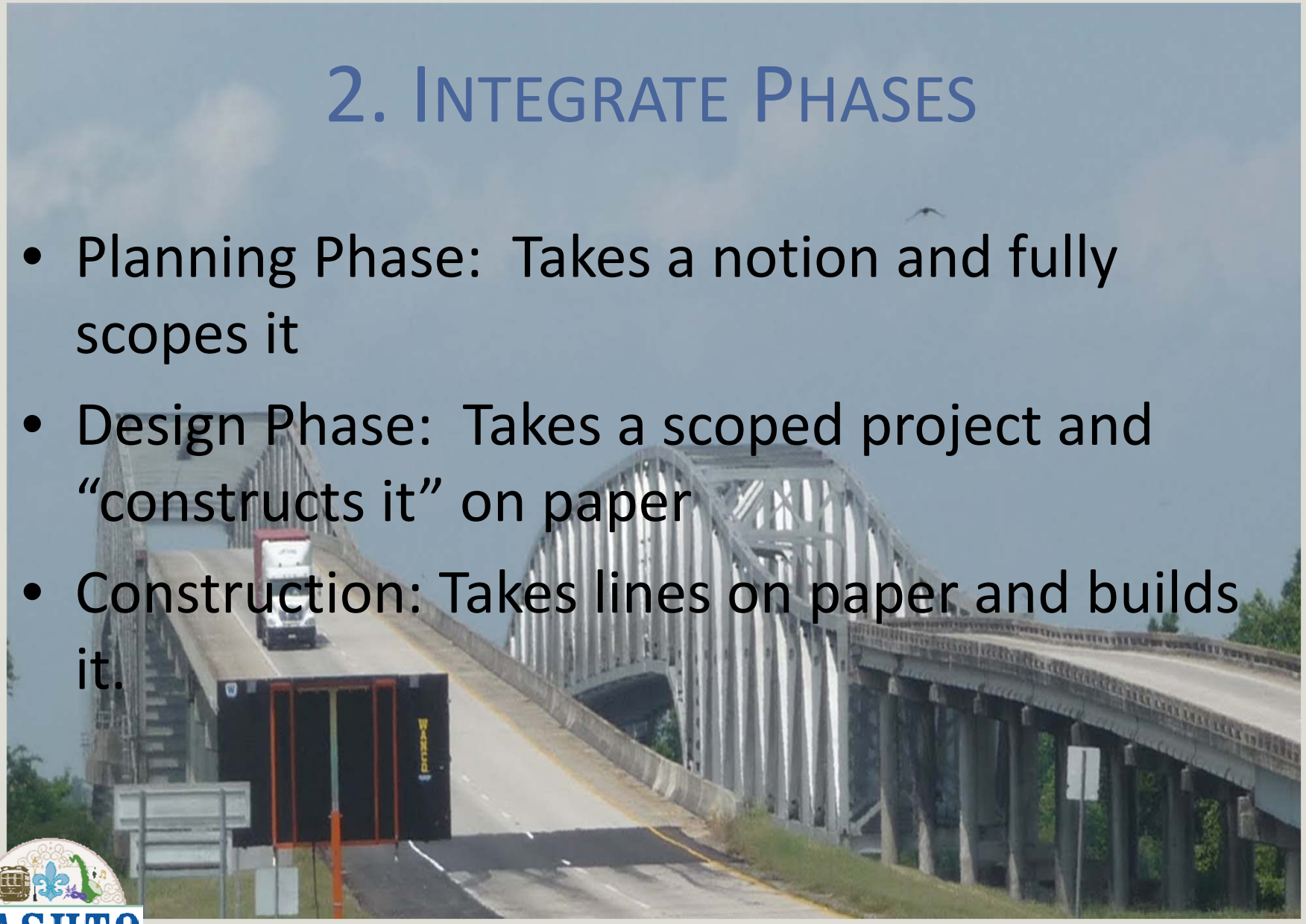
Condition changes: Something that could not be reasonably anticipated.

Design changes: The designer changed something (design error)

Add-on by Partner: Stakeholder wants something different and will pay.

	Original Contract Amou	vised Contract Amou	TOTAL Growth			
	88504293.21	92697778.77	4193485.56			
	Changed Scope	Changed Condition	Changed Design	Add-On by Partner	Other Growth	**TOTAL Growth**
	379701.36	1363098.34	953534.95	1698922.21	-201771.3	4193485.56
% Growth	0.004290203	0.015401494	0.010773884	0.01919593	-0.002279791	**0.047381719**
		Avoidable Growth	0.012784295	(7/2000 - 12/2003)		

2. Integrate Phases



- Planning Phase: Takes a notion and fully scopes it
- Design Phase: Takes a scoped project and "constructs it" on paper
- Construction: Takes lines on paper and builds it.

Characteristics of Major Phases of Capital Projects and Contingency Needed (%)

Planning – 30%	Design – 12-15%	Construction – 5%
■ Scope is conceptual ■ Budget is conceptual ■ Schedule often programmed only ■ Low risk ■ Often political interest ■ Typically less technical than subsequent phases ■ Need to know "what it takes"	■ Scope usually defined ■ Budget defined but often subject to change ■ Schedule defined ■ Moderate risk ■ Less political involvement ■ Technical skills prevail	■ Scope well defined by contract docs. ■ Budget defined by bid ■ Schedule defined by contract terms ■ High risk to all parties ■ Typically little political involvement ■ Construction skills prevail

Phases of a Project

Planning – Takes the project from initial concept to something that is fully scoped and can be designed.

Charter

Design – Takes the scoped project, "constructs" it on paper so that it can be built in the field.

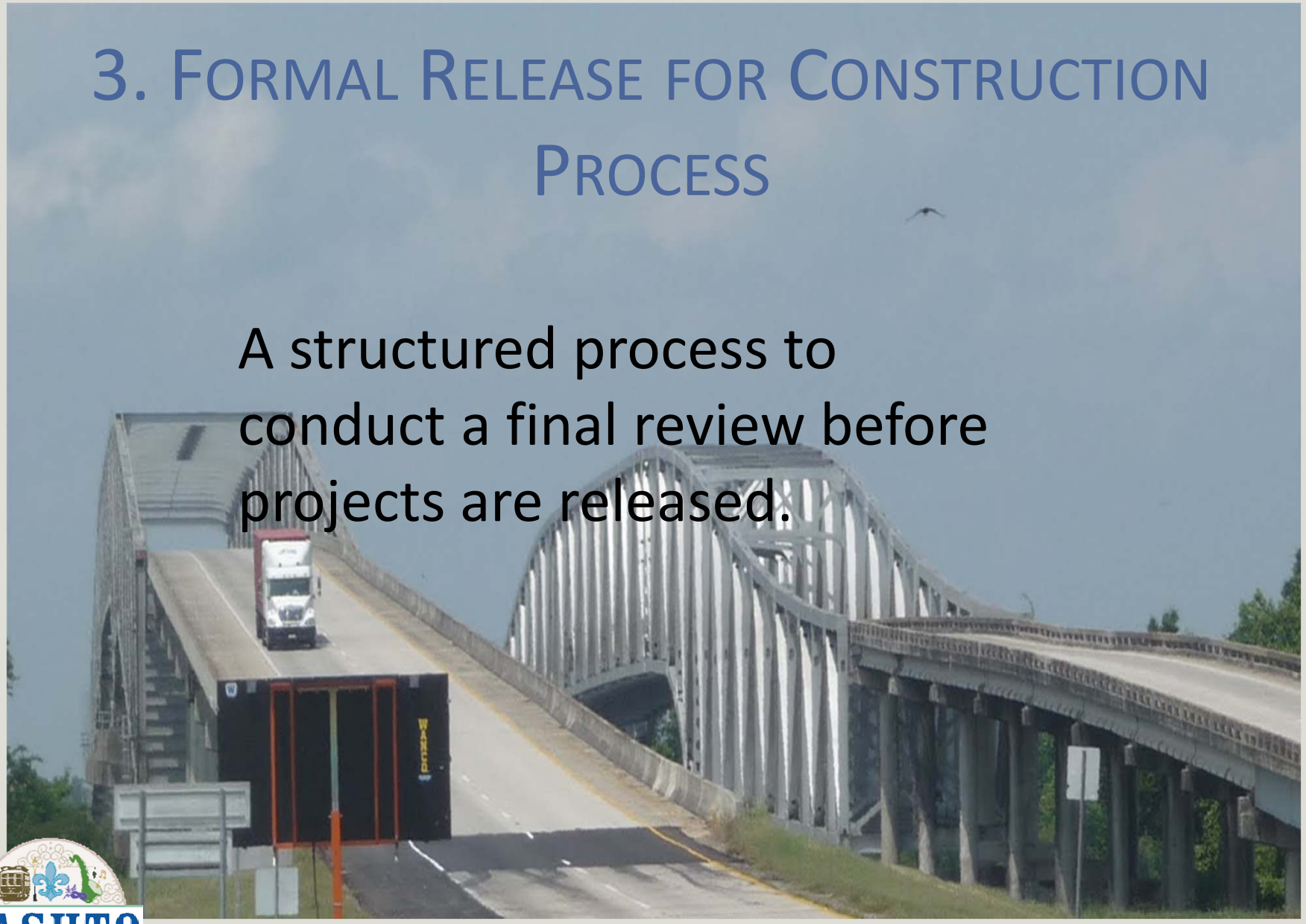
PS&E

Construction – Takes the project from ideas on paper and delivers it as a completed facility

Manuals Training

Operations and Maintenance – Uses what we build

3. Formal Release for Construction Process



A structured process to conduct a final review before projects are released.

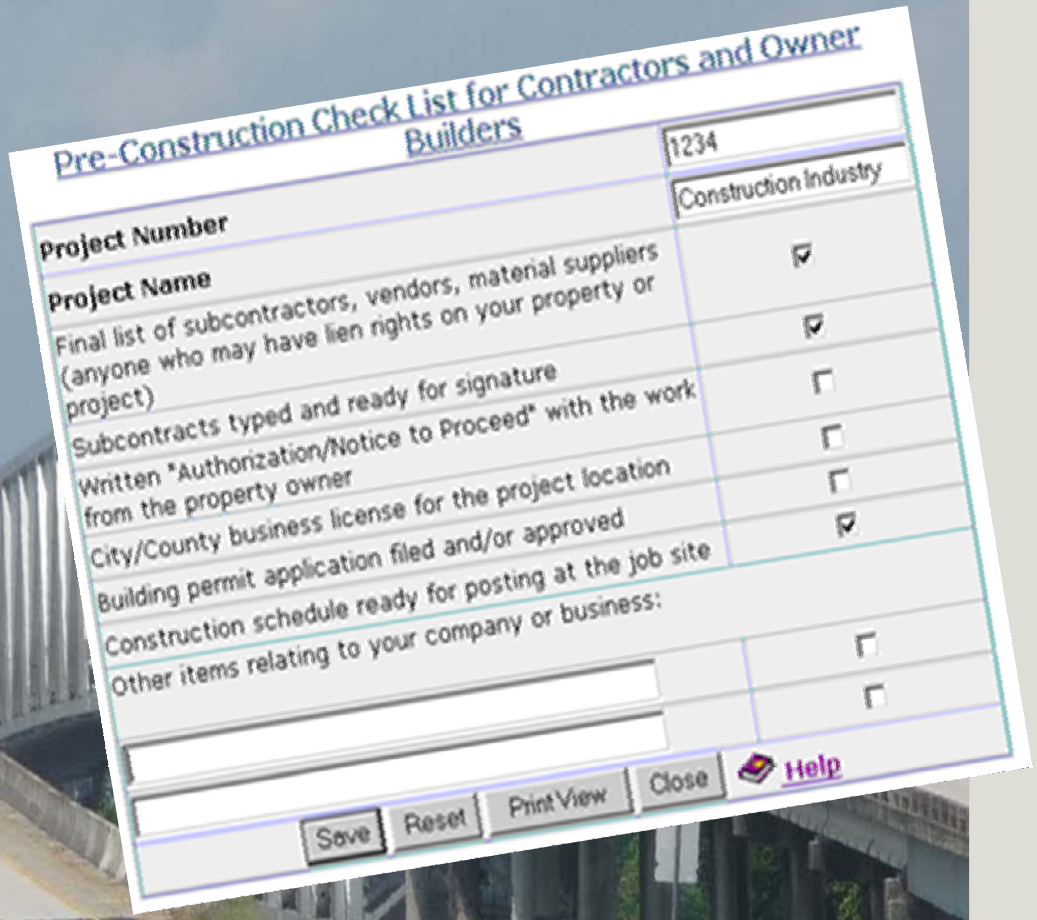
What Typically Happens Just Before A Project Is Released For Construction?

Consultant is out of budget
Schedule is against the wire
Everybody wants to review the design and comment
Stakeholders come out of the woodwork
Site conditions change

Project success is in jeopardy!

"Ready for Construction" Verification

- ✓ Based on your agency projects
- ✓ Modify as necessary for specific projects
- ✓ Use past data on "things that bite us"
- ✓ Monitor improvement and change/add as necessary
- ✓ Make this a "must use" protocol.



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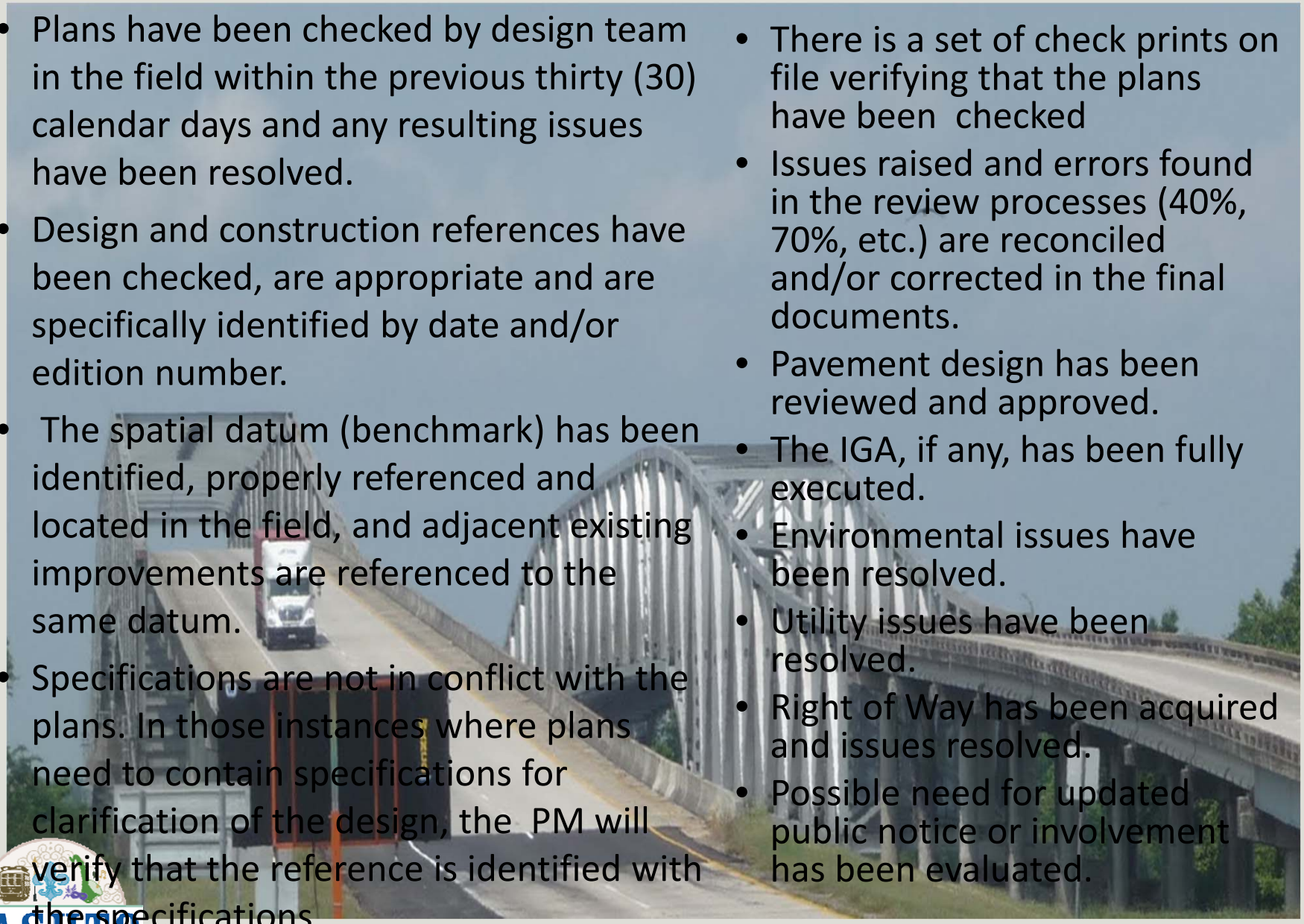
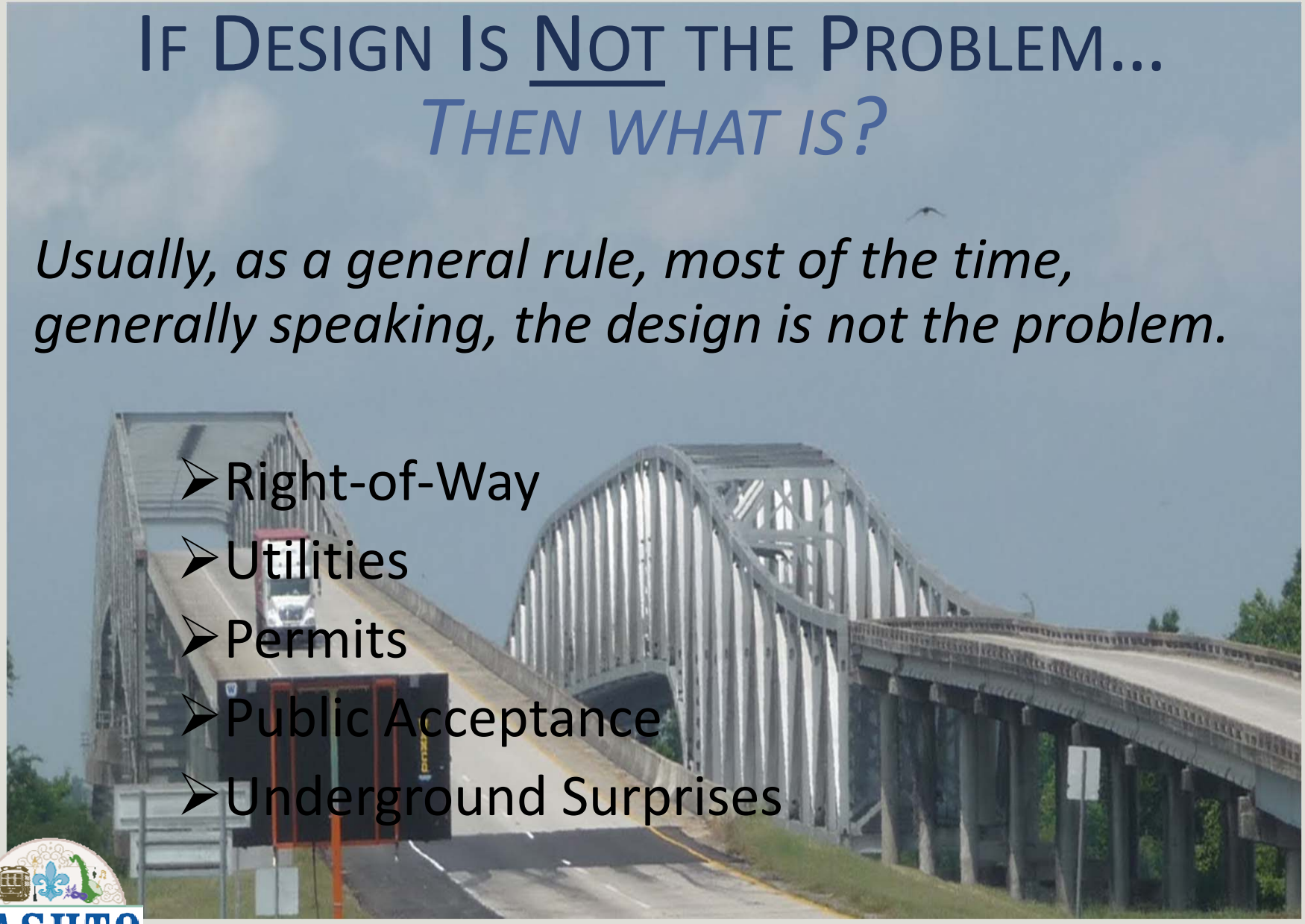


- Plans have been checked by design team in the field within the previous thirty (30) calendar days and any resulting issues have been resolved.
- Design and construction references have been checked, are appropriate and are specifically identified by date and/or edition number.
- The spatial datum (benchmark) has been identified, properly referenced and located in the field, and adjacent existing improvements are referenced to the same datum.
- Specifications are not in conflict with the plans. In those instances where plans need to contain specifications for clarification of the design, the PM will verify that the reference is identified with the specifications.
- There is a set of check prints on file verifying that the plans have been checked
- Issues raised and errors found in the review processes (40%, 70%, etc.) are reconciled and/or corrected in the final documents.
- Pavement design has been reviewed and approved.
- The IGA, if any, has been fully executed.
- Environmental issues have been resolved.
- Utility issues have been resolved.
- Right of Way has been acquired and issues resolved.
- Possible need for updated public notice or involvement has been evaluated.

IF DESIGN IS NOT THE PROBLEM…
THEN WHAT IS?

Usually, as a general rule, most of the time, generally speaking, the design is not the problem.

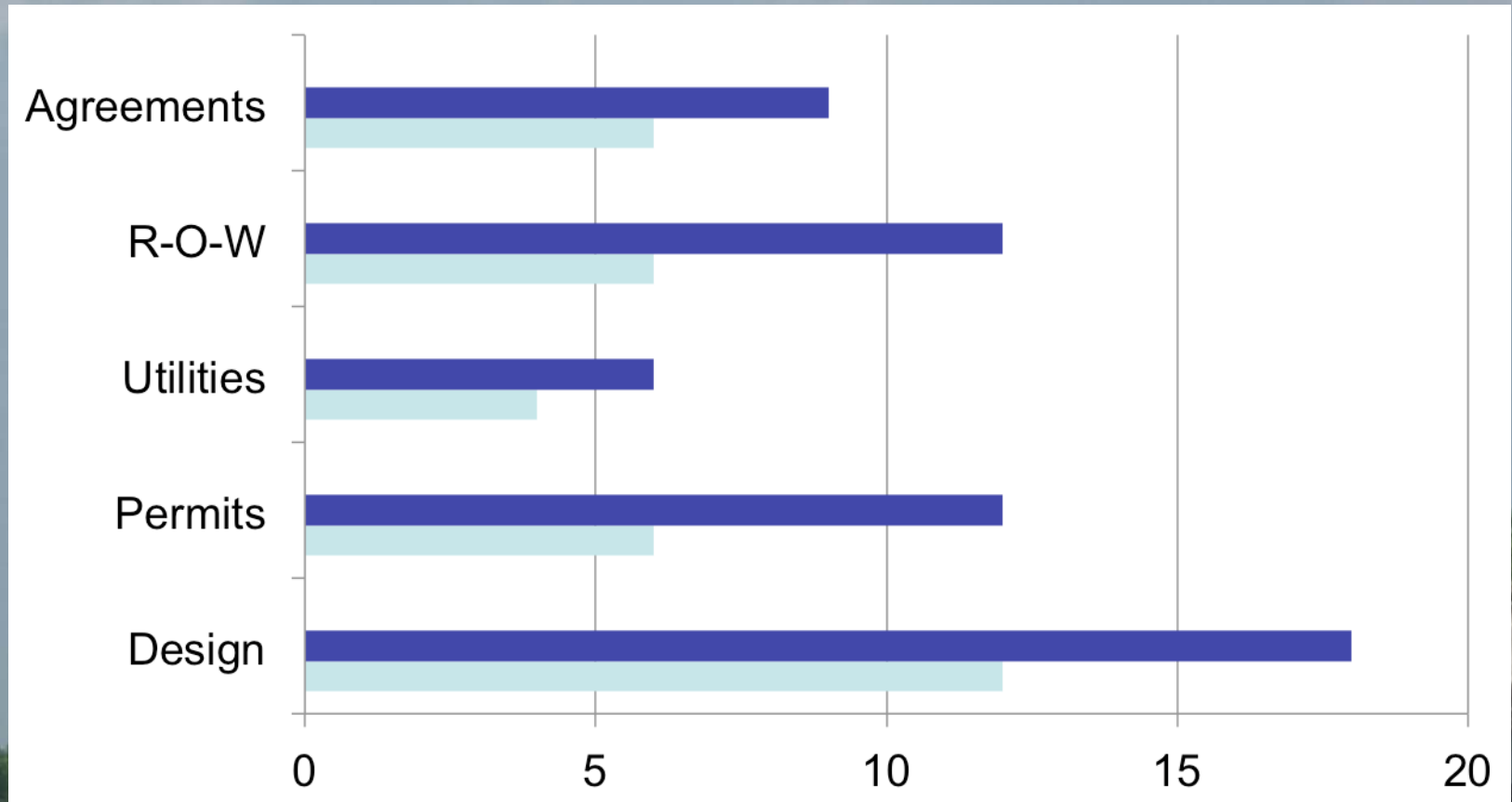


- Right-of-Way
- Utilities
- Permits
- Public Acceptance
- Underground Surprises

4. Manage ROW, Utilities Permits Like Design

- Fact: Design issues are usually not the cause of cost overrun and delay!

Manage These Activities As You Would the Design



Put these activities on your critical path and monitor progress as you monitor design.

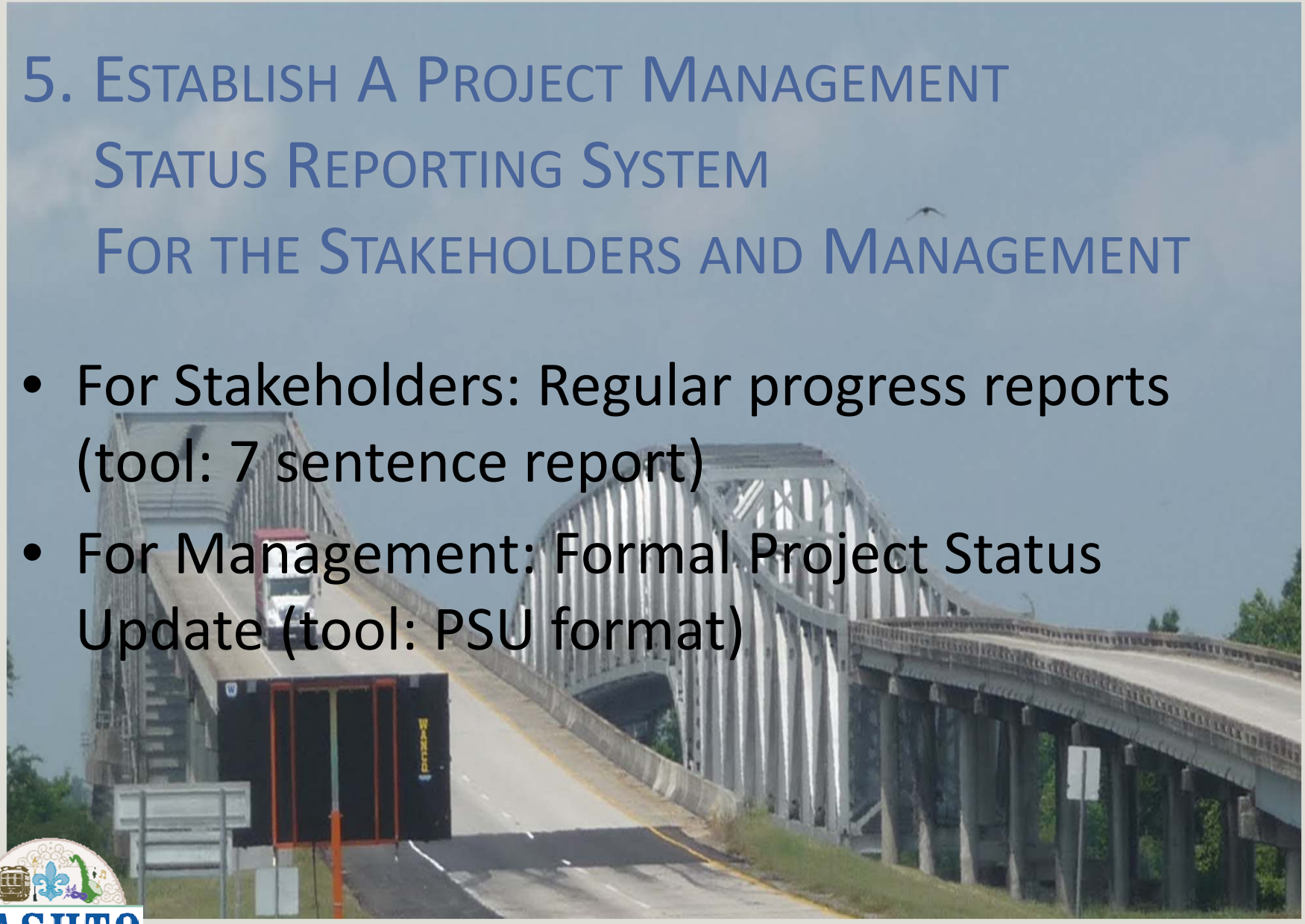
How Do I Manage Something I Can't Control?

- Understand the motivators of the other agency
  - What are their processes?
  - What are their constraints?
- Get to know people in the other agency
- Have the same person in your agency communicate with them
- Monitor their progress by asking the question
  - *Did you get what you need from us?*
  - *Are we missing anything?*
  - *Can we do anything to move the process along?*
- Hire consultants to assist that have a positive track record in working with these other agencies/organizations

Take a page from the consultant's workbook as they get permits from your agency!

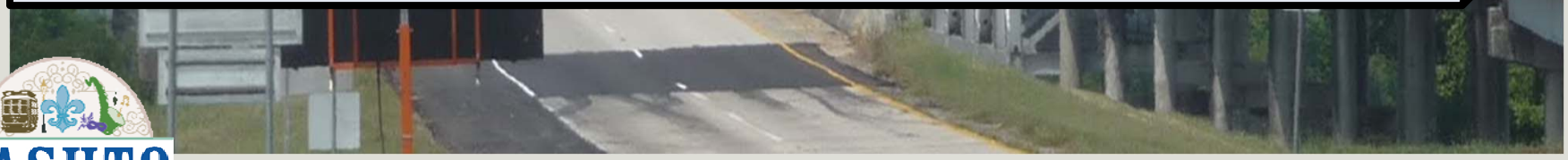
5. Establish A Project Management Status Reporting System For the Stakeholders and Management

- For Stakeholders: Regular progress reports (tool: 7 sentence report)
- For Management: Formal Project Status Update (tool: PSU format)



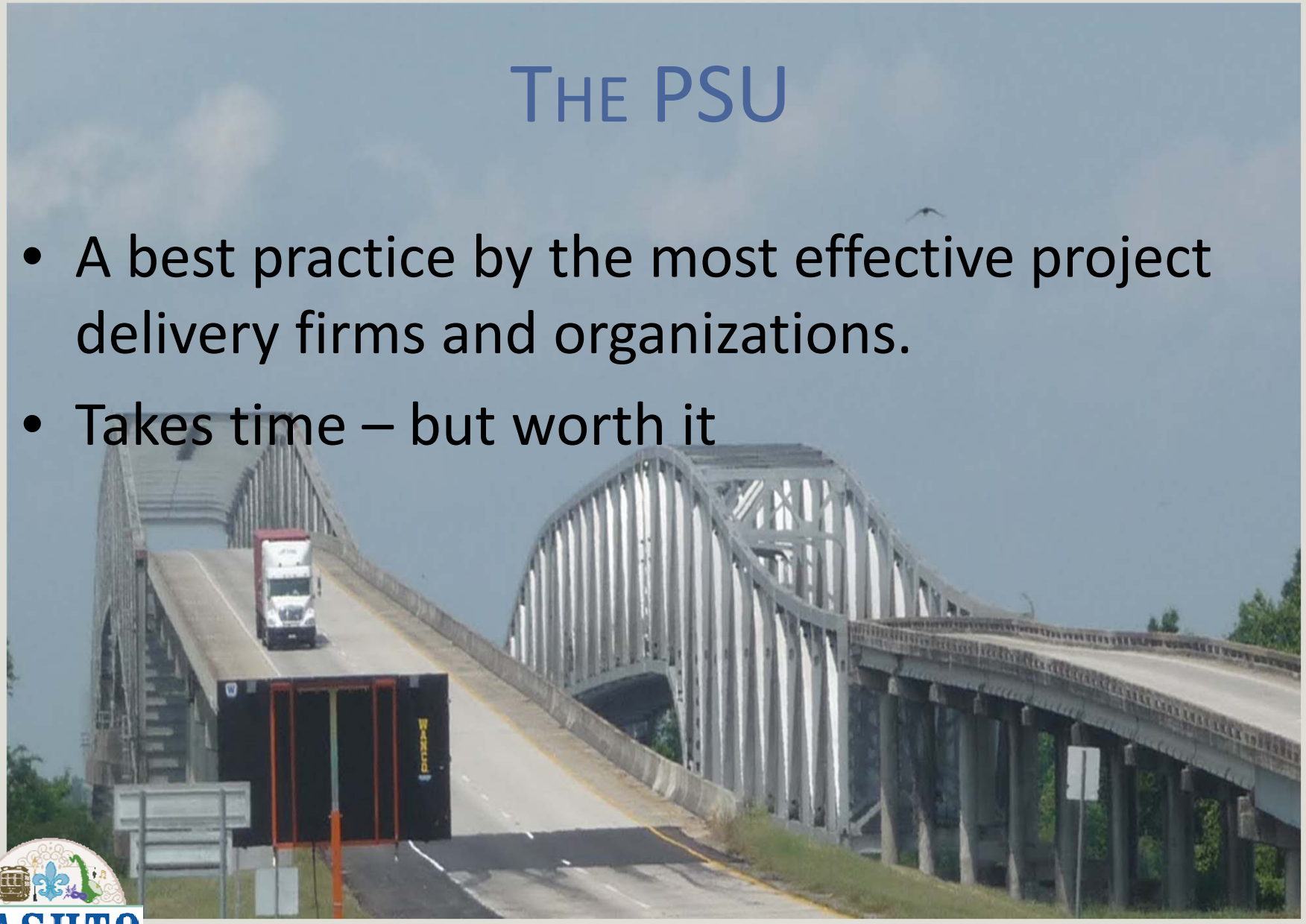
Seven Sentences

1. Work accomplished this period
2. Work anticipated for next period
3. Scope changes
4. Budget status/% complete
5. Schedule/Deliverable status
6. Input needed
7. Other issues/concerns



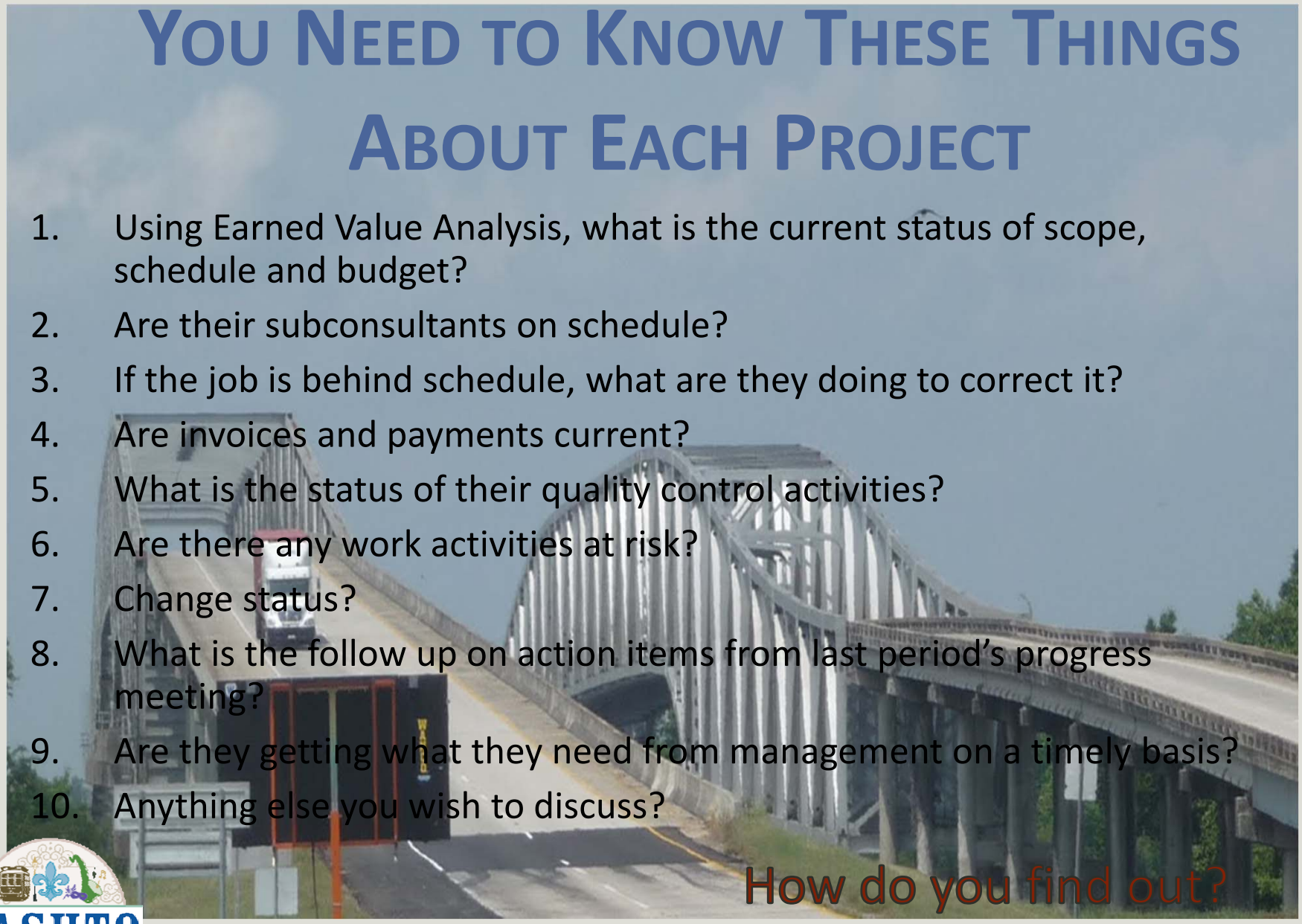
THE PSU

- A best practice by the most effective project delivery firms and organizations.
- Takes time – but worth it



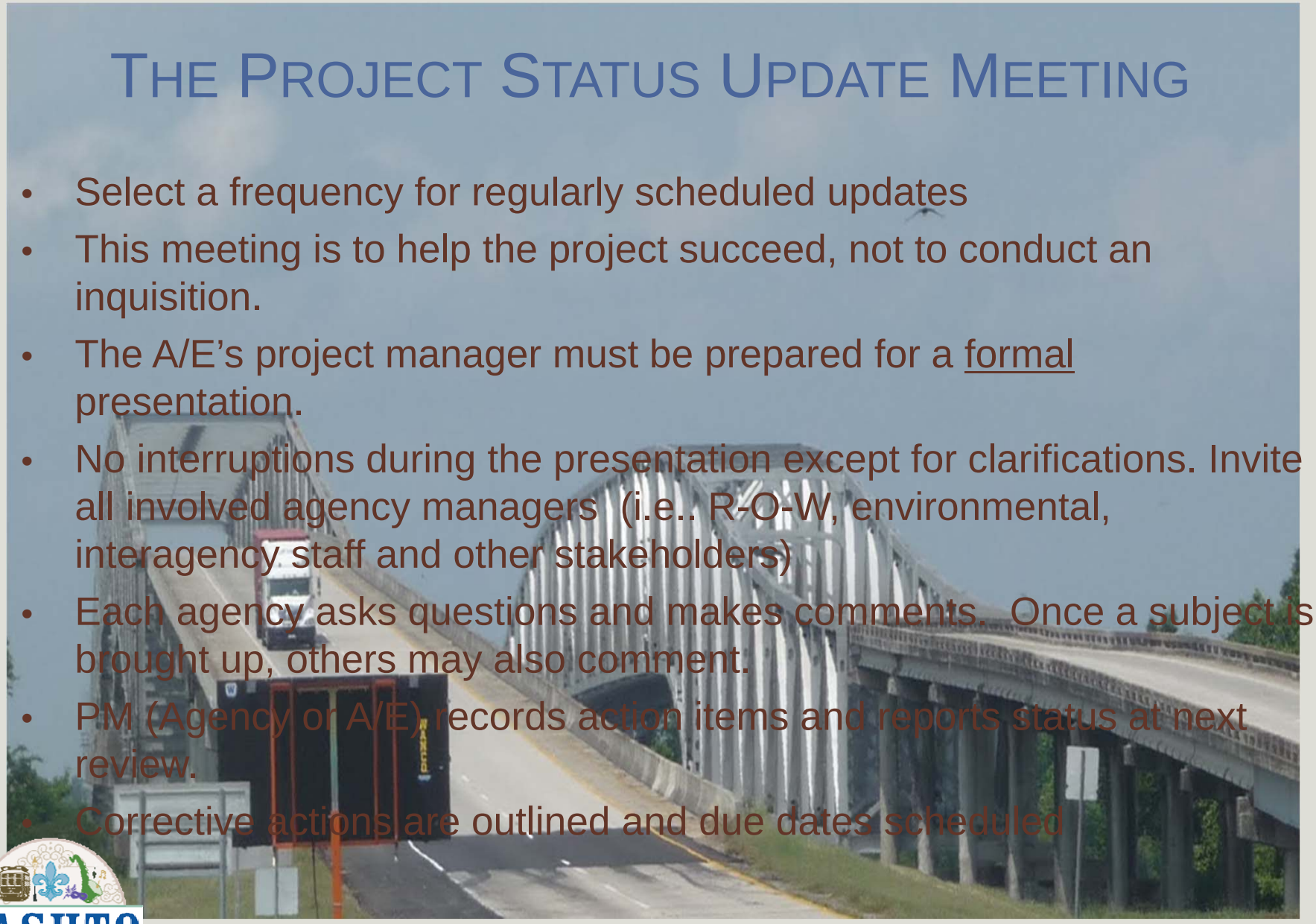
You Need to Know These Things About Each Project

1. Using Earned Value Analysis, what is the current status of scope, schedule and budget?
2. Are their subconsultants on schedule?
3. If the job is behind schedule, what are they doing to correct it?
4. Are invoices and payments current?
5. What is the status of their quality control activities?
6. Are there any work activities at risk?
7. Change status?
8. What is the follow up on action items from last period's progress meeting?
9. Are they getting what they need from management on a timely basis?
10. Anything else you wish to discuss?



How do you find out?

THE PROJECT STATUS UPDATE MEETING



- Select a frequency for regularly scheduled updates
- This meeting is to help the project succeed, not to conduct an inquisition.
- The A/E's project manager must be prepared for a formal presentation.
- No interruptions during the presentation except for clarifications. Invite all involved agency managers (i.e.. R-O-W, environmental, interagency staff and other stakeholders)
- Each agency asks questions and makes comments. Once a subject is brought up, others may also comment.
- PM (Agency or A/E) records action items and reports status at next review.
- Corrective actions are outlined and due dates scheduled

PROJECT REVIEW EXAMPLE

General Information

Project Name	*66th Street Pump Station*
Agency's Job #	*6532*
A/E/C Firm's Job #	*236.8*
Date of Review	*May 1*
Contract Type	*Lump sum*
Contract Amount	*$248,600*
Agency's Project Manager	*Mary Smith*
A/E/C Firm's PM	*Alex Jones*

Work Performed This Month	Work Scheduled Next Month
■ *Completed pump specs*	■ *Complete mechanical drawings*
■ *Completed site grading plan*	■ *Complete electrical drawings*
■ *Almost completed floor plans*	■ *Complete earthwork specs*

Monitor Schedule and Budget
Use PlanTrax® Data for a Better Picture

Earned Value Table -- Calculation of Estimated Progress

Enter your data in light green cells - all other cells are determined by formula

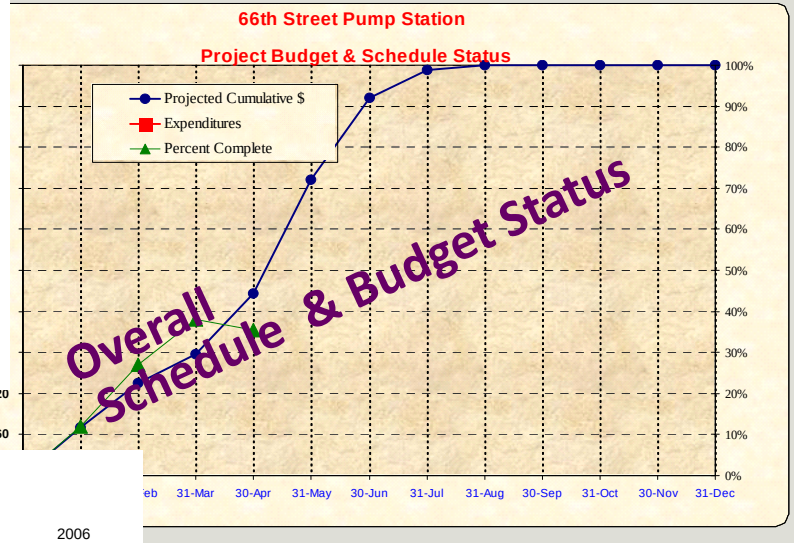
Sample Data Company
66th Street Pump Station

EV Table Date = 30-Apr-03

Task Description	Manager	Task Budget		Percent Complete	Earned Value
Totals →		248,600		35.4%	88,000
A. Preliminary Design Review	Sue	50,000	x	100.0%	50,000
B. Final Design Phase	Pete		x		
1. Floor Plans		15,000	x	70.0%	10,500
2. Site Plan		14,000	x	80.0%	11,200
3. Architectural Drawings	John	35,000	x	10.0%	3,500
4. Structural Drawings		25,000	x	0.0%	
5. Civil/Site Drawings		15,000	x	0.0%	
6. Mechanical Drawings		15,000	x	0.0%	
7. Electrical Drawings		13,000	x	0.0%	
8. Construction Specs		11,000	x	0.0%	
9. Energy, Environ. Reports		8,000	x	10.0%	800
10. Cost Estimates		6,000	x	0.0%	
11. Critical Material Schedule		4,000	x	0.0%	
12. Final Detailed Check		7,000	x	0.0%	
13. Final Corrections		6,600	x	0.0%	
14. Project Management		24,000	x	50.0%	12,000

49,720

24,860



Overall Schedule & Budget Status

Sample Data Company
Hazardous Materials Warehouse
Task Completion Schedule
From Oct 01 05 To May 31 06

= EV Table date 31-Jan-06
= Earned Value per % complete on EV Table
=Task not complete

EV Date = Jan 31 06

Task Description	EV %	Days Ahead (Behind)
A. Preliminary Design Review	100%	
B. Final Design Phase		
1. Floor Plans	70%	(18)
2. Site Plan	80%	(1)
3. Architectural Drawings	10%	(2)
4. Structural Drawings		
5. Civil/Site Drawings		
6. Mechanical Drawings		
7. Electrical Drawings		
8. Construction Specs		
9. Energy, Environ. Reports	10%	35
10. Cost Estimates		(30)
11. Critical Material Schedule		
12. Final Detailed Check		
13. Final Corrections		
14. Project Management	50%	(1)

Week ending (Saturday date) 2005 2006

1-Oct-05	8-Oct-05	15-Oct-05	22-Oct-05	29-Oct-05	5-Nov-05	12-Nov-05	19-Nov-05	26-Nov-05	3-Dec-05	10-Dec-05	17-Dec-05	24-Dec-05	31-Dec-05	7-Jan-06	14-Jan-06	21-Jan-06	28-Jan-06
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Task Schedule Status

Status of Deliverables and High Risk Issues

Deliverables/Milestones	Due Date	Actual Date
Preliminary Design Submittal	*Feb 28*	*Feb 28*
Approved Preliminary Design	*March 2*	*March 14*
Design Development Submittal	*April 2*	*April 28*
Working Drawings Submittal	*June 15*	
90% Review Set Submittal	*July 15*	
Issue for Bids	*Sept 1*	
Award Construction	*Dec 31*	

Potential Problems	Mitigation Measures	Status
1. *Delays in obtaining easements*	■ *Update approval status every 2 weeks*	*Sally is tracking this*
2. *Conflicts with existing utilities may delay construction*	■ *Pot hole congested areas* ■ *Use unit prices in bid* ■ *Include allowances for utility relocation*	*Pot hole contract awarded to ABC Surveyors*
3. *Old pipelines may not withstand extra pressure*	■ *Smoke test existing lines* ■ *Repair crews on 24-hour notice during hydro-testing*	*No action yet*

CORRECTIVE ACTIONS

Unfavorable schedule variance: *2 weeks behind schedule*
Describe corrective action: *Request extension due to delays in Public Works Dept. reviews*

Status of Agency's Activities

Agency's Activity	Status
1. *Provide record drawings for 66th street bridge*	*Partial drawings received April 12; still awaiting remaining drawings.*
2. *Review draft equipment specs*	*Still awaiting comments.*

Quality Control

Documents	Reviewer(s)	Planned Review Date	Actual Review Date
Preliminary Design Submittal	*Chung*	*Feb 10*	*Feb 14*
Design Development	*Chung, Sawyer*	*March 15*	*March 31*
Working Drawings	*Chung, Sawyer, Hernandez*	*June 1*	
Plan-in-Hand Field Review	*Chung*	*July 1*	

Plan Review Comment Sheet

- ✓ Are the necessary reviews complete?
- ✓ Have the comments been incorporated?

Billing Status

Invoiced to date =	*$20,876*
Date of most recent billing	*4/14*
Billed through what date?	*3/30*
Work in process (current unbilled) =	*$10,301*
Accounts receivable	
Over 90 days =	*$0*
Over 60 days =	*$0*
Over 30 days =	*$7,344*
Current =	*$3,230*

Status of Pending Scope Changes and Previous Action Items

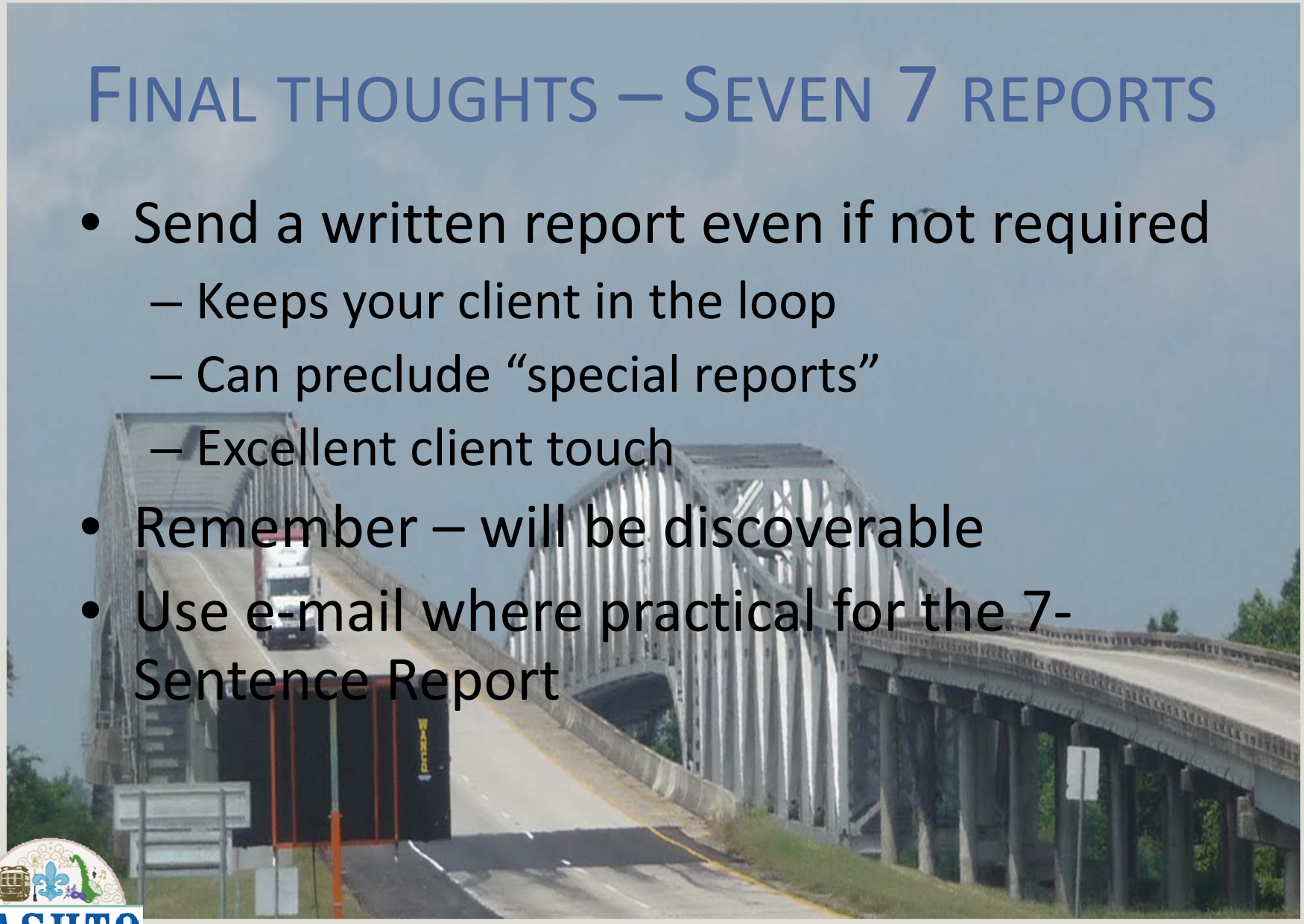
Pending Scope Change	Status
1. *Add landscaping plan*	*Consultant is estimating costs; will submit next week.*
2. *Change to variable speed pumps*	*Consultant's proposal submitted; awaiting Agency's approval to proceed with change.*

Action Item	Status
1. *Write letter to Public Works Dept. requesting plan approval*	*Consultant sent to client on April 24*
2. *Submit topo to Agency's PM for review*	*Will be done May 12*

Other Issues and Concerns:

- *Need to get faster turnaround of Public Works Dept. reviews*
- *Consultant is increasing staff of senior designers*
- *Request for time extension needs to be expedited*

FINAL THOUGHTS – SEVEN 7 REPORTS

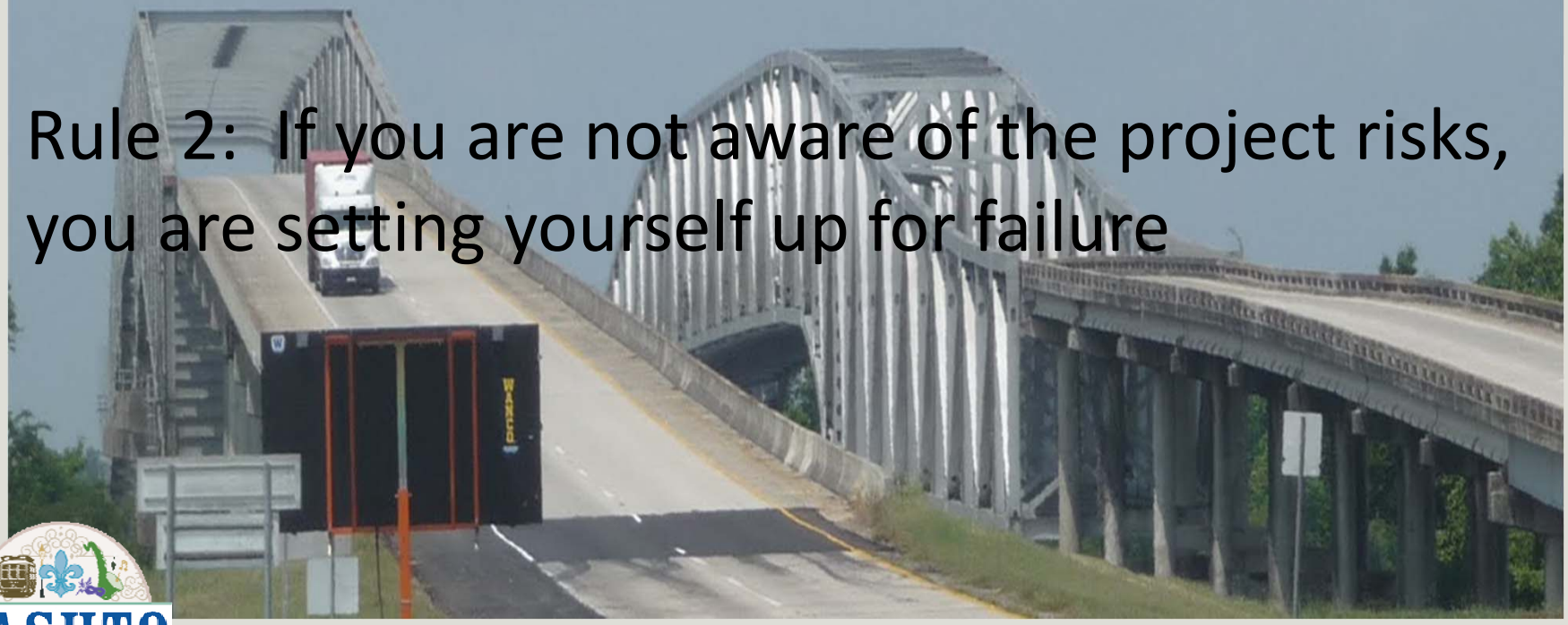


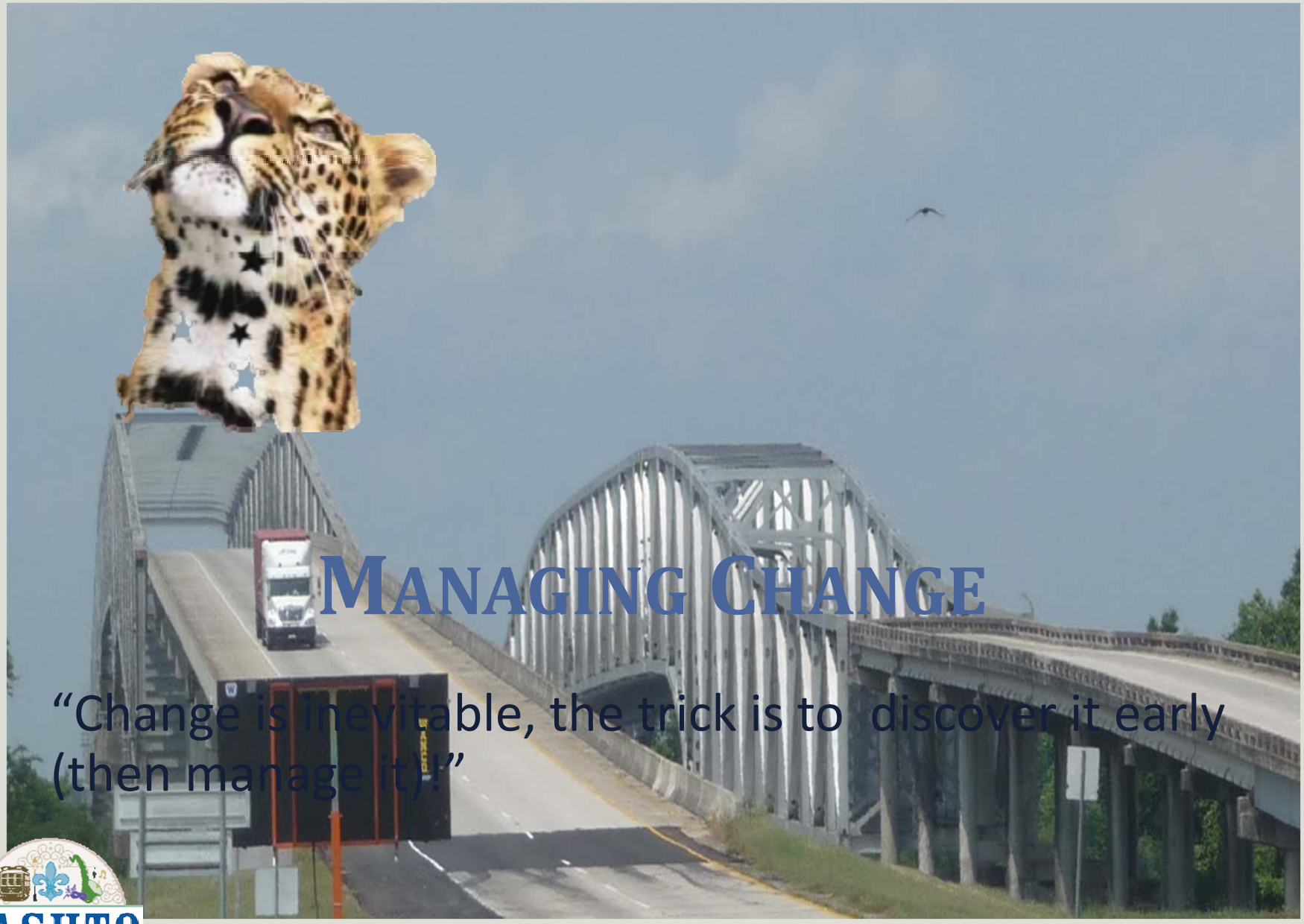
- Send a written report even if not required
  - Keeps your client in the loop
  - Can preclude "special reports"
  - Excellent client touch
- Remember – will be discoverable
- Use e-mail where practical for the 7-Sentence Report

7. Prepare Risk and Change Management Plans

Rule 1: Change is inevitable – even on the simplest of projects.

Rule 2: If you are not aware of the project risks, you are setting yourself up for failure

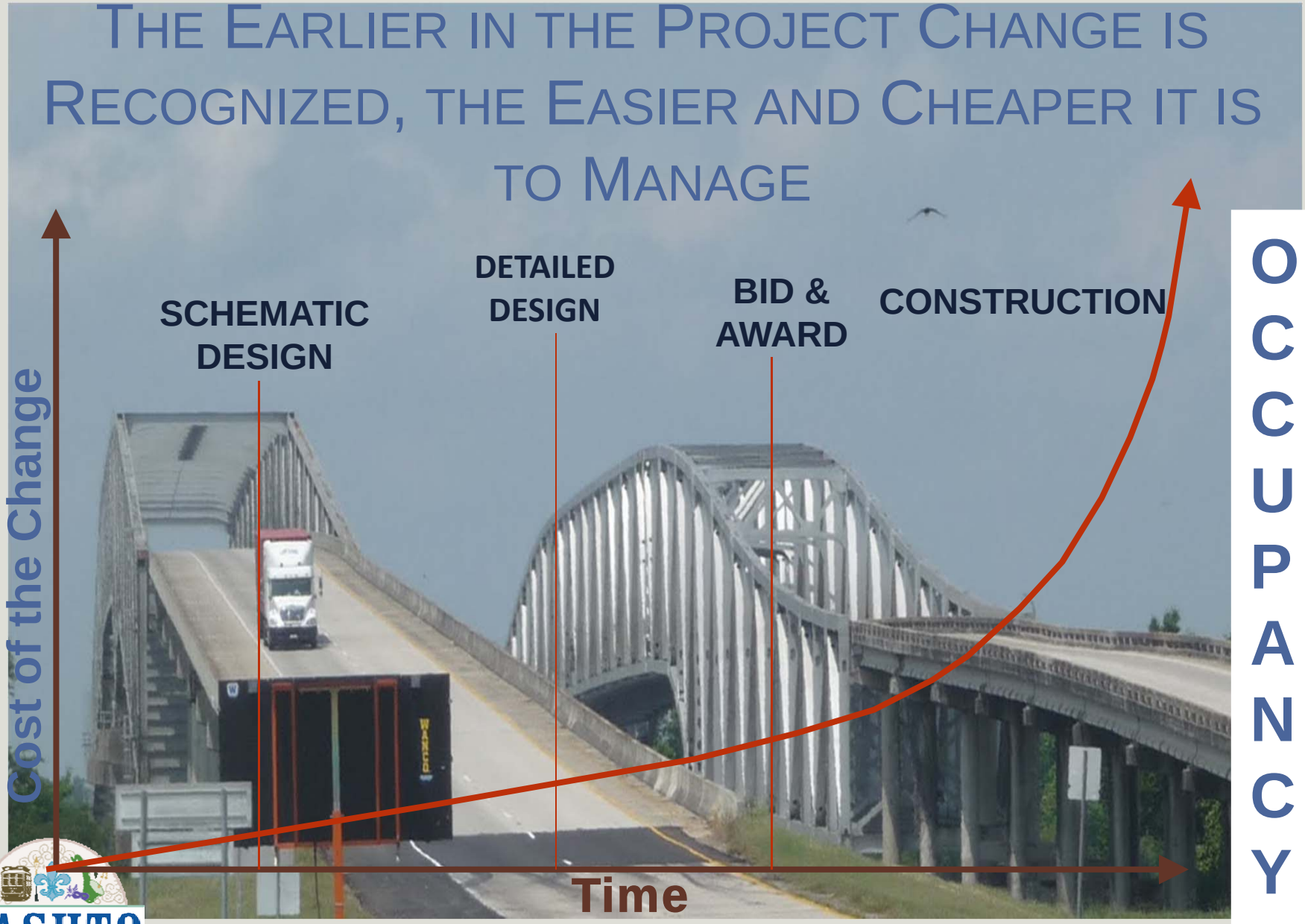




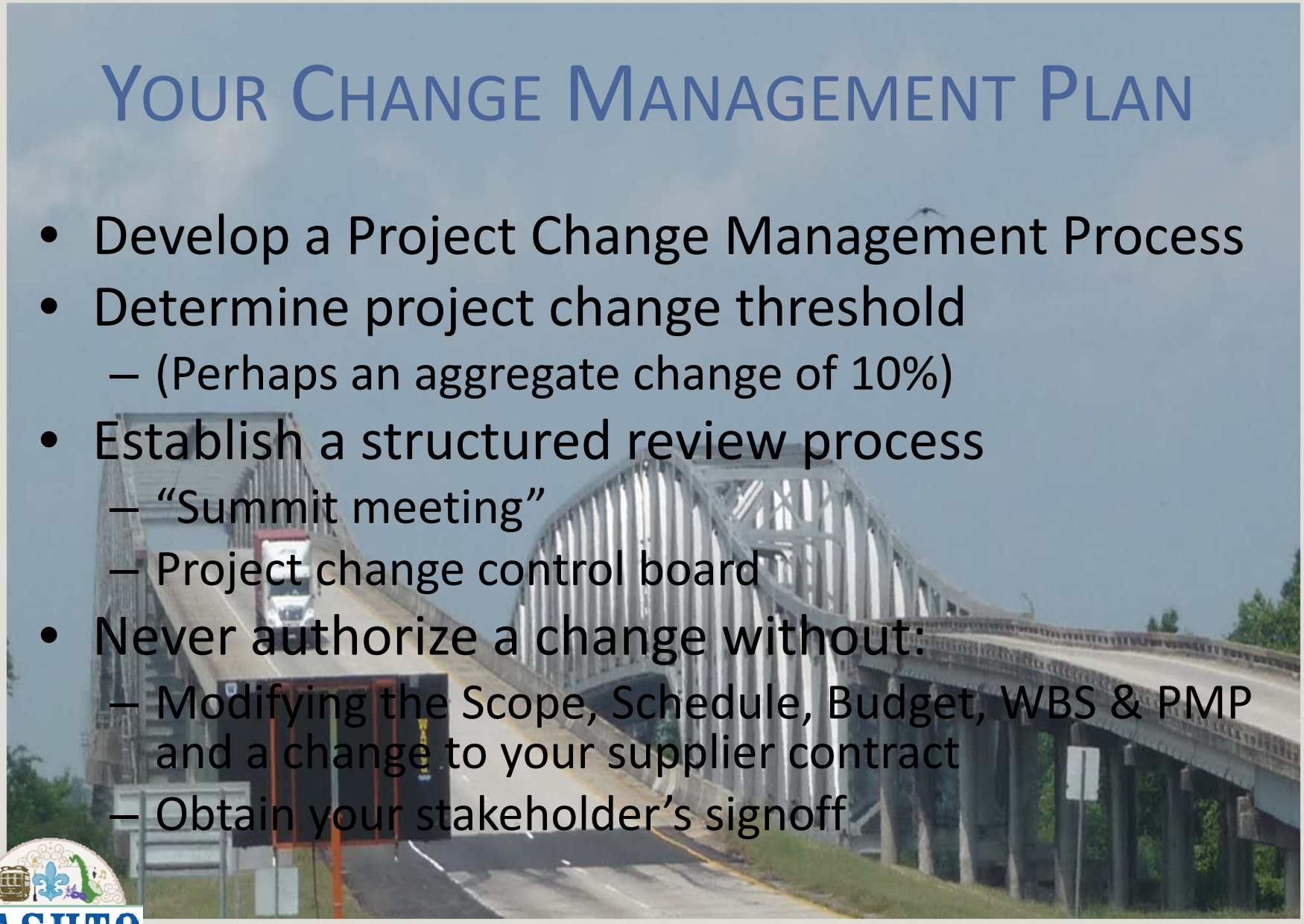
MANAGING CHANGE

"Change is inevitable, the trick is to discover it early (then manage it)!"

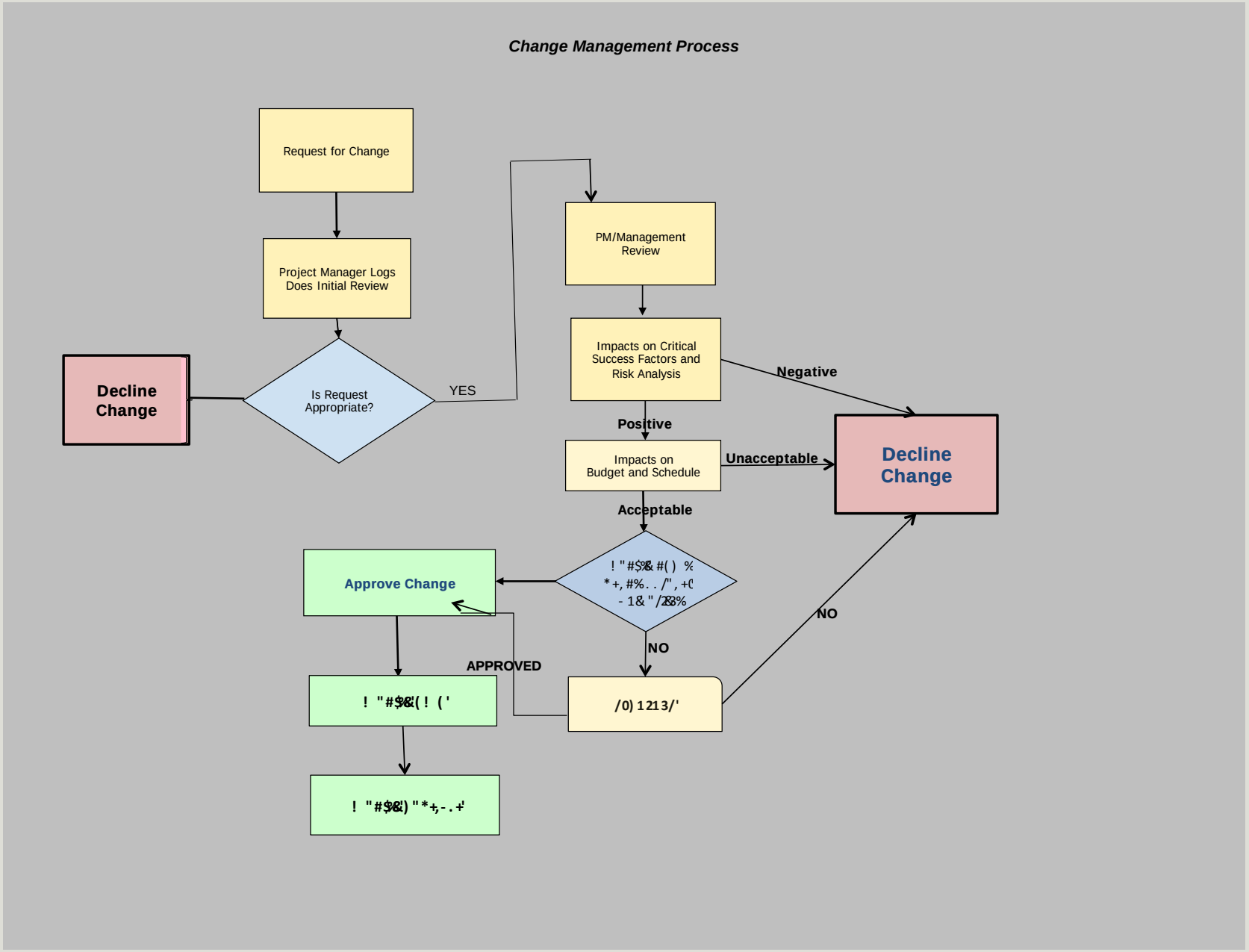
The Earlier in the Project Change is Recognized, the Easier and Cheaper it is to Manage



Your Change Management Plan



- Develop a Project Change Management Process
- Determine project change threshold
  - (Perhaps an aggregate change of 10%)
- Establish a structured review process
  - "Summit meeting"
  - Project change control board
- Never authorize a change without:
  - Modifying the Scope, Schedule, Budget, WBS & PMP and a change to your supplier contract
  - Obtain your stakeholder's signoff


Change Management Process
Request for Change
Project Manager Logs
Does Initial Review
Is Request
Appropriate?
YES
Decline
Change
PM/Management
Review
Impacts on Critical
Success Factors and
Risk Analysis
Negative
Positive
Impacts on
Budget and Schedule
Unacceptable
Decline
Change
Acceptable
Approve Change
NO
APPROVED
NO

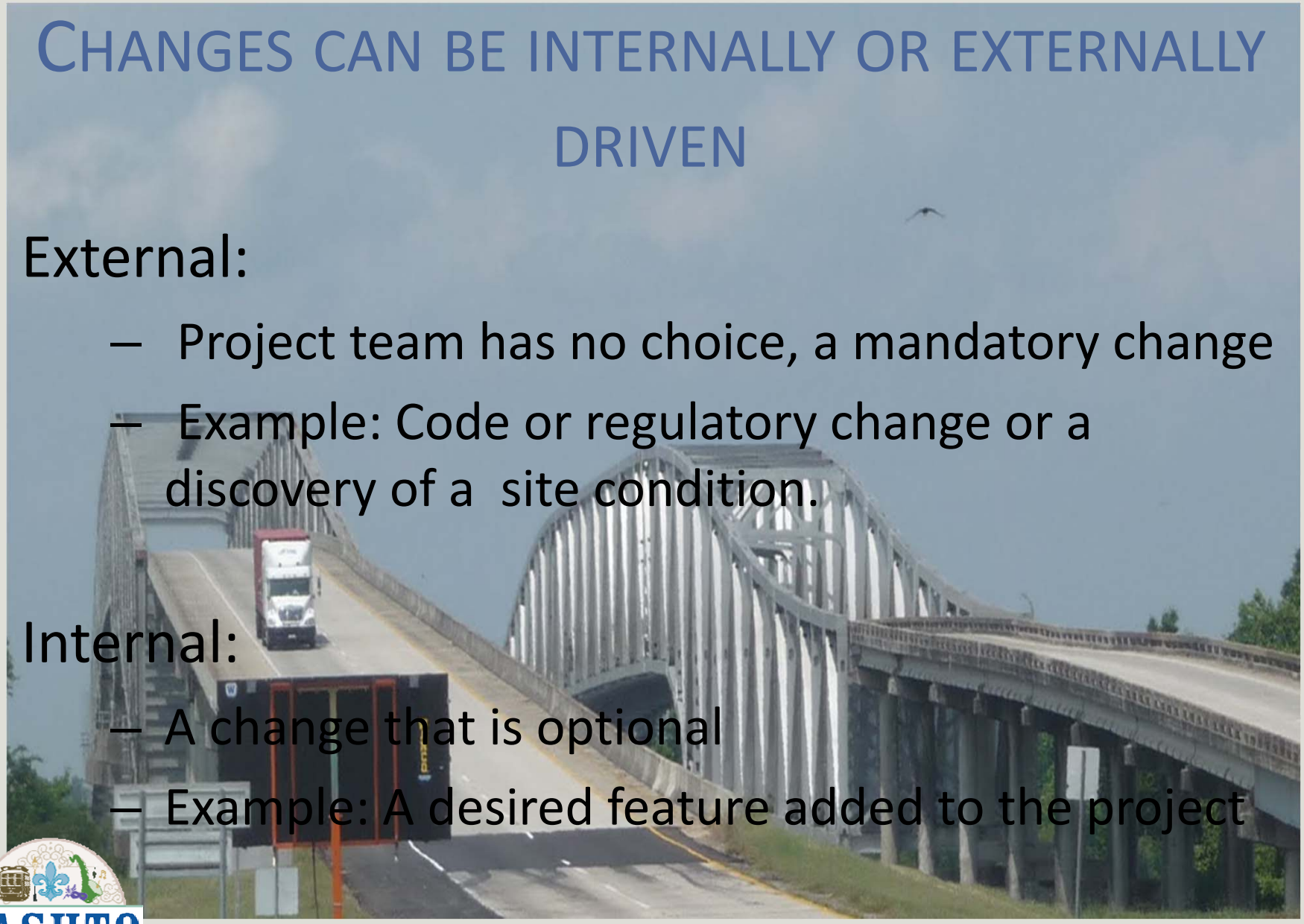
CHANGES CAN BE INTERNALLY OR EXTERNALLY DRIVEN

External:

- Project team has no choice, a mandatory change
- Example: Code or regulatory change or a discovery of a site condition.

Internal:

- A change that is optional
- Example: A desired feature added to the project



Recognize the Causes of Change

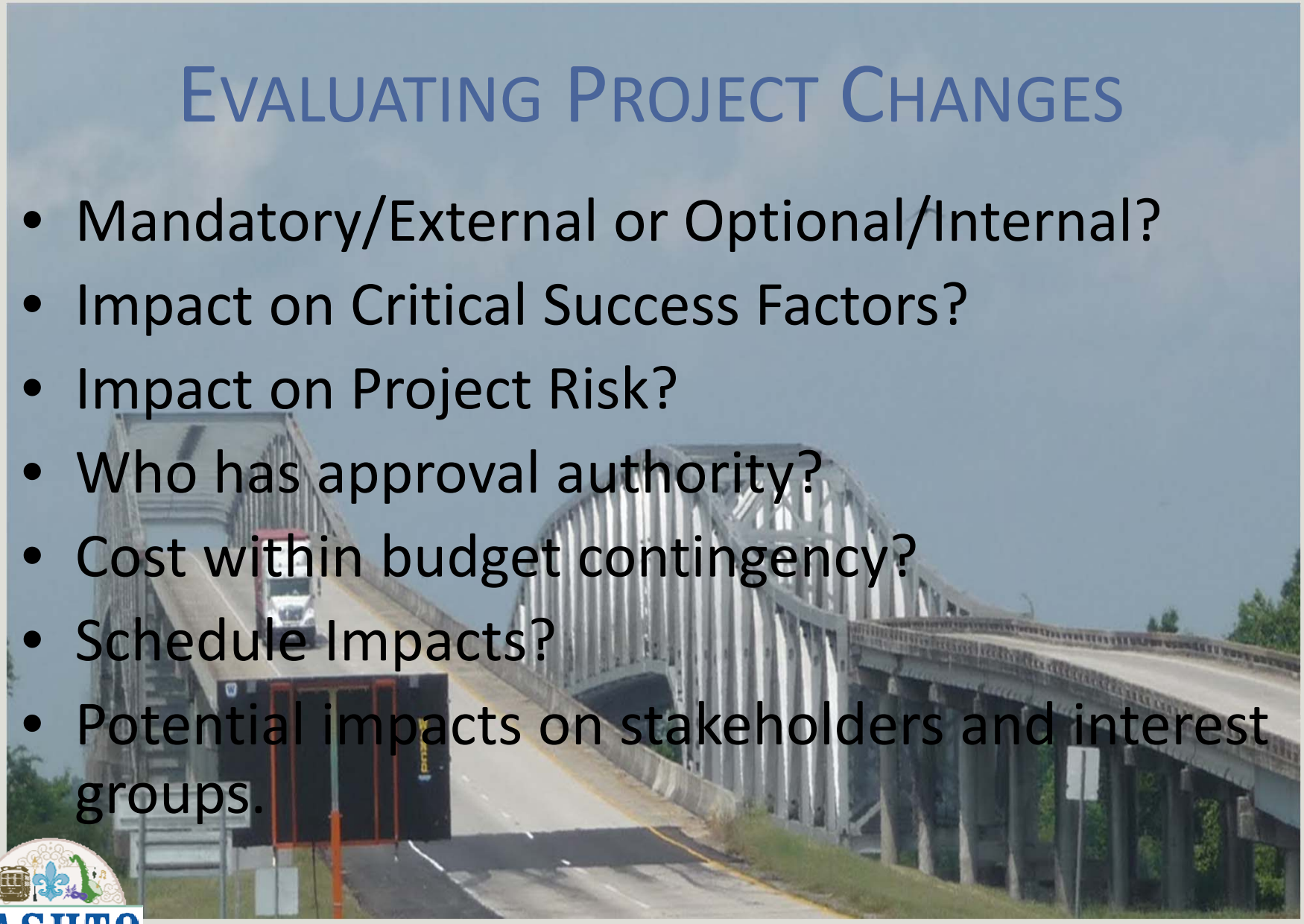
- Changes in IT requirements
- Changes in codes
- Security concerns
- Adjacency (land use, tenants, etc.)
- Stakeholder needs/wants change
- Underground conditions
- Environmental and permitting changes
- Political / Public Acceptance
- Change in key personnel
- Loss of Key Sponsor
- Beware the "good idea fairy"

Putting Change Management Together

- Develop and disseminate a project charter
  - Jointly developed with the client and signed off
- Develop a project change process
- Develop risk and quali… management plan…
- Do not short c… undergro… …on.
- Get to know the… stakeholder… decisio…
- Ed… …ent about change
- …riodic design …ews and consultation with the client
- Regular project communications
- Conduct a proactive public outreach program

The more you involve your partner stakeholders in the fundamental design decisions, the more they will take "ownership" of the design and, therefore, less changes will result.

Evaluating Project Changes



- Mandatory/External or Optional/Internal?
- Impact on Critical Success Factors?
- Impact on Project Risk?
- Who has approval authority?
- Cost within budget contingency?
- Schedule Impacts?
- Potential impacts on stakeholders and interest groups.

6. Don't Rely on Software

Software is a tool

Keep it simple and user/reader friendly

If You're Not Aware of the Potential Risks…

- Construction will be in heavy traffic area.
- Project adjacent to railroad
- Neighborhood may not support without extensive landscaping.
- Budget is *extremely limited*

Risk Management Plan

Example: Design and construction of a new urban interchange.

What Risks May Affect Our Critical Success Factors?	*What Are the Potential Impacts of These Risks?*	*What Can We Do to Eliminate These Risks?*	*What Can We Do to Mitigate These Risks?*
1. Delays in obtaining easements and ROWs	■ Delay completion date	■ Update approval status of each parcel every week	■ Contact owners as soon as delays are anticipated
2. Conflicts with existing utilities	■ Delay construction ■ Increase traffic disruptions ■ Increase costs	■ Pothole congested areas	■ Use unit prices in bid ■ Include allowances for utility relocation
3. Multiple agencies in review cycle, some don't get along well	■ Schedule delays ■ Conflicting comments during review ■ Agency "agendas"	■ Partnering session at project outset.	■ Establish hierarchy of review authority


Questions?

Where Do We Go From Here?

- Review your own agency's record
  - Construction Cost Growth
  - Schedule performance
- Do a root cause analysis
- Start to implement some of these best practices.

How we can help

- Training
- Consulting and analysis

For More Information

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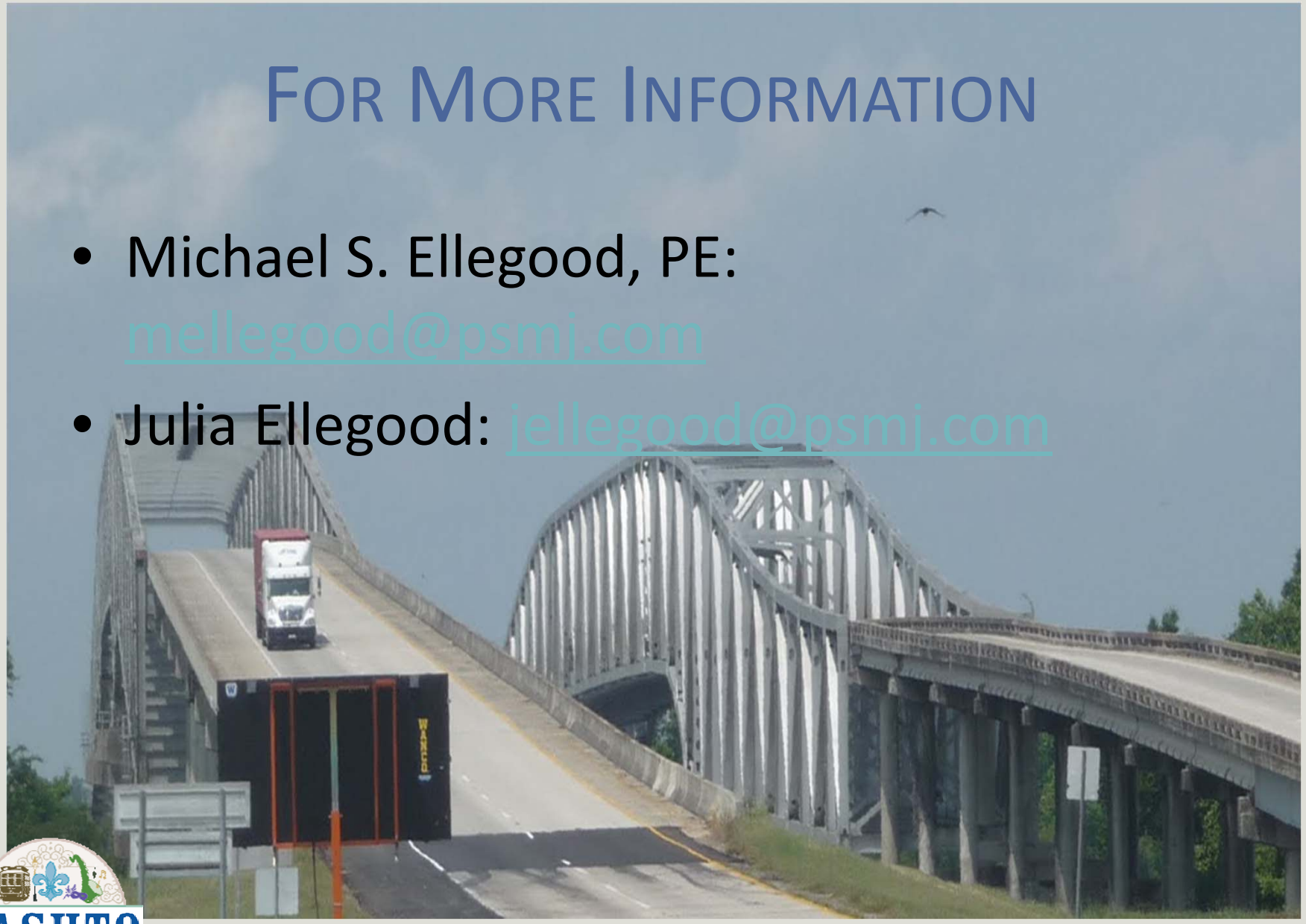

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