



*Doug Johnson
Consultant*

Project Update

ACPTP 2022-4

Quality Control and Quality Acceptance of Concrete Airport Pavement

January 12, 2023

Our Team

Tara Cavalline, PhD, PE
UNIV. NORTH CAROLINA CHARLOTTE



Tom Van Dam, PhD, PE
Jeff Stempiphar, PhD, PE
NICHOLS CONSULTING ENGINEERS

Gerald Voigt, PE
SQUARE ONE PAVEMENT CONSULTING



Jim Lafrenz, PE
TIGERBRAIN ENGINEERING

Doug Johnson, PE
CONSULTANT (Fmr. FAA Engineer)



Mike Boyle
HI-WAY PAVING

Gaining Additional Perspectives

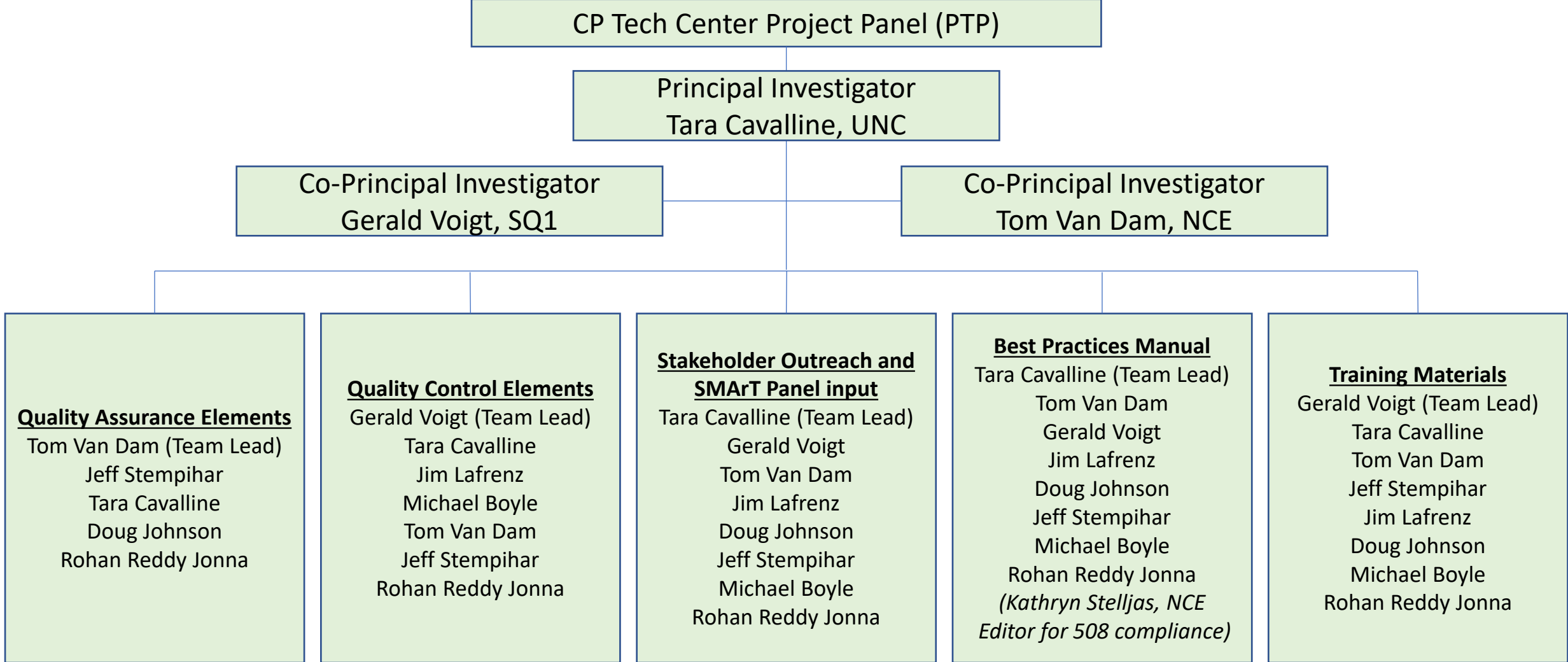
SMArT (*Subject Matter Advisory Team*)

Type	Company	Location	Panel Member	Title
Contractor	ACME Paving	Spokane, WA	Bryan White	
Contractor	AJAX Paving Industries	Troy, MI	Pete Mann	Senior Project Manager
Contractor	Boh Brothers	New Orleans, LA	Tim Lewellen	Group Mgr Airfield Paving
Contractor	Golden Triangle Construction Co., Inc.	Imperial, PA	Chuck Niederriter	COO
Contractor	Plote Construction, Inc.	Hoffman Estates, IL	Casey Kozak	Concrete QC Manager
Association	Southwest Concrete Pavement Assn.	Seal Beach, CA	Charles Stewart	Executive Director
Engineering Firm	C&S Companies	Phoenix, AZ	Lance McIntosh, PE	Aviation Svc. Group Mgr
Engineering Firm	Michael Baker	Norcross, GA	Quintin Watkins, PE	Vice President
Engineering Firm	Talbert, Bright & Ellington	Charlotte, NC	Andy Shook, PE	Project Manager
Engineering Firm	TTL Associates, Inc.	Plymouth, MI	Jeffrey Elliott, PE	Vice President
Airport/Owner	Charlotte-Douglas Intl. Airport (CLT)	Charlotte, NC	Ashton Watson, PE	Airport Engineer

Additional SME's have been invited to participate.

We are in process of scheduling interviews, pending their time and availability.

Team Organizational Structure



Our Overall Philosophy...

1

Quality construction requires that knowledgeable people follow a robust quality system.

2

Construction is a manufacturing process performed under unique project conditions. Process control is central to QC.

3

Good process control requires a clear understanding of technical fundamentals and the project requirements.

The guidance we develop as part of this work will clarify use of quality systems for all stakeholders.

It will help contractors to:

- Implement QC essentials
- Use data to drive their process improvements where it makes sense, and
- Proactively inform their process control decisions

Our Project Approach



Objectives/Deliverables

1

QC Best Practice Manual

2

Model QC Plan

3

Training Course (Modules)

Each of these three objectives is considered essential to achieve a successful project outcome for FAA and the Military Tri-Services

Objectives/Deliverables

1

QC Best Practice Manual

2

Model QC Plan

3

Training Course (Modules)

01

The **best practices manual** will provide comprehensive guidance to all stakeholders on the QC and QA process.

The manual will distinguish between QC and QA roles, responsibilities, activities, and authorities, ensuring all parties are operating on the same page during each stage of the concrete paving process.

Current Vision of QC Manual

CH 1	Introduction	<ul style="list-style-type: none"> ▪ Goal of quality systems for concrete airport pavements - terminology and definitions ▪ Overview of QA and the role of QC within the QA system ▪ Acceptance, independent assurance, and dispute resolution
CH 2	Quality Assurance Essentials	<ul style="list-style-type: none"> ▪ Role of owner/operator, role of QA personnel ▪ QA specifications, quality parameters/tests, approaches and best practices ▪ Activities and meetings and before each phase of work (subgrade, subbase, base, pavement)
CH 3	Tools for Quality Acceptance	<ul style="list-style-type: none"> ▪ Recordkeeping, forms, check sheets, spreadsheets ▪ Statistical approaches with tutorial ▪ Analysis of risk allocation
CH 4	Quality Control Essentials	<ul style="list-style-type: none"> ▪ QC requirements, introduction to QC Plans and Role of QC personnel ▪ Process control and required QC activities ▪ Test/inspection data and frequencies
CH 5	QC Plan Essentials	<ul style="list-style-type: none"> ▪ Components of a QC plan, QC plan outline ▪ Example QC plan provisions ▪ QC plan implementation and use
CH 6	Tools for Quality Control	<ul style="list-style-type: none"> ▪ Overview of recordkeeping, forms, check sheets, spreadsheets ▪ Control charts, statistical approaches with tutorial, discussion of action and suspension limits ▪ Discussion on how to use a feedback loop of data in a process control environment
CH 7	Independent Assurance	<ul style="list-style-type: none"> ▪ Role of independent assurance ▪ Statistical approaches with tutorial
CH 8	Dispute Resolution	<ul style="list-style-type: none"> ▪ How to handle discrepancies between agency and contractor data ▪ Dispute resolution including appropriate remedial actions ▪ Definition of authority and responsibility for enforcing requirements
Appendix	Model QC Plan	

Our SMArT and project technical panel members are helping us identify priorities/gaps/issues based on...



- Project experiences
- Local/Regional differences
- Case studies
- Test cases (CLT-Hi Way)

What we are learning may help further shape our vision of the QC Manual, framework and training

Five Known Gaps and Issues We Affirmed So Far

01

Test Section or Control Strip Confusion

P-501-4.1 and 32 13 14.13 (Section 1.4.6) language is not always interpreted in the same way by different inspectors, which can lead to confusion on what is required to move to production paving.

02

No Straight Edge Standard for Surface Evenness/Edge Slump

Neither P-501-4.11e nor 32 13 14.13 (Section 2.1.1.1) provides requirements for a straightedge to meet any minimum standards nor for how or where to conduct tests / take or apply readings.

03

Error Prone Concrete Flexural Beams

Beams are often the source of disputes, and how they are prepared, handled, and cured is often at issue. Correlation to compressive strength during mix design could facilitate less problem-prone testing.

04

Subjective Factor Qualification Inconsistencies

QA personnel require clear guidance on whether to apply accept/reject or stop/go decisions for defects, such as surface “bug holes,” “sliver spalls,” and others.

05

Misunderstanding of How to Combine Certain Pay Factors

P-501-6.6B includes five acceptance criteria: strength, thickness, grade, smoothness, and repairs. Confusion exists on how to combine certain factors for lot payments.

Objectives/Deliverables

1

QC Best Practice Manual

2

Model QC Plan

3

Training Course (Modules)

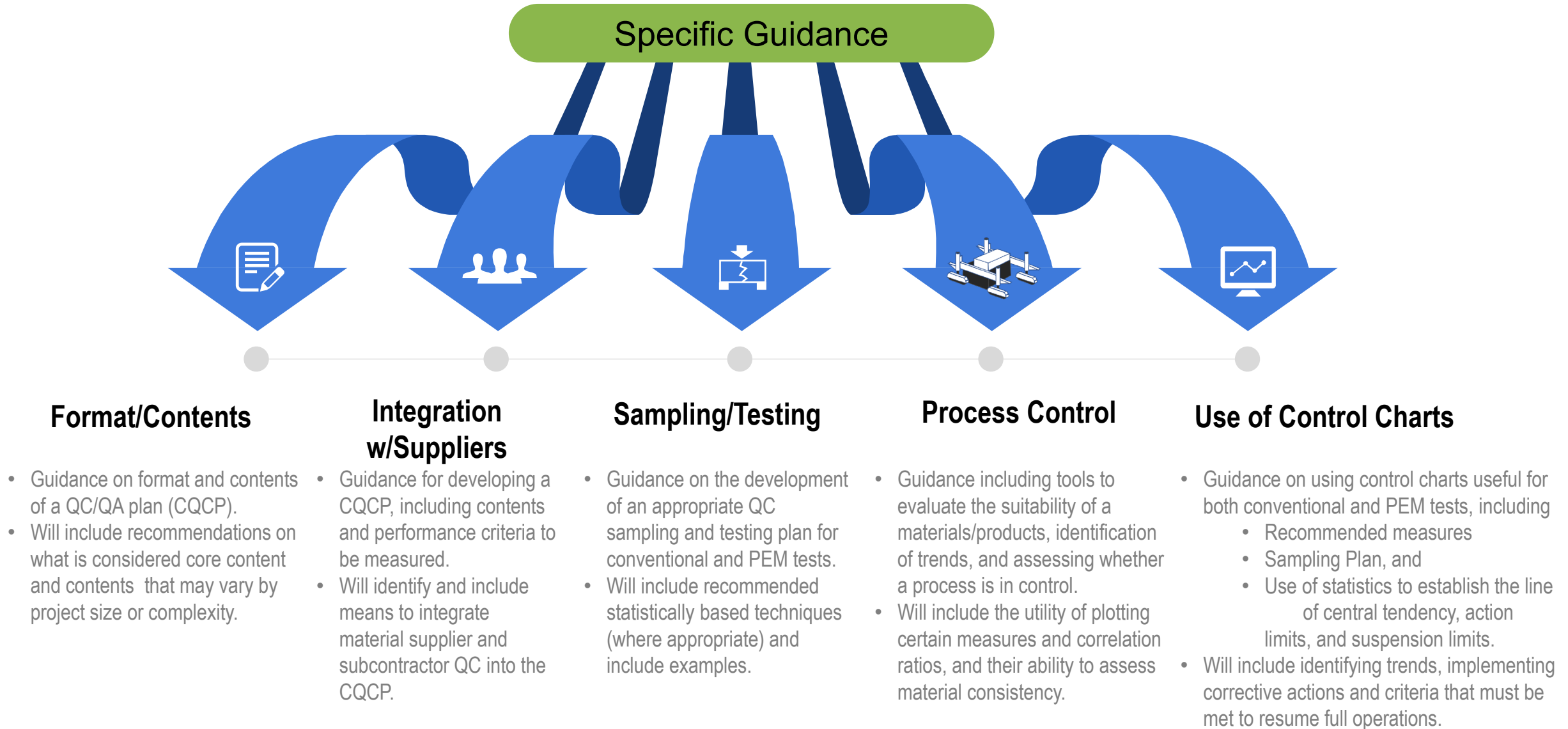
02

The **Model QC Plan** will include examples for quality processes specifically for concrete airfield sites applicable to FAA P-501 and UFGS 32 13 14.13

The model will be a “go by” for contractors to follow on future projects

We will include spreadsheet tools and examples for statistical analysis

Current Vision of Model QC Plan



Objectives/Deliverables

1

QC Best Practice Manual

2

Model QC Plan

3

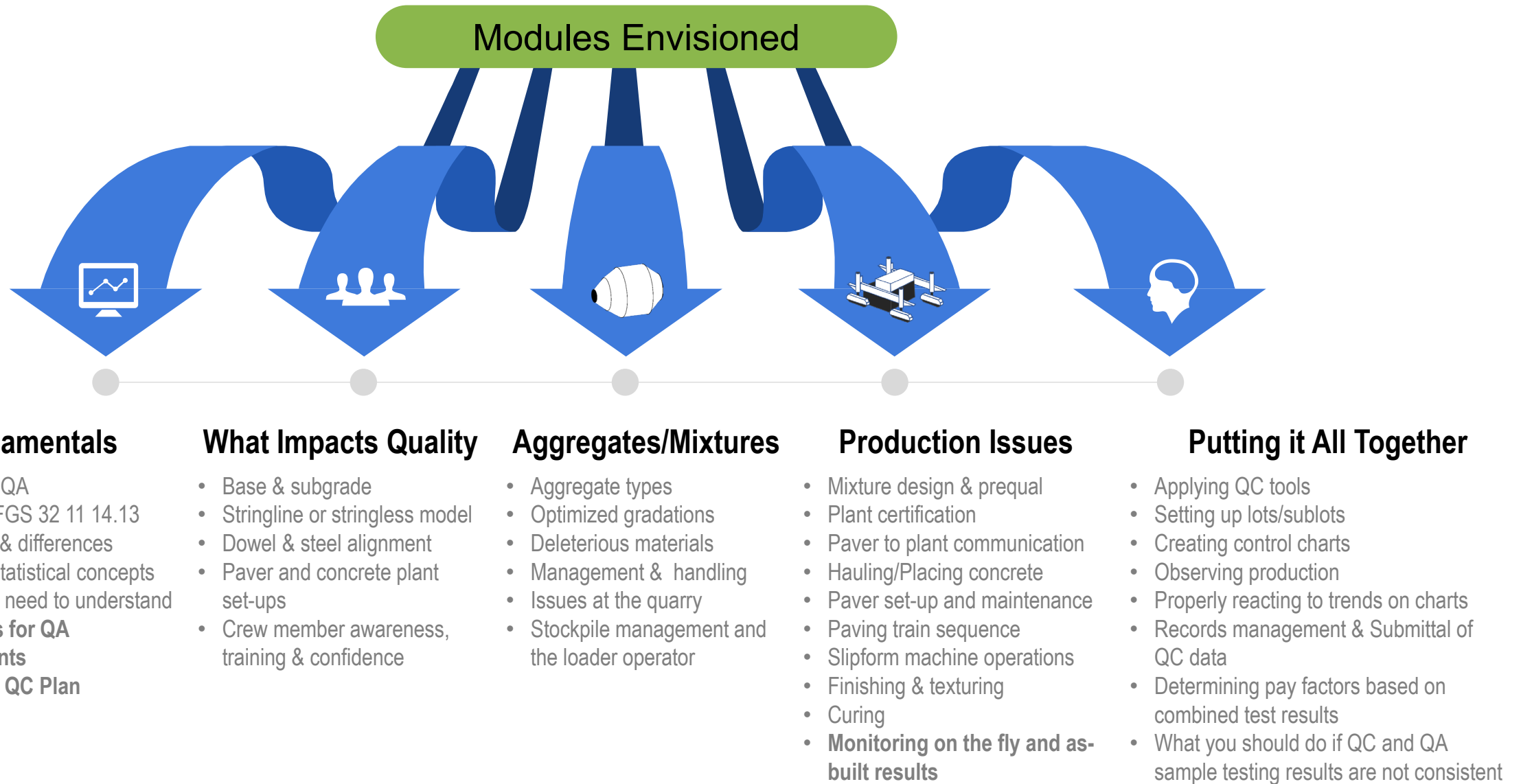
Training Course (Modules)

03

The materials will focus on training agency and contractor staff to become fully conversant with all aspects of quality control and quality assurance of airfield construction.

- PowerPoint modules
- Instructor guidance
- Online training - Synchronous (live) and adaptable for asynchronous (recorded for on-demand viewing)

Current Vision of Training Course



Work Divided into 4 Tasks w/Subtasks

Task 1 – Literature Review

Literature review of airport paving QC and QA from relevant sources

Task 2 – Work Plan

Develop detailed work plan for presentation to panel and for approval to proceed

Task 3 - Implementation

3.1 Initial SMArT Meetings/Input	3.4 ID Gaps in Quality Assessment
3.2 ID Gaps in Quality Systems	3.5 Prepare Best Practice Manual
3.3 ID Gaps in QC	3.6 Prepare Training Materials

Task 4 – Finalize Reports

4.1 Prepare and present draft final report to panel
4.2 Finalize all reports/deliverables. Ensure reports are 508 compliant

WE ARE
HERE

Timeline

Task/Subtask and Description		2022					2023												2024												
		Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
1	Literature Review						★	★	★																						
2	Work Plan						★	★	★																						
3.1	Solicit Input From SMArT																														
3.2	Address Gaps in Quality Systems																														
3.3	Address Gaps in Quality Control																														
3.4	Address Gaps in Quality Acceptance																														
3.5	Develop Best Practices Manual																						★			★					
3.6	Develop Training Materials																							★		★					
4.1	Draft Final Report																														
4.2	Final Report																														

- ★ Draft literature review and work plan submitted
- ★ Meeting with PTP to review draft work plan
- ★ Literature review and work plan finalized
- ★ Draft manual submitted to SMArT and PTP for review
- ★ Final manual submitted to PTP
- ★ Draft training materials to SMArT and PTP for review
- ★ Final training materials submitted to PTP
- ★ Submit draft final report
- ★ Meeting with PTP to review draft final report
- ★ Final 508-compliant report submitted

Notes: Quarterly Progress Reports will be submitted to the PTP in months shown in Red. Site visits will occur as opportunities align with the project schedule.

Summary of Work Performed So Far

- SMARt and other stakeholders interviews:
 - 9 conducted (included 12 stakeholders)
 - Planning a couple more interviews, time permitting
 - Also obtained relevant information from interviews conducted as part of project ACPTP 2021-2, Performance Engineered Mixtures
 - Compiling and summarizing all stakeholder feedback
- Literature review
 - Nearing completion
 - Preparing side-by-side comparison of FAA and UFGS specifications on a project phase basis
- Revised work plan for panel approval
 - Update underway
 - Will be submitted with literature review to project panel in late February or March 2023



Thank You

We are pleased to answer any questions...