



**PennDOT Engineering District 10  
Construction Unit  
ISO 9001:2015  
Quality Management System**

**Quality Manual**  
Version 15.2  
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## **Preface**

The following document is The Pennsylvania Department of Transportation Engineering District 10-0, Construction Unit Quality Manual as required by ISO 9001:2015; Quality Management System Standards. The master copy of this document is located and maintained electronically on the Departments Local Access Network (LAN) and addressed **J:\Construction\ISO**. All hard copies issued are uncontrolled and are noted as such. It is the user's responsibility to verify that all referenced copies of this manual are current prior to use.

# **PennDOT District 10-0 Construction Unit**

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# 1 – Scope

The Pennsylvania Department of Transportation's (PennDOT's) Engineering District 10 is responsible for the state-maintained transportation network in Armstrong, Butler, Clarion, Indiana, and Jefferson Counties of Pennsylvania. This includes over 3,000 road miles and over 1,600 bridges. The District 10 Construction Unit oversees the completion of state and federally-funded construction projects for the five-county region. This includes inspection and administration of roadway and bridge construction projects but can also include retaining wall construction, materials testing, geotechnical services, and auditing services. Our inspectors perform their job functions to ensure that our contractors are providing a quality product while following the required specification and construction standards.

The goal of the Construction Unit Quality Management System (QMS) is to facilitate execution of our Quality Policy:

Through the active involvement of customers, partners and employees, provide a quality construction project and support services that meet all specified requirements and we strive to exceed the expectations of our customers and stakeholders.

We are committed to comply with the requirements of our quality management system and to continually improve its effectiveness.

We shall work each day to improve our individual and collective performance.

# 2 – References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9000:2015, Quality management systems — Fundamentals and vocabulary

## 3 – Terms & Definitions

The following terms and abbreviations are specific to the PennDOT District 10 QMS and are defined here. Other relevant terms may be found as defined in ISO 9000:2015.

AAR – After Action Review

AASHTO – American Association of State Highway and Transportation Officials

ACE – Assistant Construction Engineer

ACM – Assistant Construction Manager

ADE – Assistant District Executive

ASTM – American Society for Testing and Materials

BC – Bridge Construction (Standards)

CAC – Community Advisory Committees

CB – Citizen Band

CCC – Customer Care Center

CDS V3 – Construction Documentation System (version 3) (ECMS)

CPAR – Corrective/Preventative Action Request

CSE – Construction Services Engineer

DE – District Executive

DGE – District Geotechnical Engineer

ECMS – Electronic Construction Management System

EEO – Equal Employment Opportunity

EPA – Environmental Protection Agency

EPR – Employee Performance Review

FHWA – Federal Highway Administration

FID – Field Inspectors Diary

GER – Geological Engineering Report

HAR – Highway Advisory Radio

IIC – Inspector In Charge

ISO – International Organization for Standardization

LAN – Local Access Network

NEOP – New Employee Orientation

NFQ – Notice of Final Quantities  
PA DEP – Pennsylvania Department of Environmental Protection  
PDCA – Plan-Do-Check-Act  
PE – Professional Engineer  
PennDOT – Pennsylvania Department of Transportation  
POM – Project Office Manual  
PPE – Personal Protective Equipment  
PPR – Past Performance Reports  
PPCC – PennDOT Project Collaboration Center  
PSA - Project Site Activity  
PTM – Pennsylvania Test Methods  
QA – Quality Assurance  
QMS – Quality Management System  
RC – Roadway Construction (Standards)  
ROW – Right of Way  
SBSTC – Subsurface Boring, Sampling, and Testing Contract  
SCE – Structural Control Engineer  
SR – State Route  
TC – Traffic Control (Standards)

## 4 – Quality Management System

The Construction Unit is responsible for the management of contracts for bridge and roadway construction. The Construction Unit interfaces with both the Design and Maintenance Units within the District throughout the duration of a project (see Figures 4.1, 4.2 and 4.3).

The Construction Unit QMS encompasses the management of construction projects as designed. Let contracts are placed in “Pre-Award” status in ECMS through the construction phase until the projects are completed and turned over to their owner, usually a specific County Maintenance Unit. We interface with the other units, Design and Maintenance, throughout the life cycle of the project through various processes and communications. The scope of this QMS is limited strictly to the Construction Unit and the processes listed for the responsible management of construction bridges and roadways.

The Construction Unit has established, documented, implemented and maintains a Quality Management System in compliance with ISO 9001:2015. Also, through the implementation of the management review process, internal auditing and our corrective action process, we continually strive to improve its effectiveness.

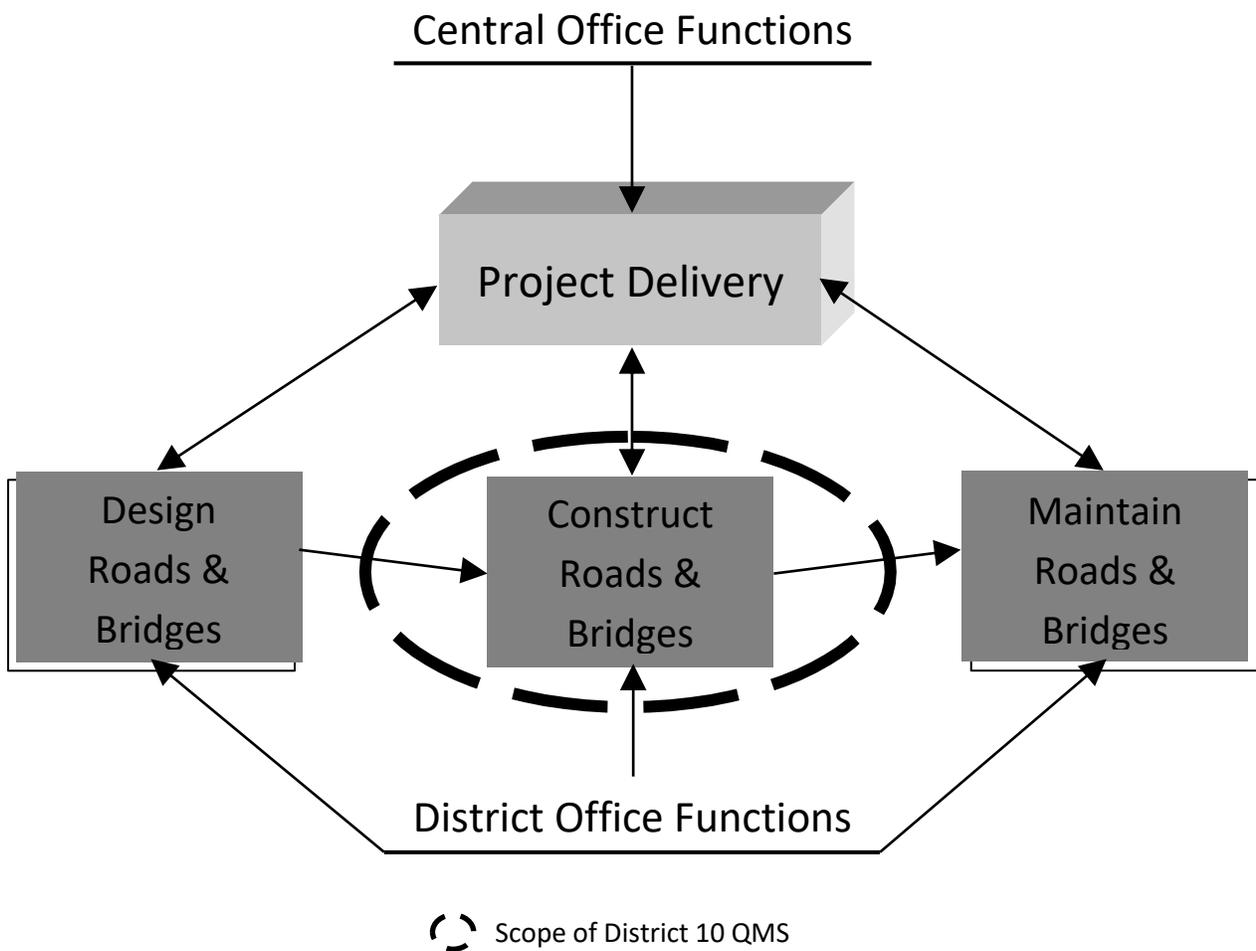
The processes needed for the QMS and their application throughout the organization are identified in our procedures and in other documents, as appropriate, for defined Unit processes of Construction. In addition, the sequence and interaction of these processes, the criteria and methods needed to ensure that both the operation and control of these processes are effective, the monitoring, measuring and analysis of these processes and the actions necessary to achieve planned results are also indicated, as appropriate, in our procedures and other documents, or addressed by ensuring the competence of personnel performing assigned duties.

Regarding availability of resources and information necessary to support the operation and monitoring of these processes, these responsibilities are the purview of the ADE – Construction and are addressed as described in other procedures.

Activities in the Construction Unit that could be considered as “outsourced” are activities such as consultant inspection services and construction support services with control of these activities being described in our purchasing process.

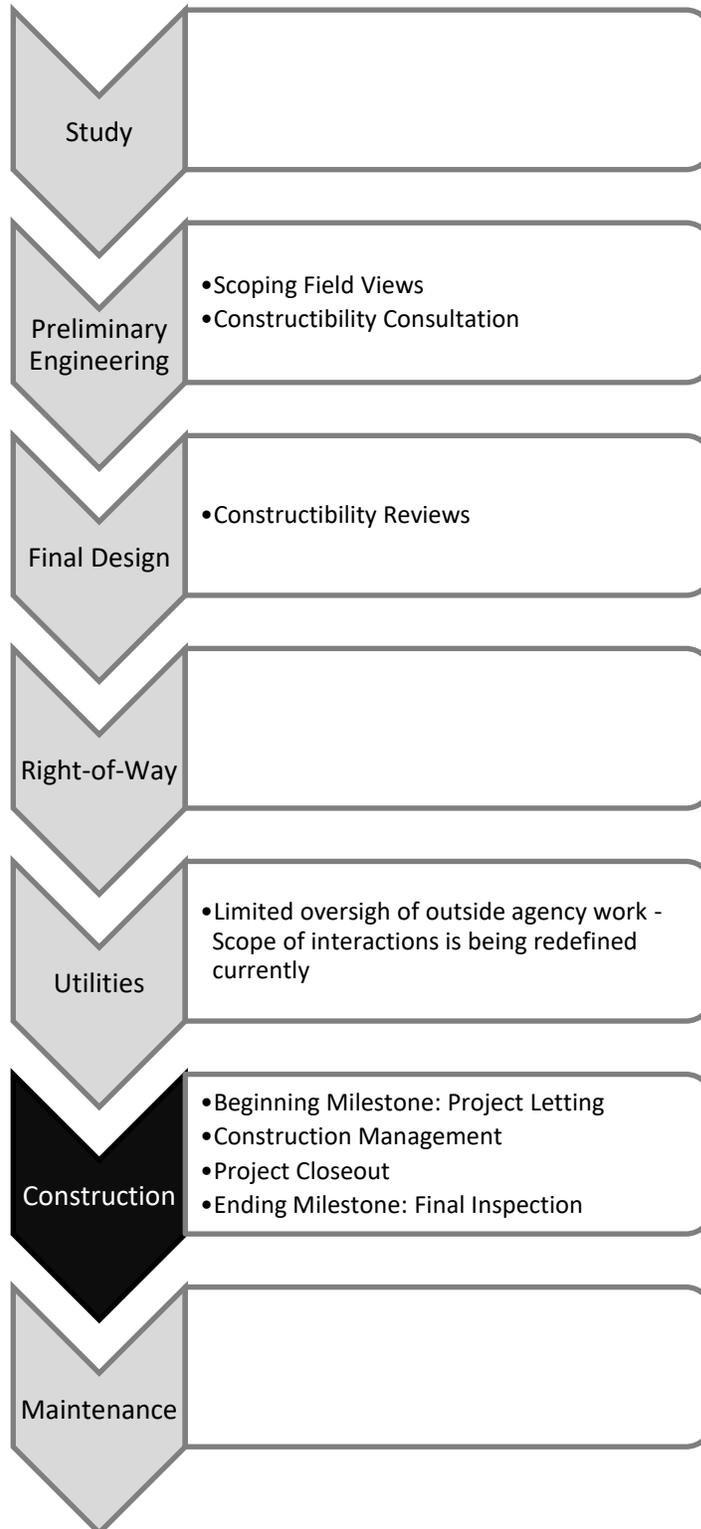
Figure 4.3 indicates one view of how our processes work together to achieve the results intended by implementing a process-approach based QMS. In one sense, we have mini-PDCA (Plan-Do-Check-Act) cycles operating within our processes as well as on a system-wide basis. We also consider end- customer satisfaction as a primary focus of our organization and attempt to align the activities of all our personnel with our PennDOT Vision, Mission and Value statements in a way that contributes to achieving customer satisfaction and quality.

## Interaction of Key Processes Figure 4.1



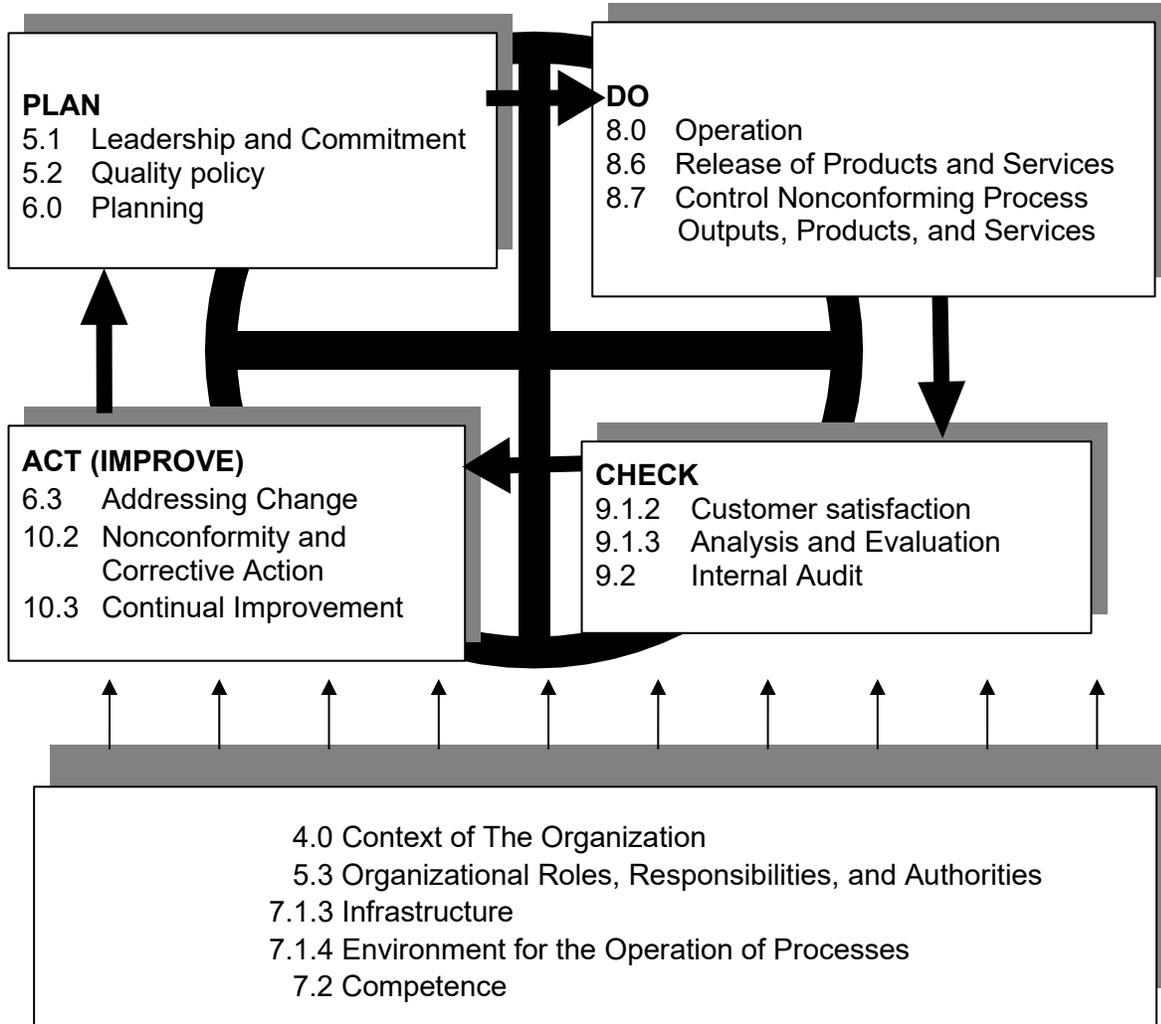
# Key Interfaces During Project Progression

## Figure 4.2



# Plan-Do-Check-Act Cycle

## Figure 4.3



# 5 – Leadership

## 5.1 Leadership and commitment

On at least an annual basis, the ADE – Construction shall provide evidence of commitment to the development, implementation and improvement of the QMS by communicating to the organization the importance of meeting customer, regulatory and legal requirements.

As evidence of the commitment, the ADE – Construction shall maintain and publish the Construction Unit Quality Policy and shall develop quality objectives for appropriate management personnel.

Further, the ADE – Construction shall conduct management reviews on a periodic basis, but at least twice a year.

Finally, the ADE – Construction shall ensure the availability of necessary resources by reviewing these issues at least during the management review process.

## 5.2 Quality Policy

The ADE – Construction is responsible to ensure that the Quality Policy is developed, documented and effectively communicated to all personnel. Further, the ADE – Construction is responsible to ensure that the Quality Policy is appropriate for the organization, that it includes commitment to meeting requirements and for continual improvement. Finally, the ADE – Construction is responsible to assure that the Quality Policy provides a basis for establishing and reviewing objectives and is reviewed periodically for continued suitability.

### 5.2.1 Responsibility and authority

The responsibility, authority and interrelationship of those who manage, perform and verify work affecting quality, are shown on our organizational charts and in our job descriptions. Job descriptions are created and are maintained in Human Resources.

Those with quality responsibilities have the organizational freedom and authority to take the action necessary to manage their responsibilities.

### 5.2.2 Management representative

The ISO Management Representative shall be appointed by the ADE - Construction. The ISO Management Representative is charged with the responsibility and has been granted the authority for ensuring that the requirements of ISO 9001:2015 are successfully carried out and maintained throughout the organization.

The ISO Management Representative reports on the performance of the Quality

System at the Management Review meetings.

Among other duties, the ISO Management Representative shall ensure that the processes of the QMS are established and maintained. The Management Representative shall report to the ADE - Construction on QMS performance including improvement and customer needs at the management review meetings. The management representative will ensure customer survey results and corrective actions are discussed annually with entire Construction Unit staff. Promoting QMS awareness shall be reviewed at least twice annually at the management review meetings.

### **5.2.3 Internal communication**

The Construction Unit shall use the Management Review meetings as its primary vehicle for assuring that communication exists among its various levels and departments regarding the processes of the QMS and their effectiveness. The ADE – Construction shall also communicate with the Construction Unit staff via meetings (e.g. the annual winter school), email and bulletin board postings, as appropriate.

## **5.3 Organizational roles, responsibilities and authorities**

Submit concerns to ISO Management Representative for review at Management Review meetings.

# **6 - Planning**

## **6.1 Actions to Address Risks and Opportunities**

As part of the QMS, Risks and Opportunities have been identified for each process. They are tabulated in the Risk and Opportunity Appendix at the end of this Manual. This Appendix provides a basis for suggestions for improvements that are identified by CPAR, audit, or through staff input, and information for increased staff awareness of the value of the QMS for each process.

## **6.2 Quality Objectives and planning to achieve them**

As part of our QMS planning the ADE – Construction shall ensure that our processes are defined in our Quality Manual, Procedures, Instructions, Forms, and Publications to ensure our processes are operating under controlled conditions and to meet documentation and record- keeping requirements as well as the requirements incorporated in our quality objectives.

The ADE – Construction shall establish quality objectives with appropriate Construction Unit personnel that are measurable and consistent with the District Scorecard, Construction Dashboards and Quality Policy.

The ADE – Construction shall ensure that the resources needed to achieve quality objectives and to meet requirements are identified and are available. In addition to

addressing needed resources, quality planning shall include a review of the QMS processes at least annually as an element of management review.

Also, as appropriate, the ADE – Construction shall consider changes that are occurring in the organization and determine what actions if any are necessary to maintain the integrity of the QMS.

## **6.3 Addressing Change**

Where changes in the Unit's QMS are identified by through audits, customer feedback or management review, recommendations for change shall be reviewed by the relevant process owner, the ADE-Construction, and the ISO Management Representative as part of the management reviews. The revised processes will then be incorporated into the Quality Manual and processes. The implementation of the revised will be determined by Management to prevent disruption and meet existing contract requirements.

# **7 – Support**

## **7.1 Resources**

### **7.1.1 General**

It is the responsibility of the ADE – Construction to determine and provide the resources needed to; a) implement and maintain the QMS and continually improve its effectiveness, and b) to enhance customer satisfaction by meeting customer requirements.

### **7.1.2 People**

For all positions, a job description shall exist that defines the requirements for the position, including the education, skills and experience required for the position.

It is the responsibility of managers to ensure that applicants being considered for hire meet the requirements contained in the job description and to identify any training needs that the “new employee” may require to maintain ongoing competence.

### **7.1.3 Infrastructure**

The organization shall identify facility needs to achieve its purpose. Facilities are provided and maintained by the Department of General Services.

The Management Representative shall annually review facilities to ensure that facilities, equipment, hardware, software and supporting services conform to needs. Recommendations shall be reported to the Management Review Committee.

#### **7.1.4 Environment for the operation of processes**

The ADE – Construction is responsible for identification and ensuring the maintenance of a suitable work environment for the organization.

Human and physical factors related to the work environment are typically not an issue for the office staff because services are performed in state provided facilities. For services provided outside state provided facilities (e.g. at construction sites), the project management staff shall conduct and document weekly safety talks and report unsuitable conditions to supervision for consideration for correction and corrective action.

The ADE – Construction shall review work environment adequacy at least annually in a Management Review meeting.

If we have unique requirements for the work environment, the ADE – Construction shall assure the documentation of a suitable plan to address the unique requirements.

#### **7.1.5 Monitoring and measuring resources**

Since our products are services and the oversight of the work of others (i.e. contractors), the Construction Unit has very limited opportunity for the use of measuring and monitoring devices in its processes. If a circumstance arises where testing or measurements need to be made or taken, we generally use the PennDOT Material Lab in Harrisburg (which is ISO 9001 certified).

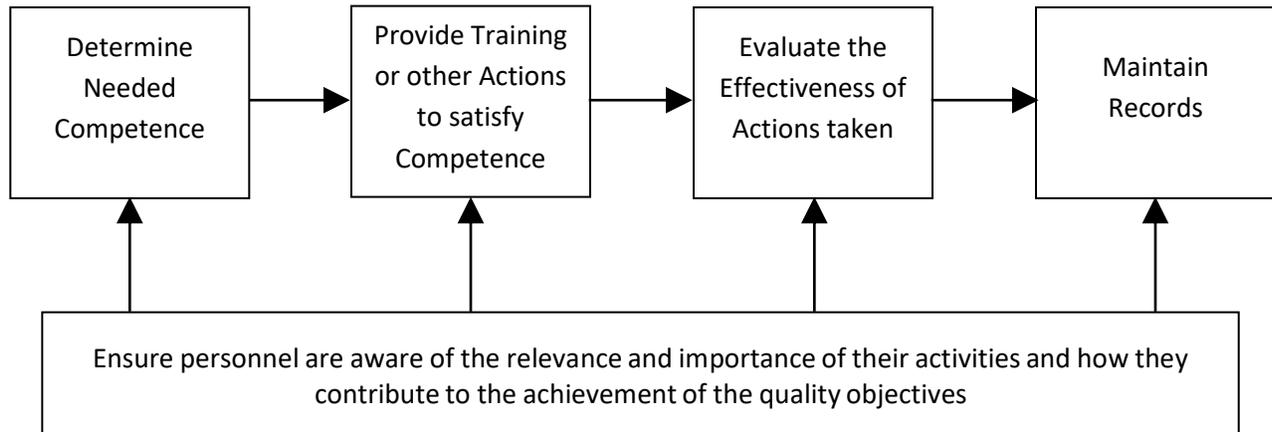
The one situation where calibration of measuring devices is required is for the activities described in Procedure 8.5.1: M2 - Equipment Calibrations – Distributors, Chippers and Rubber Tire Rollers. For this situation, the individuals doing the calibrations are responsible to ensure that the equipment used is adequate to perform the work. Also, the Construction Unit does possess various devices (i.e. nuclear density gauges for compaction, humidity gages for structural steel painting applications and finals unit digitizer for plotting cross-sections). These gages and devices are controlled and calibrated as per established procedures.

If it is required or necessary to control any other measuring and monitoring devices, each sub-unit shall identify the measurements to be made and the measuring and monitoring devices required to assure conformity of product to specified requirements and shall document a Quality Plan to provide the controls necessary to assure control of these measuring and monitoring devices.

Some supplies are distributed or are available through the Construction Unit secretary or the DLCCA. For that equipment, distribution is controlled, and all equipment is signed out, and is surveyed annually or upon a change in employment conditions.

## 7.2 Competence, awareness and training

The management staff is responsible for 1) determining competence, 2) providing training or taking other actions to address competence gaps, 3) evaluating training effectiveness, as appropriate, 4) ensuring that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives and 5) ensuring that appropriate records are maintained (see diagram below).



The requirements for training, awareness and competency for the organization shall include the following processes:

### New full-time employees

- A District orientation, NEOP (New Employee Orientation Program), shall be provided which shall be documented and a record maintained in the personnel file. In addition, the immediate supervisor shall provide training for specific job duties related to the Construction Unit.

### All full-time employees

- A Job Description shall exist for all positions in the organization.
- An appraisal process shall evaluate employee competence by way of his/her Job Description (in accordance with the Human Resources controlled process)
- A core competency exists for each job classification. In addition, an EPR (Employee Performance Review) and training needs assessment is conducted for each full-time employee.
- The EPR review process or other methods shall be used at the discretion of the supervisor to evaluate the impact of training events. For training of one day or more, to immediately assess the effectiveness of training, the trainee shall prepare a note to supervisor, describing information learned and training effectiveness. Supervisors shall compile notes and report on training effectiveness, when appropriate, at Management Review.

- Confirmation of these evaluations shall be retained as quality records.
- Appropriate records of Job Descriptions, education, training, skills and experience shall be retained in the individual personnel files for all organization personnel.

#### Temporary employees

- All temporary employees shall attend an appropriate orientation training session within 2 weeks of employment. Additional training shall be provided at the discretion of the employees' supervisor

Also, it is our expectation, but not a requirement, for supervisors to discuss the purposes and importance of training with employees before training occurs.

All training, education, experience and qualifications shall be documented in the employee's personnel records.

To assure that employees are aware of the importance and relevance of their activities and how they contribute to the achievement of the quality objectives, on at least an annual basis, the ADE – Construction shall ensure that such matters are addressed with all employees.

### **7.3 Awareness**

Staff shall be made aware of the ISO 9001:2015 certification and the ISO 9001-compliant processes and shall be encouraged to utilize them by their supervisors. Awareness presentations will be made available to new and temporary staff.

### **7.4 Documented Information**

#### **7.4.1 General**

The QMS documentation shall consist of a Quality Manual that includes and or references the Policies and Procedures of the organization as they relate to the QMS. It also includes the Quality Policy and objectives, work instructions which provide directions and guidance for the execution of critical tasks, forms which are used to provide a systematic method for recording specific information needed to document activities or the results of activities and the records required by ISO 9001:2015.

Further, the QMS documentation shall include and or reference those documents needed by the organization to ensure the effective planning, operation and control of processes.

## 7.4.2 Creating and Updating

The Master copy of all Quality System documentation shall be maintained electronically under the supervision of the ISO Management Representative. Employees shall check any hardcopy (Un-controlled) Quality System document against the electronic Master to ensure it is the latest version. Any documents for the QMS shall be reviewed for adequacy and approved prior to issue.

At least annually, an agenda item for the ISO Management Review shall be a discussion of the need for review and updating of documents. If updates are necessary, such documents shall be re-approved before reissuing.

Documents of external origin such as federal, state and county publications (e.g. Pub 408), regulations or Standards (e.g. AASHTO) are identified and controlled in each sub-unit to ensure that the proper versions of the documents are used. Any ISO documents (forms) created for District use only will be stored and controlled within our LAN system J: Drive, manual link to "P" drive" to enable field personnel to "read only" in our District 10 internet website.

The creation, revision and distribution of the Quality Manual, Work Instructions and Forms are the responsibility of the ISO Management Representative. All changes to the Quality Manual must be approved by the ADE - Construction and the ISO Management Representative.

The Table of Contents of the Quality Manual shows the latest revision date of each section, so users can verify they have the correct revision. The most recent version of each document in the Work Instructions and Forms file will have a revision date. Any user of hard copy documentation shall check the master listing maintained on the computer master to ensure the hard copy document is the applicable version.

Each sub-unit head is responsible for annually reviewing their processes within this Quality Manual for use during the last quarter of the year and report on the status at a management review meeting. If uncontrolled copies are issued, they shall be clearly identified. Obsolete documents retained for legal or knowledge-preservation purposes shall be suitably identified.

Changes to internal documents may be recommended by any employee and forwarded to the document owner for review and action. The document owner is responsible to control the new issues and revisions and to assure proper approvals and distribution, and to assure obsolete documents are removed.

A Document Ownership Chart shall be maintained by the appropriate sub-unit head who shall conduct an annual review of documents to ensure that the documents remain legible, identifiable and retrievable. Furthermore, each sub-unit head shall maintain a master copy of each document type and identify the current version to ensure applicable documents are available at points of use. These documents are listed in appendix A of this clause.

### **7.4.3 Control of documented information**

Quality records that demonstrate conformance to specified requirements shall be stored for future reference. Quality records are identified in the list below and shall be controlled by the document owner and retained for the length of time specified by the sub-unit or others, as appropriate. If control of document occurs outside the scope of the Quality Manual, then the Commonwealth Records Management Program will control record retention, see Appendix B.

Issues relating to protection, retention time and disposition of quality records shall be discussed at least annually in Management Review and appropriate actions, if any, shall be recorded and instituted.

Each sub-unit defines methods used for the identification, collection; indexing, access, filing, storage, maintenance and disposition of quality records include suitable identification of the contents of files or electronic media or storage boxes.

## **APPENDIX A DOCUMENT OWNERSHIP CHART**

The following is a list of documents referenced in the QMS procedures for individual areas throughout the Construction Unit.

Note: The classification of documents indicated below is for information only. Documents may be used in various places throughout the Construction Unit.

### **TOP MANAGEMENT**

- Customer Survey and Results
- After Action Review Minutes
- Legislative Contact Report [Customer Care Center \(Electronic\)](#)
- Organizational Chart
- Job Descriptions
- Unit Training Needs
- Position Analysis Workbooks
- District Scorecard (Electronic)
- District Dashboard (Electronic)

### **CONSTRUCTION SERVICES ENGINEER**

- [Project Office Manual \(POM\) – Publication 2](#)
- [Construction Manual - Publication 8](#)

### **SCHEDULING AND CONSTRUCTABILITY**

### **ISO MANAGEMENT REPRESENTATIVE**

- ISO 9001:2015 Standard
- Construction Unit Quality Manual

### **MATERIALS**

- Bulletin #5 Design Methods for Air-Entrained Portland Cement Concrete and Ready-Mixed Portland Cement Concrete (Replaced by ACI Pub 211)
- [Bulletin #14 Approved Aggregate Producers – Publication 34](#)
- [Bulletin #15 Approved Construction Materials – Publication 35](#)
- [Bulletin #27 Bituminous Concrete Mixtures, Design Procedures – Pub. 27](#)
- [Bulletin #41 Approved Bituminous Asphalt Producers – Publication 41](#)
- [Bulletin #42 Approved Concrete Producers – Publication 42](#)
- ASTM Specifications
- AASHTO Specifications
- [Maintenance Manual – Publication 23](#)
- [PTM Pennsylvania Test Methods Manual – Publication 19](#)

## **GEOTECHNICAL**

[Geotechnical Investigation Manual - Pennsylvania Publication 222](#)  
[Geotechnical Engineering Manual – Pennsylvania Publication 293](#)  
[Pennsylvania Design Manual 4 –Publication 15M](#)  
AASHTO LRFD Bridge Design Specifications  
Geotechnical Engineering Report (Project Specific)  
Foundation Report Project Specific (Project Specific)  
Various Geotechnical Textbooks  
PennDOT Mining Handbook

## **CONSULTANT AGREEMENT ENGINEER**

[Policy and Procedures for the Administration of Consultant Agreements–  
PennDOT Publication 93](#)

## **LABOR CONTRACT COMPLIANCE**

PennDOT Labor Compliance Manual (Project Specific)

## **STRUCTURAL CONTROL**

Structural Welding Code  
[Bridge Construction Standards – Publication 219M](#)  
[Bridge Design Standards – Publication 218M](#) Bridge  
Coating Inspection Manual

## **FIELD OPERATIONS**

[Specifications – Publication 408](#)  
Contract Documents Including Special Provisions (Project Specific)  
[Roadway Construction Standards – Publication 72M](#)  
[Traffic Control Standards - Publication 111](#)  
[Bridge Construction Standards – Publication 219M](#)  
ACE Manual – Publication 593  
[Official Traffic Control Devices – Publication 212](#)  
[Temporary Traffic Control Guidelines – Publication 213](#)  
Project Plans (Project Specific)  
Cross Sections (Project Specific)  
Project Partnering Meeting Minutes (Project Specific, if applicable)

## **FINALS**

Estimate Items Books (ECMS)  
Project Materials Book (Electronic)  
Project Quantity Book  
Project Concrete Book (MCCID App)  
Project Site Activity Sheets (ECMS)

## APPENDIX B

### QUALITY MANAGEMENT SYSTEM FORMS/RECORDS SITES

Note: Forms may be used in various places throughout the Construction Unit.

Each Unit has specific retention times for their individual records

Electronic sites have lists of Construction forms to be used during various phases/operations of the Construction process, updated by Central Office.

#### ***Publications and Reports***

[Construction Bulletins & Publication Information \(PENNDOT.gov > Projects & Programs > Construction\)](#)

#### ***Forms***

- [PENNDOT.gov > Forms, Publications, and Maps](#)

***ECMS*** – go to References – go to Publications:

- Construction Forms
- Construction Related E-Pubs
- Highway Related

#### ***Out of Scope Documents/Records***

- Management Directive 210

## 8 – Operation

### 8.1 Operational planning and control

The project delivery processes for the Construction Unit exist in eight (8) areas:

- Materials Unit
- Geo-Technical Unit
- Consultant Agreements
- Labor Contract Compliance
- Structural Control
- Field Operations
- Finals Unit
- Scheduling and Constructability

Charts 8.1 to 8.8 below indicate how the various key project delivery processes of the Construction Unit fit together including: the inputs and outputs of key processes, the critical process steps (activities), important interactions, and key measures of performance. These charts indicate our approach to planning the project delivery processes, these processes will be described in more detail in section 8.5.1.

The Construction Unit uses a process management approach that begins with a clear understanding of quality objectives and product requirements. The quality objectives come from the Current Administration's Strategic Plan. The project requirements come from the Department of Transportation's specifications, standards, material testing, and project specific special provisions.

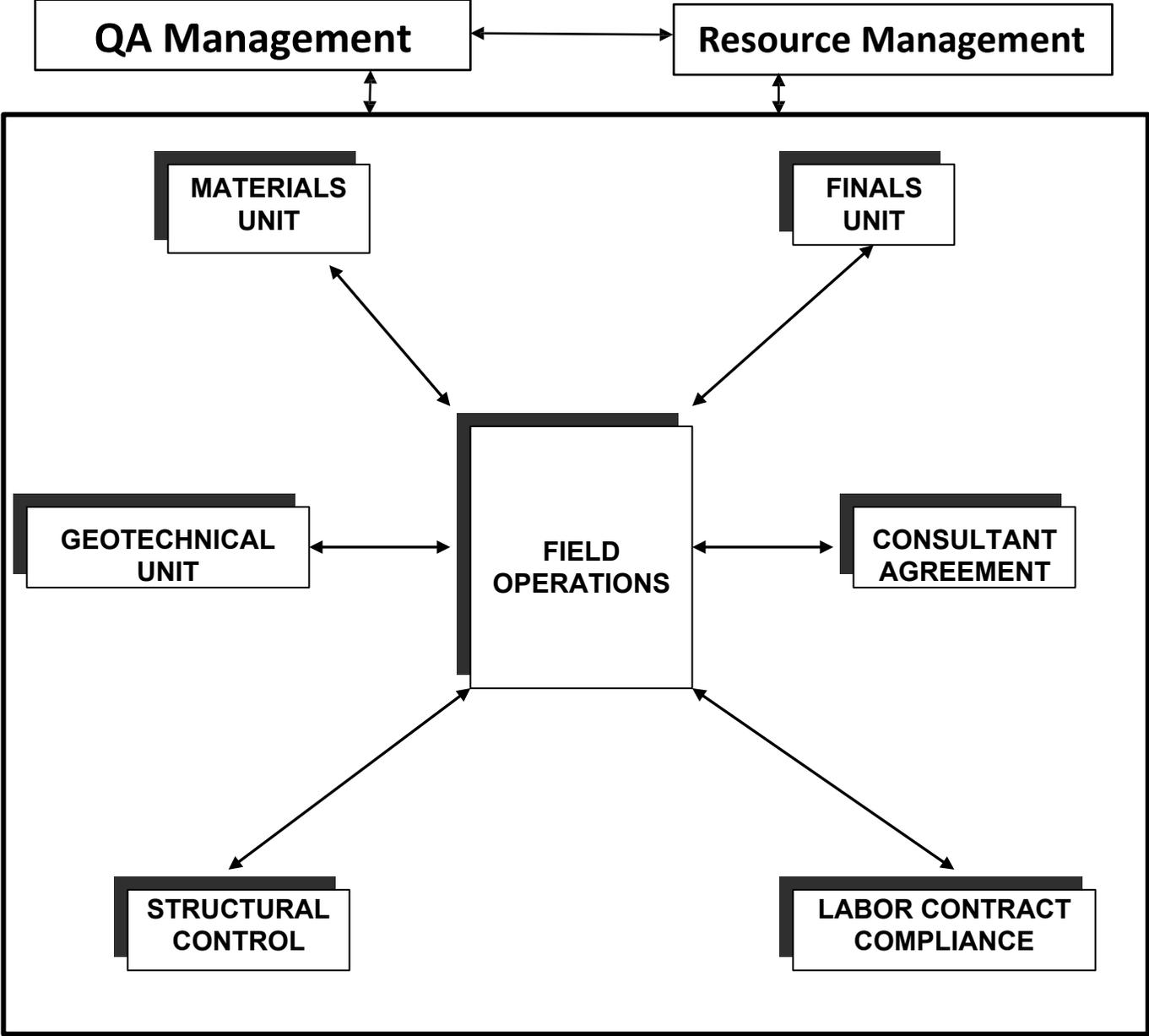
Each sub-unit within the Construction Unit has a counterpart or point of contact in the central office that has established processes, documents, and resources for specific activities. The counterparts are in Central Office sections and bureaus that provide direction, processes, documents, and specifications.

The Construction Unit works very closely with their central office counterparts to determine best practices for verification, validation, monitoring, inspection, and test activities. Also, input and advice are received from counterparts in other Districts.

The records needed to support these activities are specified by the central office in a series of reports, documents, specifications, and forms. Most records are "built into" the system because critical central office functions will not be processed until proper paperwork is submitted.

Chart 8.1

Key Areas of the Construction Unit



## Chart 8.2

### Materials Processes

#### INPUTS

- Publication 408 Specifications
- Standards
- Special Provisions
- Project Specifications
- Project Office Manual (P.O.M)
- Request from other units

#### ACTIVITIES

- Supplier Process
  - Approve Suppliers
  - Monitor Suppliers
- Provide Documentation
  - Initial Plant Inspection
  - District Quality Assurance Reviews
  - Plant Book and Master Diary
  - Concrete and Asphalt Mix Design Approvals

#### OUTPUTS

- Materials that meet Department Specifications

#### INTERACTIONS

- Materials Lab in Harrisburg
- Other Districts
- Suppliers and Contractors
- Other District Units

#### MEASURES

- Dashboards
- Scorecards
- QA Reviews
- Customer Surveys

## Chart 8.3

### Geotechnical Processes

#### INPUTS

Request from:

- Design
- Construction
- Maintenance
- Other

#### ACTIVITIES

Design/Construction/Maintenance

- Receive request
- Conduct study
- Prepare report

Design Consultants/Contractors

Mining Companies

- Receive study
- Review study
- Prepare report

#### OUTPUTS

Reports:

- Roadway
- Soil  
Reconnaissance
- Geotechnical  
studies
- Structure  
Foundation  
Report

#### INTERACTIONS

- Design
- Construction
- Maintenance
- Consultants
- Mining  
Companies
- Central Office

#### MEASURES

- Dashboards
- Scorecard
- Customer  
Surveys

## Chart 8.4

### Consultant Agreements Processes

#### INPUTS

- Publication 93 Consultant Agreement Manual
- Request within unit

#### ACTIVITIES

- Create Agreement
- Monitor Agreement
- Manage Records
- Generate Work Orders
- Closeout Project

#### OUTPUTS

- Final Invoice
- PPR
- Closeout Work Order

#### INTERACTIONS

- ACE/ACM
- Payroll
- Consultants

#### MEASURES

- Response time of proposal review
- Scorecard
- Survey

## Chart 8.5

### Labor Contract Compliance Processes

#### INPUTS

- Contract
- Request from Prime Contractor (ECMS / CS-4339R)
- Project Office Manual (POM)

#### ACTIVITIES

- Verify subcontractor is on state approval list
- Monitor subcontractor participation

#### OUTPUTS

- Approval of subcontractors
- Wage Checks
- Prevailing Wage
- EEO Requirements

#### INTERACTIONS

- Prime contractors
- Subcontractors
- IIC

#### MEASURES

- QA Reports
- Labor Complaints
- Work Order

## Chart 8.6

### Structural Control Processes

#### INPUTS

- AASHTO Manual
- Structural Welding Code
- Bridge Coating Inspection Manual
- Publication 408 Specifications
- Standards
- Special Provisions
- Project Specifications
- Project Office Manual

#### ACTIVITIES

Review Design Structure Plans for Constructability

Review Contractor's Plans for:

- Demo Plans
- Beam Erection
- Substructure Formwork
- Overhang and False Work Details
- Paint Containment

Assistant Construction Engineer for:

- Local Bridge Projects
- Bridge Painting Projects

#### OUTPUTS

- Reviewed Structure Plans
- Reviewed Paint Project Submissions
- Approval Letters
- Technical Support

#### INTERACTIONS

- Design Unit
- Construction Unit
- Consultants
- Geo-technical Unit
- Central Office
- Other Agencies

#### MEASURES

- Bridge Construction on or off schedule
- Dashboard
- Scorecard

## Chart 8.7

### Field Operations Processes

#### INPUTS

- Contract
- Project Plans
- Standards
- Specifications
- Special Provisions
- Designer Notes

#### ACTIVITIES

- QA Oversight
- Work Authorization
- Work Orders
- Estimates
- Time Extensions
- Customer Complaints
- Environmental Mitigation
- Budget Management
- Work Zone Traffic Control Reviews
- Ensure Contract Compliance
- Close-Out Project

#### OUTPUTS

- Payment documentation
- As-Builts
- Quality Project
- Finaled Project

#### INTERACTIONS

- Other units
- Design
- Maintenance
- Suppliers
- Contractors
- State and Federal Agencies
- Property Owners
- Traveling Public
- Central Office

#### MEASURES

- Project specific dashboards
- Scorecard

## Chart 8.8

### Final's Unit Processes

#### INPUTS

- Publication 408 specifications
- Standards
- Special Provisions
- Project Specifications
- Project Office Manual (POM)
- Contracts
- Budget
- ECMS

#### ACTIVITIES

- Start Projects
- Work Order Process
- Audit Process
- Process payments
- Adjust Contract Funding

#### OUTPUTS

- Completed construction project file
- Close out projects
- Provide support to IICs
- Contract Compliant Project

#### INTERACTIONS

- Field operations
- Contractors and suppliers
- Bonding Agencies
- Other Agencies

#### MEASURES

- Dashboards
- Scorecard

## 8.2 Requirements for products and services

### 8.2.1 Customer communication

The Construction Unit does not have customers in the sense of a person or organization that buys goods or services from a store or business<sup>1</sup>. Our definition of customer is according to the ISO definition of “a person or organization that could or does receive a product or service that is intended for or required by this person or organization, either internal or external to our organization” [ISO 9000:2015] The Construction Unit serves a variety of different customer types, both internal and external, predominantly through the execution of services. The specific type of customer varies with each process.

The Construction Unit services a variety of external customers.

In the broadest sense the taxpayers are the ultimate customers, but it does not make sense for the Construction Unit to be communicating with taxpayers in relation to product information, enquiries, contracts or order handling, including amendments to highways being constructed.

Customer communication is to inform and relating to customer feedback and customer complaints. Examples of our communication include our website to keep the public apprised of the status of our projects, the HAR – the Highway Advisory Radio system and CB Wizards to provide real-time information to road users about current highway conditions. We also initiate, where appropriate, and at the discretion of project managers, Community Action Committees (CAC), public meetings, and PennDOT Connects meetings to solicit customer feedback.

Because the scope of the QMS is only to the Construction Unit, the Design and Maintenance Units in the District also count as external customers. Interactions with Central Office would also be considered as interactions with external customers. Interactions with contractors on Department projects, and consultants performing design services or assisting with inspection would also be considered as interactions with external customers.

The processes in the QMS also service the Unit’s internal staff and sub-units as internal customers.

Additionally, the Construction Unit shall participate in the collection of customer satisfaction data and review this data at least annually in management review for consideration for improvement.

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<sup>1</sup> "Customer." Lexico.com, edited by Oxford University Press and Dictionary.com. Lexico.com, [www.lexico.com/en/definition/customer](http://www.lexico.com/en/definition/customer). Accessed 27 Apr. 2020.

## **8.2.2 Determining the requirements for products & services**

The Construction Unit does not receive requirements in a conventional manner. Requirements are presented to the Unit from either a PennDOT Design group or from a Consulting Engineer. By the structure of the Pennsylvania Department of Transportation, the Construction Unit is responsible for reviewing plans and specs and provides comments to the design project manager. The Construction Unit also may provide input to the design process by participating, as appropriate, in constructability reviews during design and participating in initiatives to solicit end-customer input (i.e. taxpayers) regarding proposed projects prior to design completion (e.g. Community Action Committee – CAC).

The role of the Construction Unit is to provide quality assurance and oversight to assure contract compliance of projects per the specifications, in accordance with department policies and procedures.

Regarding requirements not stated, the Construction Unit is mandated to adhere to Federal and State general requirements and to industry standards, as applicable, and to requirements contained in such documents as the POM and Publication 408.

Inspectors-In-Charge are responsible for ensuring that applicable requirements, even if not stated in contracts, but mandated elsewhere are addressed as an element of project execution.

## **8.2.3 Review of requirements related to products/service**

The Construction Unit is not directly involved in the process of issuing requests for bids or reviewing the bid response by contractors (i.e. bids to perform construction services). Our role in the process is to ensure that projects are constructible prior to release for bid. We do this through a constructability review process. As evidence of such review, a completed checklist is required as a quality record for all projects as a minimum. A constructability review can be as simple as a brief review of the design after completion by the design unit or much more comprehensive interactions with the design unit throughout the duration of the design process. (Refer to Figure 4.2 and the Process Manual)

It is our intention to focus on expanding construction unit involvement in the constructability review process and to participate as early as possible in the design process based on data that indicates potential for significant savings by performing a robust constructability review during the design phase of projects.

## **8.3 Design and Development of products and services**

While it is Department Policy for the design of PennDOT projects to be the responsibility of the Design Units in the Engineering Districts, the Construction Unit in District 10 initiated a process in cooperation with the Design Unit and the Maintenance Unit to ensure the constructability of each project.

While the Construction Unit does not design, nor maintain the projects, the Geotechnical Unit does provide design work on a limited basis as outlined in their current processes. The Geotechnical Unit reacts to requests from the Design or Maintenance Units, who are outside the QMS scope, for very specialized and specific needs. The specialized designs are then combined as part of a greater overall project design that is then constructed to produce a safe product.

To enhance the ability of PennDOT to provide safe quality roads at the lowest cost, the Construction Unit shall, where appropriate, provide input to the design process by participating in constructability reviews during the design process and by participating in initiatives to solicit end-customer (i.e. citizens) input for proposed projects prior to design completion. It is the intention of the Construction Unit to encourage more comprehensive constructability reviews and participate early in the design process.

While it is not a requirement that the Design, Maintenance and Traffic Units participate in the Construction phase of projects, the Construction Unit shall encourage involvement by personnel from these Units in the Construction phase of projects and shall monitor results in this area by maintaining scorecard metrics of such involvement, as appropriate.

## **8.4 Control of externally provided products and services**

The process of “purchasing” contractor services to build roads is handled by the Pennsylvania state bidding and contract award process. District 10 Construction Unit has limited involvement with these highly regimented and controlled processes. When appropriate (e.g. for large or complex projects), pre-bid meetings shall be held with participation by Construction Unit staff, as appropriate.

There are two types of purchased services that are made by the Construction Unit. Both have impact on ultimate customer satisfaction. These services are:

- Construction Services
- Consultant Inspection Services

Both key processes are controlled. These controls are described in 8.5.1 under Consultant Agreements.

It should be noted that the initial evaluation of construction services suppliers (consultants) and consultant inspection services suppliers (inspectors) is conducted by the Central Office. The list of approved consultants is maintained by the Central Office.

To ensure ongoing acceptability of consultants a written evaluation is conducted by Construction Unit personnel for purchased services for every project per Publication 93.

Records of evaluations are maintained. Records of acceptable consultants of purchased services are maintained by the Central Office.

## 8.5 Production and Service Provision

### 8.5.1 Control of Production and Service Provision

The Construction Unit is divided into sub-units as follows:

Units	Code
Materials	M
Geotechnical	GT
Consultant Agreements	CA
Labor Contract Compliance	LC
Structural Control	SC
Field Operations	FO
Finals Unit	F
Construction Services	C
Scheduling and Constructability	CPM
Constructability Review	CR

Each of the units has a series of key procedures to control the delivery of products and services. In each procedure, the relevant standards are noted along with relevant work instructions. The procedures also specify relevant equipment, as well as relevant monitoring and measuring devices. Also described are steps for monitoring and measurement.

### 8.5.2 Identification and Traceability

As per contract specifications, requirements for identification or traceability are defined in Publication 408 (e.g. for steel heat numbers). The IIC is responsible to ensure that all requirements set forth in the Publication 408 concerning identification and traceability are met.

### 8.5.3 Property belonging to customers or external providers

This requirement generally does not apply to Construction Unit services. If we have a customer requirement where the Construction Unit is in possession of customer supplied product, the Management Representative shall ensure a special quality plan is prepared to address the situation.

## **8.5.4 Preservation**

This requirement generally does not apply to all Construction Unit services since contractors who build our roads or bridges are responsible for all the material and components of “the products” until time for closeout of a contract. Once the contract is closed out, the product becomes the ownership of the Maintenance Unit, which is not covered by this QMS.

If circumstances ever arise that require attention of preservation of property, the Management Representative shall create a special quality plan to address the situation.

## **8.6 Release of products and services**

The Construction Unit services delivered to customers are described primarily in the procedures described in 8.5.1 and presented in the Process Manual. Other QMS processes are described in procedures throughout this Manual. The processes described in these procedures are designed to meet the State and Federal regulatory requirements. Our method for monitoring the ability of these processes to achieve planned results include the measurement and analysis, the use of internal audits, Management Review, and the corrective action process when planned results are not achieved.

We also use dashboards, scorecards and action items to track performance indicators, which we monitor within the Construction Unit and use to consider improvement opportunities. We also report scorecard results to Central Office management.

For special projects or unique contracts, an IIC shall identify and document required methods for measuring and monitoring, and shall assure that measurement and monitoring is used to achieve customer requirements.

Our services are provided in accordance with requirements defined in contracts, specifications and Department publications. Our primary opportunity to monitor and measure services to verify that requirements have been met occurs after the services have been provided. Many of the Unit’s processes and products are handled electronically, with multiple stages of reviewers, both inside and outside the Unit. Acceptance of other materials and approval of construction processes are provided only after acceptance by Unit staff of Quality Control plans or other documentation as specified in the Department’s Manuals, Specifications, and contract documentation.

The IIC shall as appropriate, review the physical work being performed and review the documentation to ensure that it meets requirements.

Additionally, on an annual basis, the performance of each employee is reviewed via our EPR process.

## **8.7 Control of Nonconforming process outputs, products, and services**

Products of the Construction Unit are primarily service in nature and typically do not have tangible products associated with the provided services. Therefore, there is limited opportunity or requirement to consider disposition of non-conforming material.

It should be noted that, if a contractor supplies what is determined to be non-conforming material, that Construction Unit personnel may be involved in ensuring that the remedy or remedies are performed by the contractor in accordance with the requirements contained in Publication 408 or other applicable documents.

If circumstances arise where an actual tangible product is found to be non-conforming, the individual discovering the non-conformance from requirements shall document the non-conformance. Each Unit documents the non-conformance observed of their requirements as needed to ensure the product, service or requirement is fulfilled. The associated documents that each Unit utilizes will be maintained within the Unit or on the project. These document systems will be reviewed by responsible unit members for conformance, closure or systematic issues. If there are trends or an immediate need, the issue will be raised to CPAR level. CPAR's, along with individual Units reporting on their process findings or finding trends, are discussed at the Management Review Meetings.

The Management Representative in assuring the documentation of a quality plan shall reference ISO 9001:2015 to assure that the quality plan is documented in accordance with this element of the standard.

Quality Control of service providers is achieved through electronic evaluations performed at the completion of service provision. Unit staff can address issues throughout a project through regular communication with contractor and consultant staff in accordance with each project's Issue Escalation Matrix. Other options for addressing issues with non-conforming processes and services are laid out in relevant Department publications such as Pub. 408 and Pub. 93.

# **9 – Performance Evaluation**

## **9.1 Monitoring, Measurement, Analysis and Evaluation**

### **9.1.1 General**

We view this clause as a “think” clause, with the processes required to meet its contents described in other clauses of our QMS. By instituting this approach, we plan and implement the monitoring, measurement, analysis and improvement of processes to ensure conformance to our product, QMS and continued improvement of our system.

### **9.1.2 Customer satisfaction**

The Construction Unit employs several strategies to monitor customer perception as to whether the organization has met customer requirements. Since the ultimate customers are the users of the roads and bridges we build. District 10 Construction conducts customer surveys, Internal, External – Project Specific property owners, commuters, Material Suppliers, Prime Contractors and Consultants. The Project specific projects are decided by Management.

Information relating to customer perception as to whether the organization has met customer requirements shall be discussed and handled in at least one of the following: Immediate response to concern within time frame of CCC, weekly Construction Staff meetings if immediate attention/discussion is required, Management Reviews and for Group discussion at Winter School.

### **9.1.3 Analysis and evaluation**

The Construction Unit shall collect and analyze information relating to customer satisfaction, product conformity and the performance of contractors, consultant inspectors, and suppliers to contractors. We shall also review our dashboards, action items and scorecard quarterly for opportunities for improvement and look for trends in our process performance and for opportunities to initiate corrective and preventive action.

Analysis of data shall be an agenda item for Management Review.

## **9.2 Internal Audit**

The management representative shall prepare an annual audit schedule, showing audits to be performed throughout the year based on status and importance. The schedule shall be presented to the ADE-Construction for review and approval and distributed to all affected departments. The schedule shall be reviewed in Management Reviews for appropriateness. Internal audits shall be conducted on a periodic basis, with all aspects of the QMS being audited within a 3-year period. Consideration will be made during the schedule planning on the importance of processes to be audited based on negative trends in product conformance (CPAR's reported for an area) or any other issues that adversely impact our system.

The management representative shall maintain a list of qualified personnel to conduct internal audits. The management representative shall ensure that personnel assigned to perform internal audits are competent, impartial and objective. Auditors may not audit their own work.

A team of one or more qualified auditors shall conduct individual audits. The auditor(s) shall notify the auditee at least one week prior to the meeting or a timeframe mutually agreed by both parties.

Upon completion of each audit, a report shall be prepared and presented to the ADE – Construction, the manager or supervisor of the area being audited, the Management Representative, and other individuals at the discretion of the auditor within 5 working days for distribution. Completed audit reports will be stored electronically on the departments' Local Access Network (LAN). Adverse audit findings, if any, shall be captured on Corrective Action Request forms.

The disposition of any Corrective Action Requests as the result of an internal audit shall follow the Corrective Action procedure, noting that this procedure requires verification of the actions taken and the reporting of verification results. Management responsible for the area being audited shall respond to any observations, areas for improvement identified and nonconformities noted during the audit prior to the next regularly scheduled management review meeting.

The management representative shall review all internal audit reports and shall analyze them for trends and opportunities for improvement and shall report the results of this analysis the ADE – Construction at least twice during the year. Refer to the chart in Process C4.

If an internal audit cannot be completed in the timeframe designated by the approved audit schedule, the Management Representative shall determine if there is adequate reason to re-schedule the audit without implications on the auditor's EPR.

## **10 – Improvement**

### **10.1 General**

Any individual in the Construction Unit is free to develop their own methods of meeting the requirements of each process and to share ideas for improvement with their associated staff either informally at staff meetings or officially through the IdeaLink or WorkSmart systems controlled by Central Office or through elevating ideas through the chain of command for each document or publication.

### **10.2 Nonconformity and Corrective Action**

Any individual in Construction Unit is authorized to generate a Corrective/Preventive Action Request (see attached form). In addition, the Corrective Action process shall consider customer complaints that arise via letters, facsimiles, emails and phone conversations from any source, if a trend is being observed.

The Corrective Action process shall also require review of dashboards, action items and scorecard to identify trends of customer dissatisfaction, concerns or internal process performance related to any dimension of any Construction Unit services or products. In addition, the Corrective Action process may be considered for all issues raised via any contract mandated customer complaint procedure and those arising out of internal audits. CPAR's generated by internal

audit findings require the audit team representative initiating the request to verify its closure by informing the auditee and management representative that the identified issue has been resolved.

All Corrective/Preventive Action Request forms shall be forwarded to the Management Representative who shall be responsible for assigning the evaluation and subsequent action regarding the Corrective Action to the individual deemed responsible for the activity.

The various units of Construction have developed and are utilizing specific documentation tools for their own processes/needs. These tools will be kept within the specific units or projects as the Units require. Individual units will review and discuss their findings for developing trends at each Management Review Meeting. If at this time, a trend or need is seen, a CPAR will be generated to close a process failure.

The process for evaluating the Corrective Action Request and determining the appropriate course of action may consider the following elements, as appropriate:

1. Identify deviations from requirements.
2. Investigate the causes of the deviation.
3. Explore Corrective Action alternatives or determine that Corrective Action is not appropriate or necessary for this particular issue.
4. Select the most appropriate Corrective Action, if any, and identify the responsibility and a time frame for completion.
5. Assure that Corrective Action has been effectively implemented, or refer the Corrective/Preventive Action Request to Management Review, if the implementation of Corrective Action requires resolution at that level of the organization.
6. Results of the Corrective Action process shall be recorded, and records maintained as Quality Records.

All requests for Corrective Action shall be logged on a Corrective/Preventive Action Master Log.

# CORRECTIVE/PREVENTIVE ACTION REQUEST

Rev1/13

CPAR - \_\_\_\_\_

**TO:** [semarshall@pa.gov](mailto:semarshall@pa.gov) (Man. Rep.) **FROM:** \_\_\_\_\_

**CC:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**A. Corrective/Preventive Action Request** *(Please complete a separate form for each item):*  
In the space below describe the issue/problem/situation or customer complaint and the root cause of issue.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

(When section A has been completed, forward this form to the Management Representative)

Received by Management Representative: Signed \_\_\_\_\_ Date: \_\_\_\_\_

Assigned to: \_\_\_\_\_ Date: \_\_\_\_\_ Response requested by: Date \_\_\_\_\_

**B. Corrective/Preventive Action Response** *(Describe the Corrective/Preventive action to be taken, estimated completion date and means of verification of closure.)*

Signed \_\_\_\_\_ Date: \_\_\_\_\_

(When section B has been completed, return to the Management Representative)

**C. Review of Corrective/Preventive Action implementation Comments:**

Signed \_\_\_\_\_ Date: \_\_\_\_\_

(Management Representative)

## 10.3 Continual Improvement

Our approach to continual improvement is to use the management review process as a primary mechanism for gathering information relating to the QMS and our products and processes. This is also our forum for setting priorities and allocating resources to achieve improvement.