



**METROPOLITAN WASHINGTON AIRPORTS AUTHORITY**  
**DULLES CORRIDOR METRORAIL PROJECT**

**Quality Program Plan**

Revision 6, June 2008

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**METROPOLITAN WASHINGTON AIRPORTS AUTHORITY**



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## LIST OF ACRONYMS

A2LA – The American Association for Laboratory Accreditation  
ADA – Americans With Disabilities Act  
DIAAH – Dulles International Airport Access Highway  
DTP – Dulles Transit Partners, LLC  
FTA – Federal Transit Administration  
ICBO ES – The International Council of Building Officials Evaluation Service  
LAN – Local Area Network  
LPA – Locally Preferred Alternative  
Airports Authority – Metropolitan Washington Airports Authority  
NDE – Non-destructive Examination  
NVLAP – The National Voluntary Laboratory Accreditation Program  
PPTA – Virginia Public-Private Transportation Act  
QA – Quality Assurance  
QA/QC – Quality Assurance/Quality Control  
QPP – Quality Program Plan  
VDOT – Virginia Department of Transportation  
WMATA – Washington Metropolitan Area Transit Authority

**Metropolitan Washington Airports Authority  
Quality Policy Statement**

It is the policy of the Washington Metropolitan Airports Authority (Airports Authority) that the Dulles Corridor Metrorail Project (Project) be planned, designed, and constructed with the highest regard for quality. All consultant and contractor Quality Assurance/Quality Control (QA/QC) plans shall fully meet the mandates outlined in the contract documents and be executed independently of cost and schedule Project functions. Each QA/QC plan must define quality goals and objectives, specify quality-related activities, and assign responsibilities for ensuring that the activities are conducted and that the objectives are met.


This *Quality Program Plan* provides specific requirements for program implementation based on Federal Transit Administration (FTA) and Airports Authority policy, including the assignment of primary responsibility for implementation. The Airports Authority and DTP consultant and contractor QA/QC plans will outline specific requirements for individual activities during design and implementation of the Project. Each contract issued by Project participants for Project work will be reviewed to determine that specific portions of the QA/QC plan are customized to the Project specific scope of work.

The *Quality Program Plan* shall provide for implementation of administrative and control measures during design, procurement, construction, installation, testing, inspection, start-up, and turnover. The administrative and control measures shall be prepared and implemented in such a manner as to contribute to and document the attainment of a safe, reliable, economical and convenient public transit system.

As described in Section 1.0 of this Plan, the Airports Authority Vice President for Engineering is accountable for planning, designing, and constructing the Project with the highest regard for quality. For the Dulles Corridor Metrorail Project, line responsibility for quality has been assigned to the Airports Authority Project management team. Led by the Project Director, the Airports Authority Project management team will establish the administrative processes and procedures necessary to ensure that each activity undertaken focuses on quality performance above all other goals. The Project Director will work with the Dulles Project team to determine which processes they will use to ensure that all stakeholders have confidence that the quality activities will be properly performed.

The Airports Authority Project Quality Assurance/Quality Control (QA/QC) Manager reports to the Project Director and has been formally delegated the authority to implement quality-related activities in all areas of the Project; to identify quality problems; to control further processing, delivery, or installation of nonconforming or deficient work; to initiate, recommend or provide solutions to project management; and to verify implementation of solutions. In matters related to quality, the Project QA/QC Manager shall have complete and ready access to the Airports Authority Project Director. In cases where conflicts regarding quality cannot be resolved between the Project QA/QC Manager and members of the Project team, final resolution will rest with the Airports Authority Project Director.

The quality of the work conducted for the Project has a direct effect on the successful integration of the line into the regional Metrorail system. Quality is the ultimate measure by which the public will judge the success of Project efforts. It therefore follows that the quality policies and procedures must be faithfully implemented by every Project participant.

Signed:   
Frank D. Holly  
Vice President for Engineering  
Metropolitan Washington Airports Authority

Date: April 26, 2007

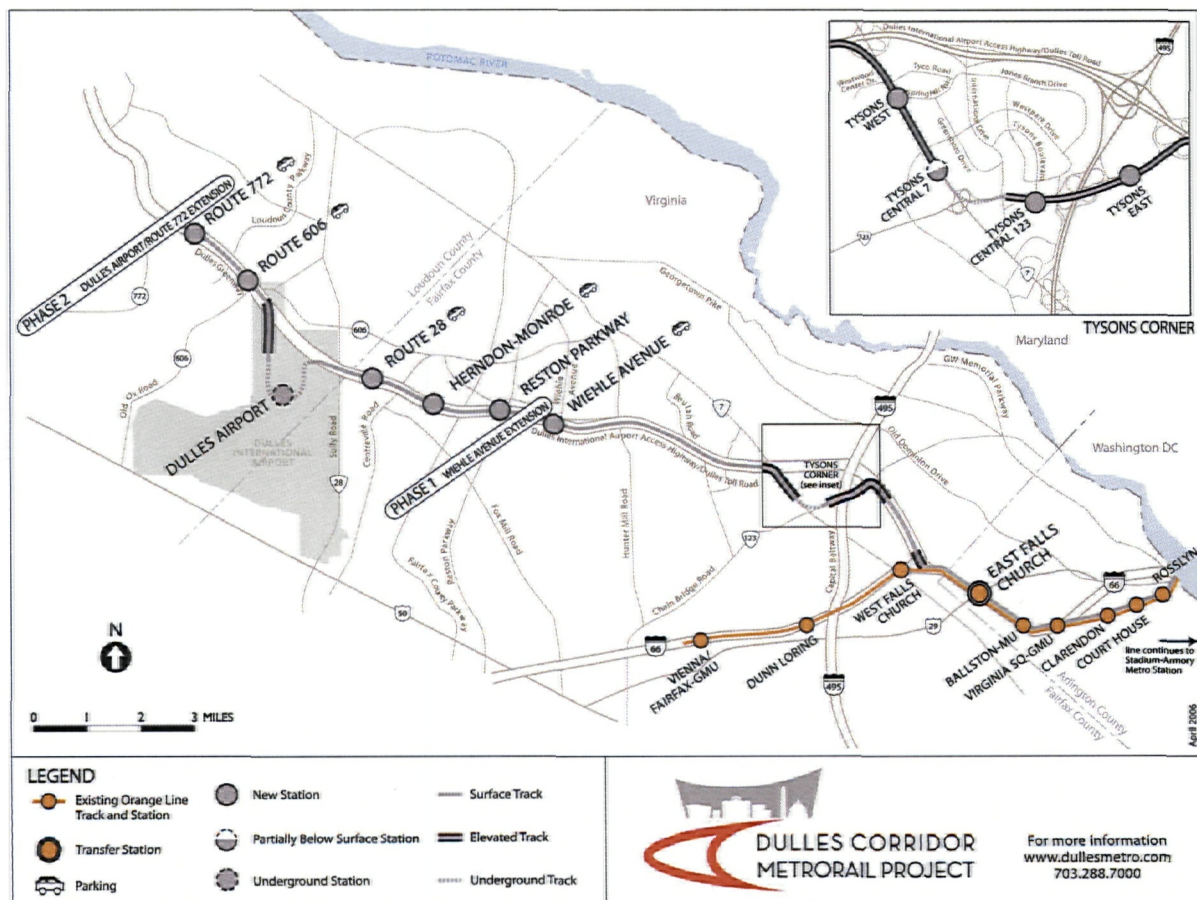
# INTRODUCTION

As the Program Manager/Grantee for the Dulles Corridor Metrorail Project (Project), the Metropolitan Washington Airports Authority has established this Quality Program Plan (QPP) for the Project. The QPP specifies all activities and procedures necessary to verify, audit and evaluate quality for the Project and is intended to serve as an overarching program around which other organizations involved in the implementation of the Project will design their Quality Assurance/Quality Control (QA/QC) Program Plans. This QPP is incorporated into the Project Management Plan for the Project and is in conformance with FTA's "Quality Assurance and Quality Control Guidelines, February 2002," FTA's "Project and Construction Management Guidelines, 2003 Update," and the requirements of "ISO 9001-1994, Quality Systems – Model for Quality Assurance in Design, Development, Production, Installation, and Servicing."

## Project Overview

The Airports Authority is planning to construct a 23.1-mile extension of the Washington Metropolitan Area Transit Authority's (WMATA's) Metrorail system in the rapidly growing Dulles Corridor located in Northern Virginia outside Washington, D.C.

The Project will extend the existing 103-mile Metrorail system from the Metrorail Orange Line in Fairfax County through Tysons Corner to Washington Dulles International Airport and beyond the airport to Route 772 in Loudoun County. Most of the extension will be constructed in the median of the Dulles International Airport Access Highway (DIAAH) and Dulles Connector Road, but the alignment will also directly serve Tysons Corner and Dulles Airport. The extension will include 11 new Metrorail stations, a rail yard site on Dulles Airport property, and an expansion of the existing rail yard at West Falls Church.



Due to FTA guidance on federal funding limitations for this Project and the timing of local funding availability, Airports Authority will be constructing the Dulles Corridor Metrorail Project in two major phases. Phase 1 of the Project (*Extension to Wiehle Avenue*) will be the initial 11 miles of the LPA from the current Metrorail Orange Line to Wiehle Avenue in Reston. It will include 5 stations, improvements to existing WMATA Service and Inspection Yards, and tail tracks on the outbound side of the interim terminus at Wiehle Avenue. Phased construction may require additional refinements to some facilities. Phase 2 of the Project (*Extension to Dulles Airport/Route 772*) will complete construction of the Project's Locally Preferred Alternative (LPA) between Wiehle Avenue and Route 772 in Loudoun County, add 6 additional stations, and add a new Service and Inspection Yard.

## 1.0 MANAGEMENT RESPONSIBILITY

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- 1.1 The Airports Authority Project Director and the Project's management team (consisting of the Deputy Director of Project Development, the Deputy Director of Design, the Deputy Director of Construction, the Project QA/QC Manager, and the Project Safety and Risk Management Manager) are responsible for establishing and demonstrating commitment to the Airports Authority's Quality Policy for the Dulles Corridor Metrorail Project (Project). The Project's management team is charged with ensuring that the Quality Policy is understood, implemented and maintained throughout all appropriate levels of the Project.
- 1.2 It is the policy of the Airports Authority that the Project shall be planned, designed and constructed with the highest regard for quality. The QA/QC Plans submitted to the Airports Authority for the Project by suppliers and contractors, including WMATA and the Dulles Transit Partners (the Airports Authority's contractor), shall meet the mandates outlined in the contract documents and be executed independently of cost and schedule project functions. In accordance with FTA's *"Quality Assurance and Quality Control Guidelines, February 2002,"* FTA's *"Project and Construction Management Guidelines, 2003 Update,"* and ISO 9001-1994, these QA/QC Plans will be required to define quality goals and objectives, specify quality-related activities, and assign responsibilities for ensuring that the activities are conducted and that the objectives are met.
- 1.3 This QPP provides specific requirements for program implementation based upon FTA and Airports Authority policy, including the assignment of primary responsibility for implementation. QA/QC plans from the parties identified above will outline specific requirements for individual activities. The Airports Authority and Airports Authority suppliers and contractors, including DTP and their subcontractors and suppliers, will define and document the responsibility, authority, and the interrelation of personnel who manage, perform, and verify work affecting quality. This applies in particular to personnel who require the organization freedom and authority to:
  - Initiate action to prevent the occurrence of any nonconformances relating to product, process, and quality system.
  - Identify and record problems relating to product, process, and quality system.
  - Initiate, recommend, or provide solutions through designated channels.
  - Verify the implementation of solutions.
  - Control further processing, delivery, or installation of nonconforming product until the deficiency or unsatisfactory condition has been corrected.
- 1.4 The Airports Authority and Airports Authority suppliers and contractors, including DTP and their suppliers and subcontractors, will identify resource requirements and provide adequate resources, including the assignment of trained personnel, for management, performance of work, and verification activities including audits.
- 1.5 The Airports Authority and Airports Authority suppliers and contractors, including DTP and their suppliers and subcontractors, will review their quality systems at defined intervals sufficient to ensure the systems continuing suitability and effectiveness in satisfying the requirements of this QPP. These reviews will be performed by managers with executive responsibility.
- 1.6 Each contract for work on the Project will be reviewed to determine that specific portions of the QA/QC plan are customized to the Project's specific scope of work. The QPP shall provide for implementation of administrative and control measures during engineering and design,



construction, testing, and start-up. The administrative and control measures shall be prepared and implemented in such a manner as to contribute to and document the attainment of a safe, reliable, economical, and convenient public transit system.

- 1.7 This section describes the Airports Authority personnel who are responsible for ensuring or controlling quality for the Project.
  - 1.7.1 The Airports Authority Vice President for Engineering is responsible for managing the Airports Authority Capital Construction Program for the two Washington DC area airports and for the Dulles Corridor Metrorail Project. The Vice President for Engineering has established the Airports Authority policy on quality assurance, ensures that adequate qualified staff and resources are assigned to the Project, and provides overall technical direction and management of the Project.
  - 1.7.2 The Airports Authority Project Director, who reports to the Vice President for Engineering, is responsible for the day-to-day management of the Project and for ensuring that the Project's quality assurance program is implemented and maintained in accordance with the Project's policy for quality assurance. The Project Director is assisted in the management of the Project by the Project's management team as defined in Section 1.1 above.
  - 1.7.3 The Airports Authority Project QA/QC Manager reports to the Project Director and has been designated as the person with the responsibility and authority to ensure that Airports Authority's quality policy is implemented and maintained on the Project. The Project QA/QC Manager has been delegated the authority, and provided the necessary freedom, to implement quality related activities in all areas of the Project; to identify quality problems; to control further processing, delivery, or installation of a nonconforming or deficient work; to initiate, recommend or provide solutions to Project management, and to verify implementation of solutions. In matters related to quality on the Project, the Project QA/QC Manager will have complete and ready access to the Airports Authority Project Director.
  - 1.7.4 The Project QA/QC Manager conducts periodic reviews of the Project quality assurance program and policy to ensure that the program remains suitable and effective.
  - 1.7.5 In cases where conflicts regarding quality cannot be resolved between the Project QA/QC Manager and a member or members of the Project's management team, final resolution will rest with the Project Director.
  - 1.7.6 The organization chart and descriptions of responsibilities for the Airports Authority's overall Project management organization is provided in the Project Management Plan and reflects the relationships of the personnel discussed above.
- 1.8 The Airports Authority recognizes that the quality of the work conducted for the Project has a direct effect on future revenue service, maintenance costs and operating efficiency of the Metrorail System. The future success of the Washington Metropolitan Area Transit Authority (WMATA) is reliant upon quality, which is the measure that their existing and new riders will use to determine the value of the Dulles extension as part of the Metrorail System. It therefore follows that the quality policies and procedures identified in this QPP, and the QA/QC Plans submitted to the Airports Authority, must be faithfully implemented by every Project participant.

## 2.0 DOCUMENTED QUALITY MANAGEMENT SYSTEM

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- 2.1 To meet Project quality objectives as stated in the Airports Authority Quality Policy Statement, the Airports Authority has established a documented quality management system for the Project. This system is documented in this QPP, the Project Management Plan, and in Airports Authority Project procedures. Attachment A to this QPP contains a list of Airports Authority Project procedures. This list will be revised, updated, and maintained during the course of the Project by the Airports Authority Project QA/QC Manager. In addition, Airports Authority contractors and suppliers, including DTP and their subcontractors and suppliers, are required to establish documented quality management systems meeting the requirements of this QPP, current FTA Quality Assurance and Quality Control Guidelines, and the requirements of ISO 9001-1994. Additional ISO 9001 requirements related to Contract Review; Control of Customer Supplied Product; Handling, Storage, Packaging, Preservation, and Delivery; Servicing; and Statistical Techniques that are not specifically addressed by the FTA Quality Assurance and Quality Control Guidelines, but that are applicable to the Project, are addressed below in Sections 2.5, 2.6, 2.7, 2.8 and 2.9.
- 2.2 Written procedures and instructions will be developed for Project activities affecting quality. Procedures utilized on the Project will contain a statement of the purpose and scope and will reference appropriate codes, standards, or specifications. During development of quality procedures during the course of the Project, consideration will be given to identifying and acquiring any inspection equipment, skills, or special quality processes needed to ensure quality performance. Inspection and testing techniques will be kept up-to-date. Where new techniques are being used for construction or manufacturing, adequate time will be allowed to develop appropriate quality procedures for the new techniques. Procedures and instructions will contain formats for the quality records needed to ensure that the procedures and instructions are followed and documentation requirements are understood.
- 2.3 Project personnel conducting oversight activities, including quality audits and surveillance and inspection activities shall be independent of those having direct responsibility for the activities being overviewed or inspected. Checking of design documents shall be conducted by individuals that are qualified and experienced and are capable of conducting such design work.
- 2.4 DTP documented quality systems, including procedures, instructions, and revisions, are reviewed and approved by the Airports Authority or their representative. Weekly quality reports that summarize design, procurement, construction, and testing activities; that list and summarize quality audits and surveillances, reviews, inspections, and tests performed; and that identify and summarize the status of quality issues shall be submitted to the Airports Authority by DTP.
- 2.5 DTP, including suppliers and subcontractors, will establish and maintain documented procedures for contract review and for the coordination of these activities. These procedures shall require, as applicable, that proposals, contracts, or orders will be reviewed to ensure that:
- The requirements are adequately defined and documented. Where no written statement of requirements is available for an order received by verbal means, it shall be ensured that the order requirements are agreed before acceptance.
  - Any differences between the contract or accepted order requirements and those in the proposal are resolved.
  - The capability exists to meet the contract or accepted order requirements.

It shall be identified how an amendment to a contract is made and correctly transferred to the functions concerned. Records of contract reviews will be maintained.

- 2.6 DTP and DTP suppliers and subcontractors will establish and maintain documented procedures for the control of verification, storage, and maintenance of the Airports Authority or WMATA-supplied product provided for the Project. Any such product that is lost, damaged, or is otherwise unsuitable for use shall be recorded and reported to the Airports Authority or WMATA as applicable.
- 2.7 DTP and DTP suppliers and subcontractors will establish and maintain documented procedures for handling, storage, packaging, preservation, and delivery of product. These procedures will address the following requirements:
- Use will be made of designated secure storage areas or stock rooms to prevent damage or deterioration of product, pending use or delivery. Appropriate methods for authorizing receipt to and dispatch from such areas will be stipulated. The condition of product in stock will be assessed at appropriate intervals.
  - Packing, packaging, and marking processes will be controlled to the extent necessary to ensure conformance to specified requirements.
  - Appropriate methods for preservation and segregation of product will be applied.
  - Arrangements will be provided for the protection of the quality of the product after final inspection and test.
- 2.8 DTP and DTP suppliers and subcontractors will, if applicable, establish and maintain documented procedures for performing, verifying, and reporting that servicing meets specified requirements.
- 2.9 DTP and DTP suppliers and subcontractors will identify the need for statistical techniques required for establishing, controlling, and verifying process capability and product characteristics. Documented procedures will be established to implement and control the application of statistical techniques.

## 3.0 DESIGN CONTROL

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- 3.1 Preliminary Engineering (PE) and final design work for the Project is conducted by DTP. DTP and DTP suppliers and subcontractors have established and maintained procedures and instructions that meet the current requirements of the FTA Quality Assurance and Quality Control Guidelines and ISO 9001-1994 requirements for design control in order to ensure that the design criteria and other design input document requirements are met by the design output documents. DTP has prepared a DTP Project Management Plan for the Project that includes design activities and that identifies the responsibility for the design parts. This Plan, which is approved by the Airports Authority, also identifies who, within DTP, has the QA responsibility for design; identifies the various organizational interfaces required between various groups producing and commenting on the design; and specifies the information to be documented, transmitted, and regularly reviewed.
- 3.2 The Airports Authority will conduct technical reviews of design output documents as defined by the Design-Build Contract. The Airports Authority has developed detailed procedures for conducting technical reviews of DTP design documents and for other Airports Authority oversight and review activities. The technical review procedures will ensure that DTP design documents are reviewed by appropriate Airports Authority technical specialists as well as representatives from WMATA construction, QA, safety, operations, and maintenance groups.
- 3.3 Design input requirements will be identified, documented, and reviewed by DTP. The design will be based upon WMATA design criteria and standards and will incorporate the Airports Authority, the Virginia Department of Transportation (VDOT), and local jurisdiction requirements. DTP has reviewed these input requirements and any ambiguities in the documents have been resolved to the extent possible between DTP, WMATA, VDOT, and the Airports Authority during the PE phase of the work. All ambiguities will be resolved prior to completion of final design.
- 3.4 DTP will document design output. Design output will meet design input requirements, will include acceptance criteria, will conform to appropriate regulatory requirements whether or not these requirements have been stated in design input requirements, and will identify those aspects of the design which are crucial to the safe and proper functioning of the final product or system.
- 3.5 DTP will assign competent personnel to those activities required to verify the quality of the design. Design verification activities will include the carrying out of alternative calculations; independent checking of design calculations, specifications, drawings, and contract documents; conducting and documenting design reviews; undertaking qualification tests and demonstrations; and comparing the design with a similar proven design, if available. Design reviews include reviews for constructability, operability, and maintainability.
- 3.6 DTP has established procedures for the identification, documentation, review, and approval of all changes and modifications to the design. This responsibility extends to those responsible for construction and manufacturing to ensure compliance to design requirements and for the development of "record" documents as part of the design documentation at the end of the Project. All design changes are transmitted to the Airports Authority as they are issued for implementation.

The Airports Authority is responsible for monitoring DTP's design changes for compliance with design input documents. Changes that deviate from WMATA design criteria and standards and other requirements specified by the Design-Build Contract require the approval of the Airports Authority. These deviations will be processed for approval in accordance with the requirements of the Design-Build Contract and the Airports Authority procedures.

- 3.7 DTP has established a configuration control process that requires the evaluation, coordination, and approval or disapproval of changes in the configuration of an item after establishment of a configuration baseline. The baseline consists of approved or conditionally approved technical

documentation for an item as set forth in drawings and associated lists, specifications, and referenced documents. Drawings are uniquely numbered and specifications follow a standard format. Specification paragraphs are numbered and identified. Complete drawing lists are established and the total number of drawings, the titles of drawings, the revision status, and the dates the drawings were approved are recorded. Changes to approved drawings or specifications are required to be made in accordance with established procedures. As detailed in Sections 4.0 and 13.0 of this Plan, permanent files are maintained of contract documents which include historical information relating to Project changes. As the Project is implemented, the configuration control process evolves to include the documentation of the completed changes in terms of "record drawings."

## 4.0 DOCUMENT CONTROL

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- 4.1 The Airports Authority has established Project procedures for control of the Airports Authority Project documents that ensure that all relevant documents are current and available to all users who require them. In addition, the Airports Authority contractors and suppliers, including DTP and their subcontractors and suppliers, are required to establish and maintain document control procedures that address the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for document control.
- 4.2 Project document control procedures address the requirements for the review and approval of documents by authorized personnel, the distribution and storage of these documents, the elimination of obsolete documents to prevent inadvertent use, and the control of changes to the documents. Copies of documents are required to be available at the locations that need them for the effective functioning of the quality management system and obsolete documents that exist in hard copy are required to be promptly eliminated from each work location. Any hard copy superseded documents retained for the record at work locations must be clearly identified as such. Unless otherwise specifically authorized by governing procedures, changes to documents are to be reviewed and approved by the same authorized personnel who reviewed and approved the originals. Changes to documents are required to be promptly distributed to work locations and a master list of documents made available that enumerates the current revision levels of each document. Where practicable, the nature of the change will be identified in the document or appropriate attachments.
- 4.3 Project documents requiring control include but are not limited to:
- Quality Program Plan
  - Project Management Plan
  - Contracts, Subcontracts, Purchase Orders and changes
  - Project QA/QC plans
  - Project procedures
  - Project correspondence
  - Project Implementation Plan
  - Project Procurement Plan
  - Design criteria and associated standards and specifications and changes
  - Drawings
  - Specifications
  - Calculations.
- 4.4 The Airports Authority has established a web accessible electronic document management system using Enterprise Document Management System (EDMS) Open Text. The usage of this document management system is described in Airports Authority procedures. This document management system allows access, storage, and management of very large numbers of files via a standard web browser. The system captures, stores, distributes, and organizes information, provides access to the repository information, provides version control of revised documents, and controls access to documents to prevent unauthorized use or modification. The Airports Authority Project Electronic Document Control Group (EDC) is responsible for collecting, registering, distributing, filing, and retaining Airports Authority Project-related documents using the electronic document management system and for implementing revision controls to preclude use of invalid or obsolete documents. The EDC electronic files are maintained on a server located in the Airports Authority Project office. Changes to the electronic files are backed up daily and all files are backed up weekly. Weekly back ups are stored at a location remote from the Airports Authority Project office.
- 4.5 The DTP Project document control system, whose usage is described in DTP document control procedures, is based upon a DTP established electronic communication and coordination management system accessible through the DTP Project's local area network (LAN) and the

internet. The DTP Project document control system is named "InfoWorks." Except as specifically noted in DTP document control procedures, all DTP Project-related documentation will be logged, indexed, input, and maintained in InfoWorks by the DTP document control group. The DTP document control group will make distribution of documents electronically. To ensure the integrity of the documents, access to both hard copy and InfoWorks files will be controlled. The electronic InfoWorks files will be backed up on a regular basis by DTP and the backups stored at a location remote from the extranet files.

- 4.6 DTP Project personnel who obtain hard copies of controlled documents from InfoWorks to do work are required and trained to verify, using InfoWorks, each time that they do work using the documents, that the hard copies are the latest approved revisions.

## 5.0 PURCHASING

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- 5.1 The Airports Authority has established Project procedures for Airports Authority Project-related purchasing that comply with FTA Circular 4220.1E and the FTA Master Agreement, that address the current FTA Quality Assurance and Quality Control Guidelines on purchasing, and that comply with ISO 9001-1994 purchasing-related requirements. The Airports Authority has established a Project procedure for periodically evaluating the performance of suppliers and contractors on the Project. The Airports Authority has also established quality audit and quality surveillance procedures for monitoring the performance of contractors and suppliers, including DTP and their subcontractors and suppliers, during the course of their work. Additional monitoring procedures will be developed as required. DTP has established purchasing procedures that address the requirements of this QPP, the FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements.
- 5.2 Purchasing procedures utilized by the Airports Authority, DTP, and subcontractors and suppliers will address the following requirements:
- Documented lists of acceptable suppliers and contractors will be established for the desired service or product, consistent with applicable procurement requirements. Selection of suppliers and contractors will be based upon their ability to meet contract requirements, including quality requirements.
  - The level of quality requirements applied to contractors and suppliers will be based upon the complexity and importance of the service or product being supplied.
  - The contract or purchase document will clearly specify the expectations of the purchaser, including relevant standards, drawings, specifications, process requirements, inspection instructions, and approval criteria for materials, processes and product. Purchasing documents are reviewed and approved by a designated authority for adequacy of specified requirements, including quality requirements, prior to release. The purchaser of services or product will ensure that the supplier fully understands the contract, agrees with the contract, and has the capacity to perform as required.
  - The contract or purchase agreement will specify the right of the Airports Authority or their representative and the purchaser to carry out review, examination, oversight, or inspection and test of the work at the location of the work and, upon receipt, to verify that the work or product meets requirements. Such provisions will not absolve the supplier of the responsibility to provide acceptable work or product nor will these provisions preclude subsequent rejection.
  - Where equipment procurement is involved, the purchaser will define, as appropriate, the means and methods for handling, storage, packaging, and delivery of product. The purchaser will establish procedures to receive, inspect, store, and maintain equipment procured. Any equipment that is damaged or is otherwise unsuited for use will be documented and reported to the supplier.
- 5.3 Certain Airports Authority suppliers, including consultants, who are performing limited scope quality-related work on the Project will conduct their work in accordance with Airports Authority Project procedures and this QPP rather than separate procedures and Quality Plans.
- 5.4 DTP suppliers, subcontractors, or vendors who are currently certified to ISO 9001 requirements and whose scope of work is consistent with their ISO 9001 certification are considered to meet the quality assurance program requirements as addressed in this Quality Program Plan.



## **6.0 PRODUCT IDENTIFICATION AND TRACEABILITY**

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- 6.1 The Airports Authority suppliers and contractors, including DTP and their suppliers and subcontractors, shall, as applicable, address the requirements of this QPP, current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements on product identification and traceability in their Project quality plans and procedures.
- 6.2 These plans and procedures will require the identification and control of items of production (batch, materials, parts, and components) to prevent the use of incorrect or defective items and to ensure that only correct and acceptable items are used and installed. These plans and procedures will address the following requirements:
- Product identification and traceability will be required during all the various production phases from receipt of raw materials, components, or subassemblies through the manufacturing/ construction/ installation processes to delivery of final products or systems.
  - Physical identification and control will be used to the extent possible. Where physical identification is impractical, physical separation, procedural control, or other appropriate means will be employed. Items that fail to possess identification, or items for which record traceability has been lost, or items that do not conform to requirements will be separated if practicable, or identified by other means, to prevent use or installation. Items will be required to be identified by how they are marked or where they are located.
  - Traceability means traceable to a particular project, specific warranty, test report, supplier, point in time, purchase order, or through production. Raw materials will be traceable back to a particular batch number, shipment number, packing slip, or invoice and will be accompanied by applicable test data sheets and material certifications.
  - Store room or inventory tracking procedures will allow items to be traceable back to a particular order number, batch number, date received, test lot, or other pertinent source.
  - Assemblies in production will be traceable to particular projects through the use of routing documentation. Routing documentation will contain sufficient information, including work instructions, manufacturing standards, and tooling, etc.
  - Final assemblies will be clearly marked with project numbers, model numbers, serial numbers, bar codes, etc., so that all pertinent information regarding that assembly can be retrieved.

## 7.0 PROCESS CONTROL

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- 7.1 The Airports Authority will establish, as required, Project procedures that prescribe the methods to conduct ongoing quality-related work processes. In addition, Airports Authority contractors and suppliers, including DTP and their subcontractors and suppliers, will establish work procedures and instructions that address the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for process control.
- 7.2 Project process control procedures and instructions will:
- Specify actions or controls where needed to ensure quality and prescribe use of suitable production and installation equipment, a suitable work environment, personnel qualifications, and conformance with referenced standards/codes and Quality Plans.
  - Require monitoring and control of processes and product characteristics during production and installation.
  - Require continuous monitoring during the conduct of special processes and/or prescribe additional controls, such as personnel testing and qualification and process testing and qualification. Special processes are those processes whose results cannot be verified by subsequent inspection and testing of product, and include processes such as welding, nondestructive examination, and heat treatment.
  - Ensure that work processes are performed in the proper sequence.

## 8.0 INSPECTION AND TESTING

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- 8.1 The Airports Authority contractors and suppliers, including DTP and their suppliers and subcontractors, who purchase equipment, perform manufacturing and/or construction, perform installation of equipment, and/or perform testing will develop quality plans and inspection and test procedures meeting the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for inspection and testing.
- 8.2 Personnel conducting inspections and tests on the Project shall be independent of those having direct responsibility for the construction or installation of the items being inspected or tested.
- 8.3 Test laboratories that are utilized on the Project to conduct testing such as soil testing, aggregate testing, concrete testing, electrical testing, mechanical and welding testing, nondestructive examinations, and calibration of measuring and test equipment will be accredited by one of the following accreditation bodies or a similar recognized accreditation body:

- The American Association for Laboratory Accreditation (A2LA)
- The International Council of Building Officials Evaluation Service (ICBO ES)
- The National Voluntary Laboratory Accreditation Program (NVLAP).

Use of test laboratories that are not accredited requires prior approval by the Airports Authority.

- 8.4 The following criteria will be considered for identifying areas of emphasis of inspection and testing programs and the related inspection and test procedures:
- Items or work affecting safety
  - Items that affect system reliability
  - Items that affect service life
  - Long lead time items or custom manufactured items
  - High visibility areas
  - ADA compliance items.
- 8.5 Quality plans and related inspection and test procedures will address requirements for receiving inspection of incoming product. The extent of receiving inspection will vary with the amount of inspection at the source, the safety criticality of the product, and the confidence in the quality procedures of the supplier. Incoming product will not be released for installation or use until the required inspections and tests have been satisfactorily conducted and documented, unless specific procedures exist that allow release only in urgent cases and that permit the product to be immediately recalled if found to be nonconforming.
- 8.6 Quality plans and procedures will address requirements for the conduct of in-process inspection and tests to verify conformance of items or work activities to specified requirements. Both inspection and process monitoring methods will be performed, as necessary, to ensure that the specified requirements for control of work processes and the quality of the item are achieved throughout the duration of the work. Items or product will be held from further processing until required inspections and test have been satisfactorily performed and documented, unless specific procedures exist that allow release only in urgent conditions and that permit the product to be immediately recalled if found to be nonconforming.
- 8.7 Quality plans and procedures will address requirements for final inspection and test that will ensure that all specified inspections and tests, including those specified for receipt and in-process work have been satisfactorily completed and documented prior to further use of the item or product.

- 8.8 Quality plans and procedures will address requirements for documentation of inspections and tests with records that show clearly whether the product has passed or failed the inspections or tests in accordance with defined acceptance criteria. Where the product fails to pass inspections or tests, nonconformance control procedures, as addressed in Section 11.0 of this QPP, shall apply.
- 8.9 Quality plans and inspection and test procedures will make provisions for the Airports Authority to identify important inspection and test activities that they or their representative may observe. The Airports Authority or their representative will classify each inspection or test activity identified for possible observation as either a hold point or a witness point. Notification of these activities will be made to the Airports Authority or their representative in advance of the activity in an agreed upon time frame. Inspection and test activities identified as hold points shall not be conducted until the Airports Authority or their representative is present unless the Airports Authority or their representative has formally waived the hold point. Inspection and test activities identified as witness points may be performed as scheduled, with or without the presence of the Airports Authority or their representative, provided that notification of the witness point has been made in the agreed upon time frame.
- 8.10 DTP shall submit inspection and test plans to the Airports Authority or their representative for approval for all Project-related work. These plans shall include a matrix of all inspections and tests required by the Design-Build Contract documents, the specifications, and the drawings that are to be performed by DTP and DTP suppliers and subcontractors. The plans shall specify provisions for coordinating onsite and offsite inspections and tests and for meeting the notification requirements described in Section 8.9 above. Inspection plans shall include the checklists to be used for conducting and documenting the inspections. Test plans shall include the identification of the test requirement, description of the test, type of test (i.e. factory, sub-system, system), applicable standard(s), test frequency, responsibility for test performance, means of recording and tracking test results, and means for recording and tracking test discrepancies and related corrective actions.
- 8.11 DTP shall submit an integrated test plan to the Airports Authority or their representative for approval. The plan shall include a matrix of integrated systems tests required by the Design-Build Contract documents, the specifications, and the drawings that are to be performed by DTP and DTP suppliers and subcontractors. The plans shall specify provisions for coordinating onsite and offsite tests and for meeting the notification requirements described in Section 8.9 above. The plan shall provide for an Integrated Systems Testing Status Report that tracks and reports the status of integrated testing and that is updated and submitted to the Airports Authority or their representative monthly. The test plan shall include the identification of the test requirement, description of the test, applicable standard(s), test frequency, responsibility for test performance, means of recording and tracking test results, and means for recording and tracking test discrepancies and related corrective actions.

## **9.0 INSPECTION, MEASURING, AND TEST EQUIPMENT**

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- 9.1 The Airports Authority suppliers and contractors, including DTP and their suppliers and subcontractors, who use inspection, measuring, and test equipment to carry out inspection and test on the Project will establish procedures that ensure that this equipment is identified, controlled, calibrated, and maintained in order to demonstrate the conformance of work to specified requirements. These procedures will meet the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for inspection, measuring, and test equipment.
- 9.2 Inspection, measuring, and test equipment control procedures will address the following requirements:
- Inspection, measuring, and test equipment that are selected for use must be capable of the necessary accuracy and precision.
  - Inspection, measuring, and test equipment whose use can affect product quality shall be identified. This equipment will be calibrated at prescribed intervals or prior to use, against equipment having a valid relationship to national standards. If no national standards exist, the basis of calibration shall be documented. Procedures or instructions for performing the calibrations will be established and used and records of calibration results maintained.
  - Inspection, measuring, and test equipment will be identified with a suitable indicator or approved identification record to show the calibration status.
  - Inspection, measurement, and test equipment will be properly maintained to ensure its fitness for use. Suitable environmental conditions shall be maintained when the equipment is in use. When inspection, measuring, and test equipment is found to be out of calibration, the validity of previous inspection and test results shall be assessed and documented.
  - Where test software or test hardware is used for inspection, this software or hardware will be checked to prove it is capable of verifying the acceptability of a product prior to its use and shall be periodically rechecked at prescribed intervals.
- 9.3 The metrological confirmation system for measuring equipment given in ISO/DIS 10012 will be used for guidance when establishing calibration systems.

## **10.0 INSPECTION AND TEST STATUS**

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- 10.1 Airports Authority suppliers and contractors, including DTP and their suppliers and subcontractors, will establish processes and procedures that identify the inspection and test status of work during production and installation. These procedures will meet the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements related to inspection and test status.
- 10.2 Test and inspection status will be identified by means of markings, stamps, tags, labels, routing cards, inspection records, test software, physical location, or other suitable means. Status indicators will indicate the conformance or nonconformance with regard to the inspections and tests performed.
- 10.3 Requirements related to the inspection and test status of planning and design documents that indicate the conformance or nonconformance with regard to checking and reviews performed are addressed in Sections 3.0 and 4.0 of this QPP.

## 11.0 NONCONFORMANCE

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11.1 The Airports Authority contractors and suppliers, including DTP and their suppliers and subcontractors, who purchase equipment, perform manufacturing and/or construction, perform installation of equipment, and/or perform testing will develop procedures for the control of nonconforming work meeting the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for nonconformances. These procedures will be written to ensure that nonconforming work is not inadvertently used or installed.

11.2 The following nonconformance-related definitions apply to the Project:

<i>Nonconformance -</i>	A discrepancy in characteristic, documentation, or procedure that affects form, fit or function and renders the quality of an item unacceptable or indeterminate in regard to meeting all relevant project requirements. Examples of nonconformances include physical defects; test failures; incorrect or inadequate documentation; or deviation from prescribed processing, inspection, or test procedures.
<i>Repair -</i>	A disposition of a nonconforming condition that indicates that an item can be made acceptable for its intended use, even though it is not restored to a condition that meets all specification requirements.
<i>Rework -</i>	A disposition of a nonconforming condition that indicates that the deficiency can be brought into conformance with the original requirements through re-machining, reassembly, reprocessing, reinstallation, or completion of the required operations.
<i>Use-as-is -</i>	A disposition of a nonconforming item when it can be established that the item is satisfactory for its intended use.

11.3 Project nonconformance procedures will address the following requirements:

- Nonconforming work will be identified, documented, and evaluated to determine appropriate disposition. Nonconforming items will be clearly identified as nonconforming and where practicable, segregated to prevent inadvertent installation. The organization performing activities affected by the nonconforming work will be notified.
- The responsibility for review and disposition of nonconforming work will be defined. Nonconformances will be dispositioned as repair, rework, use-as-is, scrap, or use for alternate application. Dispositions will be documented. Repair and use-as-is dispositions will be reviewed and approved by the responsible design organization.
- Reworked or repaired work will be reinspected in accordance with established procedures.

11.4 Nonconformances that deviate from WMATA design criteria and standards and other requirements specified by the Design-Build Contract and that are dispositioned repair or use-as-is must be approved by the Airports Authority or their representative.

11.5 The status of Project nonconformances will be reported to the Airports Authority Project QA/QC Manager by Project participants on an ongoing basis.

## **12.0 CORRECTIVE ACTION**

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- 12.1 The Airports Authority has established Project procedures for identifying, documenting, correcting, and preventing recurrence of conditions of nonconforming work. In addition, Airports Authority contractors and suppliers, including DTP and their subcontractors and suppliers, are required to establish corrective action procedures that address the requirements of this QPP, current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for corrective action.
- 12.2 Project corrective action procedures will be established for:
- Investigating the cause of nonconforming product and taking the corrective actions needed to prevent recurrence
  - Analyzing processes to detect and eliminate potential causes of nonconforming product
  - Initiating preventive actions to deal with problems to a level corresponding to the risks encountered
  - Ensuring that corrective actions are taken and that they are effective
  - Implementing and recording changes in procedures resulting from corrective action.
- 12.3 DTP and their suppliers and subcontractors shall inform the Airports Authority Project QA/QC Manager of all issues requiring corrective action and shall keep the Airports Authority Project QA/QC Manager informed of the status of resolution of these issues.



## 13.0 QUALITY RECORDS

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- 13.1 The Airports Authority has established procedures for the accumulation and storage of Airports Authority Project-related quality records. In addition, the Airports Authority contractors and suppliers, including DTP and their subcontractors and suppliers, will establish and maintain procedures for accumulation and storage of quality records that comply with the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements related to quality records.
- 13.2 Project quality plans and procedures related to quality records identify which records will be kept, the responsibility for production and collection, and responsibility for indexing, filing, storage, maintenance, and disposition of quality records. Quality records will be maintained to show achievement of quality objectives and appropriate functioning of the quality management system. Each organization generating quality records will prepare a quality records list that lists every type of document generated as a result of implementing the quality program. Types of records include but are not limited to:
- Design reviews
  - Drawings and specifications
  - Calculations
  - Design changes
  - Procurement documents
  - Procedures and instructions
  - Quality plans
  - Calibration records
  - Audit and surveillance reports
  - Corrective actions
  - Test data
  - Geotechnical reports
  - Survey reports
  - Inspection reports.
- 13.3 Quality records shall be complete, legible, specify the work involved, and be kept in an environment to minimize deterioration and damage. Access to quality records will be controlled to prevent alteration, damage, or loss.
- 13.4 DTP quality records shall be maintained until the completion of the Project, at which time they will be turned over to the Airports Authority for disposition.

## 14.0 QUALITY AUDITS

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- 14.1 To ensure that the elements of the Project quality management system are functioning as intended, the Airports Authority has established Project procedures for the conduct of internal and external Airports Authority quality audits on the Project. In addition, DTP and their subcontractors and suppliers will establish internal and external quality audit procedures that address the requirements of this QPP, the current FTA Quality Assurance and Quality Control Guidelines, and ISO 9001-1994 requirements for quality audits.
- 14.2 Project procedures for quality audits shall address the following requirements:
- Audit schedules will be issued and periodically updated. Audit frequency will depend upon the status and importance of the activity being audited. For internal audits, each element of the applicable quality program shall be audited at least annually.
  - Requirements for the qualification of lead auditors and auditors shall be defined. Audits shall be carried out by personnel independent of those having direct responsibility for the activity being audited.
  - Audit plans, defining the objectives, scope, time and duration of audit activities, will be provided to audited organizations in advance of each audit. Audits will be conducted using checklists prepared in advance of the conduct of the audit and approved by the audit team leader.
  - The results of audits shall be presented to the management of the audited organization by the audit team at the conclusion of the audit. This presentation will be followed by the timely issuance of a written audit report by the audit team leader. The audit report will be issued by the management of the auditing organization to the management of the audited organization with copies to management of other affected organizations as appropriate.
  - The management of the audited organization will correct any deficiencies identified by the audit in a timely manner. The organization that conducted the audit will track audit deficiencies, report on their status, and verify effective resolution of the deficiencies.
- 14.3 To prevent overlapping or redundant audits, the Airports Authority and DTP will establish joint, coordinated Project audit and surveillance schedules. The schedules will be for six-month periods and will be updated during each six-month period as necessary.
- 14.4 DTP shall provide the Airports Authority Project QA/QC Manager with copies of Project-related audit reports and will report at least monthly on the status of audit deficiencies. The Airports Authority Project QA/QC Manager will provide copies of Airports Authority audit reports to the Airports Authority Project Director.

## 15.0 TRAINING

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- 15.1 Airports Authority personnel assigned to the Project are trained and qualified in accordance with the requirements of this QPP and Airports Authority Project procedures. Airports Authority contractors and suppliers, including DTP and their suppliers and subcontractors, will establish training programs and procedures that address current FTA Quality Assurance and Quality Control Guidelines and ISO 9001-1994 requirements on training and that ensure personnel performing activities affecting quality are qualified on the basis of appropriate education, training, and experience.
- 15.2 The Airports Authority Vice President for Engineering ensures that all Airports Authority personnel that are assigned responsibilities for the Project are qualified based upon education, skills, abilities, experience, and training.
- 15.3 It is the responsibility of every Airports Authority Manager to, as part of the annual Airports Authority evaluation process, work with their direct reports to develop a training plan that will ensure that the direct reports are properly trained to perform all assigned work. This training is used to fill gaps in the direct reports' qualifications and abilities. Fulfillment of the identified training by the direct reports is included in the manager's annual evaluations of the direct reports' performance.
- 15.4 An Airports Authority Project procedure has been established that requires each manager or supervisor on the Project to identify the key Project-related documents, including this QPP, the Project Management Plan, Airport Authority procedures, the Design-Build Contract, etc., that his or her personnel must be familiar with or understand and document these requirements on training matrices. Training on these documents will be by reading assignment or classroom instruction. All such training will be documented.
- 15.5 The Airports Authority Contract Administration Officer is responsible for ensuring that key non-Airports Authority staff assigned to the Project by DTP and other consultants and contractors are qualified and adequately trained. This will be accomplished through a review of staff resumes and verification from the employing organization of staff qualification and training.

## ATTACHMENT A

### Airports Authority Dulles Corridor Metrorail Project Management Procedures

Procedure Number	Title	QPP Section(s) Reference
PM-1.01	Preparation, Approval, and Revision of Procedures	2.0, 4.0
PM-1.02	Document Control	4.0
PM-1.03	Corrective Action	12.0
PM-1.04	Quality Audits	5.0, 14.0
PM-1.05	Quality Surveillance	5.0, 14.0
PM-1.06	Project Orientation Training	15.0
PM-1.07	Quality Records	13.0
PM-1.08	Training and Qualification of Auditors	14.0
PM-1.09	Quality System Review	1.0
PM-1.10	Monitoring Design-Build Contractor Nonconformances and Corrective Actions	11.0, 12.0
PM-1.11	Coordination and Performance of Airports Authority Identified Hold and Witness Points	5.0, 8.0
PM-1.12	Resolution of Contractor-Related Issues	5.0, 12.0
PM-2.01	Processing Requests for Information (RFIs)	3.0, 7.0
PM-2.02	Review of Changes to Design Standards	3.0, 7.0
PM-2.03	Monitoring of Design-Build Contractor Design Changes	3.0
PM-3.01	Monitoring of the Design-Build Contractor Property Acquisition Activities	5.0, 7.0
PM-4.01	Monitoring of the Design-Build Contractor's Supplier and Subcontractor Submittals	5.0
PM-4.02	Monitoring of Site Construction, Installation, and Testing	5.0, 7.0
PM-4.03	Monitoring of Startup and Integrated Testing	5.0, 8.0
PM-5.01	Processing Design-Build Contract Changes	5.0
PM-5.02	Review of Project Schedules	5.0, 7.0
PM-5.03	Contracting and Contract Administration	5.0

<b>Procedure Number</b>	<b>Title</b>	<b>QPP Section(s) Reference</b>
PM-5.04	Evaluation of Contractor/Supplier Performance	5.0
PM-5.05	Processing Design-Build Contract Payments	5.0, 7.0
PM-5.06	Review of Contract Data Requirements List (CDRL) Items	3.0, 5.0, 7.0
PM-5.07	Contingency Control Procedure	7.0
PM-6.01	Monitoring of the Design-Build Contractor's Environmental, Safety, and Health Activities	5.0, 7.0
PM-6.02	Monitoring of the Design-Build Contractor's System Safety and Security Certification Activities	5.0, 7.0
PM-6.03	Emergency Incident Notifications	7.0