



CLEAN WATER NASHVILLE

OVERFLOW ABATEMENT PROGRAM

Program Management Plan

Volume I - Approach

April 2015

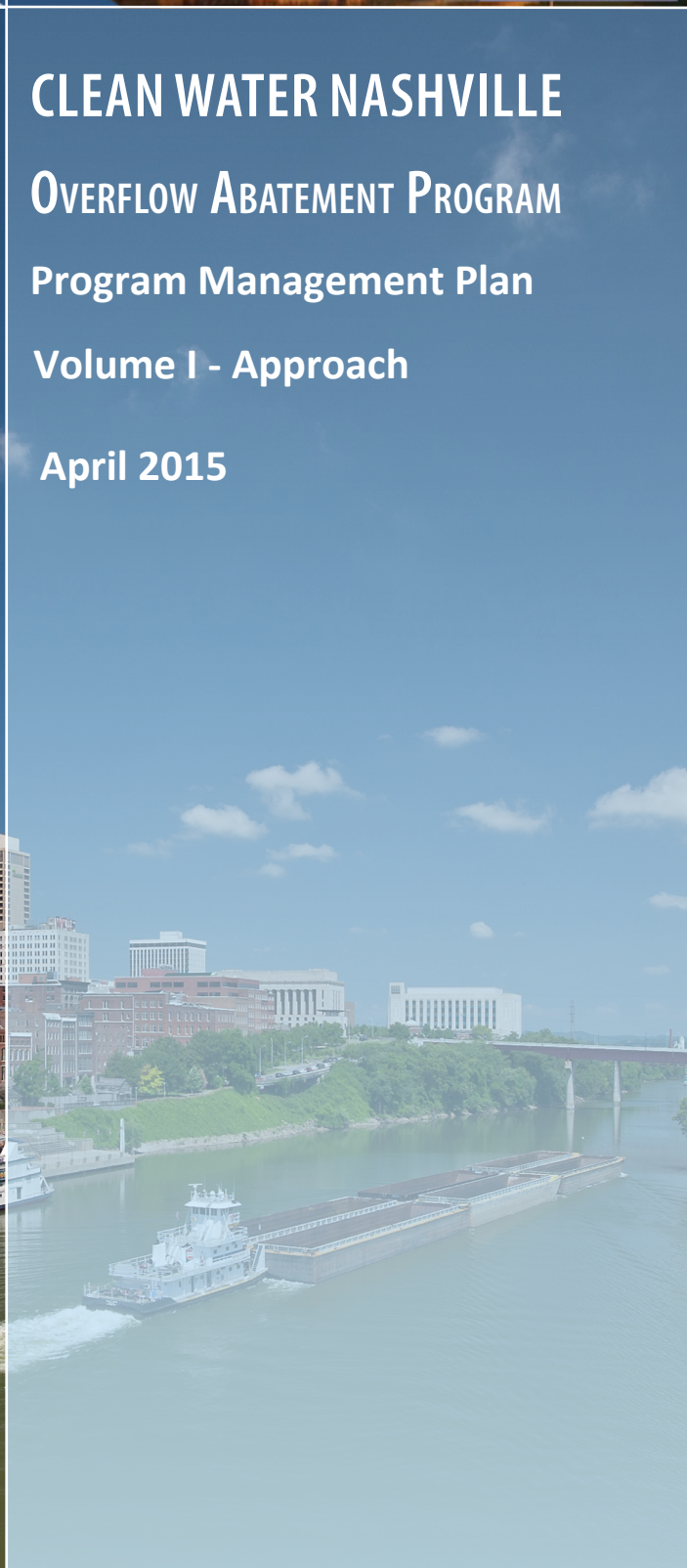


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Section 1

Program Management Plan Overview

1.1 Introduction

Nashville Metro Water Services (MWS) is implementing a program of infrastructure improvement projects aimed at reducing sewer system overflows and enhancing the water quality in the Cumberland River and its tributaries. This Clean Water Nashville Overflow Abatement Program (Program) has been developed as a result of an ongoing enforcement action initiated by the United States Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC). This enforcement includes a Consent Decree between MWS, the United States, and the State of Tennessee, dated March 12, 2009. The Consent Decree required the submittal of a *Long Term Control Plan* and a *Corrective Action Plan/Engineering Report* to the EPA and TDEC outlining what improvements need to be made in wastewater collection, conveyance, storage, pump station, and treatment in order to achieve compliance with the Consent Decree. From the date of acceptance by the regulatory agencies, MWS has eleven (11) years to implement the plans.

This *Program Management Plan* has been developed to provide the approach of the Program Management Team (made up of Metro Water Services management, Program Management Consultant staff, and Construction Management Consultant staff) for delivering the Program in accordance with the Consent Decree. This *Program Management Plan* is a “living document” that will be progressively updated as the Program advances. The approach, described in the three volumes of the *Program Management Plan*, provides a consistently repeatable means of addressing expected Program issues as well as the flexibility required to aggressively manage the dynamic situations that are inherent to programs of this magnitude. Also included are the mechanisms for tracking and assessing the efficiency of the approach as well as incorporating improvements, when identified.

1.2 Program Understanding

The Program Management Team is fully committed to successfully implementing the approach needed to achieve MWS’ Mission for the Program:

The Mission of the Clean Water Nashville Overflow Abatement Program (Program) is to fulfill the Consent Decree requirements by planning, designing, and constructing system improvements in a cost-effective manner to enhance the quality of water for the Nashville community.

MWS also established goals to support this Mission challenging the Program Management Team and participating stakeholders to accomplish the following:

- Safely complete the work
- Drive the schedule to meet or beat Consent Decree milestones
- Operate as a cohesive and coordinated team
- Ensure that projects meet or exceed expected performance criteria
- Control costs to complete the work in a manner that provides the best value for the customer
- Manage quality into all phases of Program implementation

- Promote workforce and economic diversity
- Enhance trust and confidence with Metro Water Services' customers and stakeholders
- Promote sustainable practices during design and construction
- Plan for no unpleasant surprises

1.3 Program Management Processes, Activities, and Tasks

The approach defined in this *Program Management Plan* originated in numerous areas. Initially, the Program Management Consultant investigated the existing MWS and Metro processes and procedures used to complete capital projects prior to the Consent Decree. The Program Management Consultant then determined the process and procedure requirements typically required for a program the size and complexity of the Program. An assessment was made of the “gap” between the existing and needed processes, and recommendations to fill this “gap” were offered in the “Gap” Analysis Report.

Finally, as an independent validation of these approach recommendations, the Program Management Team facilitated a full-day Chartering Workshop. Assembling staff from MWS and its Program Management Consultant, Construction Management Consultant, and Designers, these critical Program participants were asked to define the approach factors considered necessary to best achieve the Program’s mission and goals. These factors were categorized into four key Program elements for workshop presentation: 1) Design Management, 2) Construction Management, 3) Budget/Schedule Management, and 4) Communication. This information was documented in the minutes of the Chartering Workshop and corresponded substantively with the “gap” recommendations. All of this information was then used to define the activities and tasks of the Program Management Team’s approach.

1.4 Program Management Plan Structure

The overall *Program Management Plan* consists of Volume I – Approach, Volume II – Program Procedures, and Volume III – Reference Documentation.

1.4.1 Volume I – Approach

Volume I of the *Program Management Plan* is structured to address each of the functional areas needed for effective Program implementation. It describes an integrated Program organizational structure to address the issues identified in the “gap” and the Chartering workshop. It supplements an overall policy discussion with reference to work processes, technical/support systems, and proven tools/techniques to effectively and efficiently implement the approach to successfully meet the Program’s goals.

The following sections are included in the *Program Management Plan*, Volume I:

- **Section 1, Program Management Plan Overview**
- **Section 2, Management Approach.** This section outlines the makeup of the Program Management Team, its organizational structure, and the roles and responsibilities of all team members including Designers and contractors. Key positions are defined as well as the organization’s interfaces and key functional requirements.
- **Section 3, Program Controls: Scope and Document Management.** Specific Program Controls are described in detail in Section 3. Program’s scope structure is presented, including: 1) development of the work breakdown structure, 2) scope and change management, 3) document

management, and 4) the Program Information Management System (PMIS). To ensure transparency in governance, the Program Controls discussion is expanded to include performance assessment, reporting, internal communications, and claims management.

- **Section 4, Program Controls: Schedule Management.** Adding to the functions described for Program Controls in Section 3, Section 4 focuses on the aspects of schedule management. This includes the Master Program Schedule and project schedules discussed by phase (planning, design, permitting, real estate, bid and award, construction, and closeout) and the procedural requirements for development and updating.
- **Section 5, Program Controls: Financial Management.** Section 5 of the *Program Management Plan* outlines the Program's approach to address the effective monitoring and management of cost information. Specifically, the financial management approach discusses Program and project level budgets for all Program components in accordance with the work breakdown structure. Also discussed is the control of funds including the management of contingency and escalation as well as processing invoices and updating funding/cost information during the Program.
- **Section 6, Program Controls: Risk Management.** The final Program Controls' element is risk management, and Section 6 discusses the identification and assessment of risks in a culture of proactive project risk management. This section discusses effectively integrating risk management with other Program and project management functions through each project's implementation.
- **Section 7, Planning and Technical Support.** The Planning and Technical Support section describes the on-going planning and analysis processes supporting the Program. This section outlines how the following activities are managed: 1) development of Project Summaries, 2) coordination of data collection activities, 3) maintenance of hydraulic models, 4) changes or updates to baseline wet weather solutions, 5) project planning support for rehabilitation activities under the Annual Rehabilitation Program, 6) post-construction monitoring and analysis, and 7) other specialized technical support as needed.
- **Section 8, Design Management.** The Design Management section identifies the design process and how it is managed and controlled by the Program Management Team. This process focuses on managing risk and the timeliness of design deliverables through the team structure; quality procedures; and consistency in standards, details, and specifications. Included in this discussion are the activities associated with permitting and land/easement acquisition that are primarily accomplished during a project's design phase. References are made to the *Design Management Manual* included in Volume III of the *Program Management Plan* that describes the Designer's responsibilities.
- **Section 9, Construction Management.** This section outlines the aspects of the construction management process that are implemented by the Construction Management Consultant who is charged with managing the completion of construction projects on time and within budget. This section also discusses the critical interface between the Project Manager and the Site Construction Manager during this phase. Construction project administrative procedures to reduce and manage risk are identified and discussed in greater detail in the *Construction Management Manual* included in the *Program Management Plan*, Volume III.
- **Section 10, Stakeholder Communications and Community Outreach.** This section identifies the team structure required to implement the communications activities for the Program. It discusses implementing and developing project-by-project communications plans and supporting MWS' strategies for communicating with stakeholders, including the public.

1.4.2 Volume II - Program Procedures

In conjunction with the overall Program approach, Program and project procedures are incorporated into Volume II of the *Program Management Plan* as baseline criteria for consistency in implementing the Program's policies and Quality Assurance/Quality Control on all projects. Procedures available in Volume II include the following:

Program Controls Procedures

- Actual Cost Update
- Change Justification
- Contract Initiation and Update
- Controlled Document Revision
- Funding Update
- Invoice Review
- Lessons Learned
- Master Schedule Update
- Schedule Review

Design Procedures

- Design Deliverable Review
- *Project Work Plan* Review
- Real Estate Acquisition

Quality Procedures

- Program Management Consultant Quality Audit
- Quality Review of Program Management Consultant-generated Documents

1.4.3 Volume III – Reference Documentation

To supplement the policies and procedures of Volumes I and II, guidance documents, tools, processes, checklists, forms, and other reference documentation are available in Volume III of the *Program Management Plan*. These include the following:

References

- *Code of Ethics Policy*
- *Construction Management Manual*
- *Design Management Manual*
- *Master Program Budget and Schedule*
- *PMIS User Manual*
- *Program Risk Management Plan*
- *Quality Management Plan*

Guidelines

- Document Control Guidelines
- Estimating Guidelines

- Procurement Guidelines

1.5 Safety

Safely completing work is a paramount concern for the Program. This begins with the general public and extends to Program staff along with construction contractors engaged in building projects. At a minimum, members of the Program Management Team adhere to the health and safety programs of their respective organizations.

During the construction phase of projects, the Construction Management Consultant monitors the contractor's compliance with the contractually-required contractor *Safety Plan* that outlines the contractor's responsibility for applying safeguards, controlling and avoiding risks, and ensuring construction is completed safely for the protection of everyone. The *Construction Management Manual* contains the safety guidelines established by the Construction Management Consultant for their staff. Members of the Program Management Team are expected to adhere to the applicable portions these guidelines and the contractor's *Safety Plan* whenever on active construction sites for Program projects.

1.6 Code of Ethics Policy

Maintaining high standards of integrity, transparency, and impartiality by all staff of the Program is essential to the proper performance of the Program and maintenance of confidence with parties conducting business with the Program, Metro government officials, and the public. For the purpose of this policy, the term "Program staff" refers to Metro Water Services (MWS) staff members, Program Management Consultant members, or Construction Management Consultant members who spend at least 25% of their time on a quarterly basis engaged in Program activities. The *Code of Ethics Policy* and Disclosure Statement are established to identify standards of conduct for staff members, to provide criteria for managing potential conflicts of interest, and to provide transparency for potential conflicts of interest. While it is not anticipated that Program staff is or will be unduly influenced by any outside party, a Program of this magnitude requires that the issues that could affect the *appearance* of partiality be identified and managed.

Non-MWS Program staff are required to read the *Code of Ethics Policy* and sign the Disclosure Statement on an annual basis. If there are any questions about the details of the policy or concerns about a particular situation, staff are encouraged to consult their supervisor or Program Leadership (Program Director, Program Manager, or Construction Manager).

Section 2

Management Approach

2.1 Overview

It is Metro Water Services' intent to implement the Clean Water Nashville Overflow Abatement Program (Program) efficiently and economically by providing an affordable solution for combined sewer overflow/sanitary sewer overflow (CSO/SSO) abatement with the lowest possible impact to MWS' customers. To achieve the Mission and goals described in Section 1, especially the desire for a cohesive, coordinated team making timely, informed decisions, an integrated management approach is used. This approach starts with the identification of clear roles and responsibilities for all Program participants organized in a structure that effectively deals with issues as they arise through consistent procedures that are understood and utilized. The information presented in Section 2 describes the organizational structure for the Program.

2.2 Structure

2.2.1 Team Organization

To ensure the availability of appropriate management, design, and construction expertise for the duration of the Program, MWS has established a Program team (briefly introduced in Section 1) comprised of MWS staff augmented by qualified consultants. This team provides overall Program Management, Project Management, Planning, Design Management, Construction Management, and Program Controls Support. The tasks associated with each of these team functions are discussed in the subsequent Sections 3 through 10 of this *Program Management Plan*, Volume I.

MWS has established a Program Management Consultant role and a Construction Management Consultant role to manage the Designers and construction contractors who work on the Program. The Program Management Team, led by MWS staff and supported by the Program Management Consultant and the Construction Management Consultant, is structured as an "extension of staff" organization with clear roles, responsibilities, and authority. Structure is provided to the Program Management Team so that the Program requirements and milestones are met. The Program Management Team and its organizational relationship within MWS are shown in Figure 2-1 below.

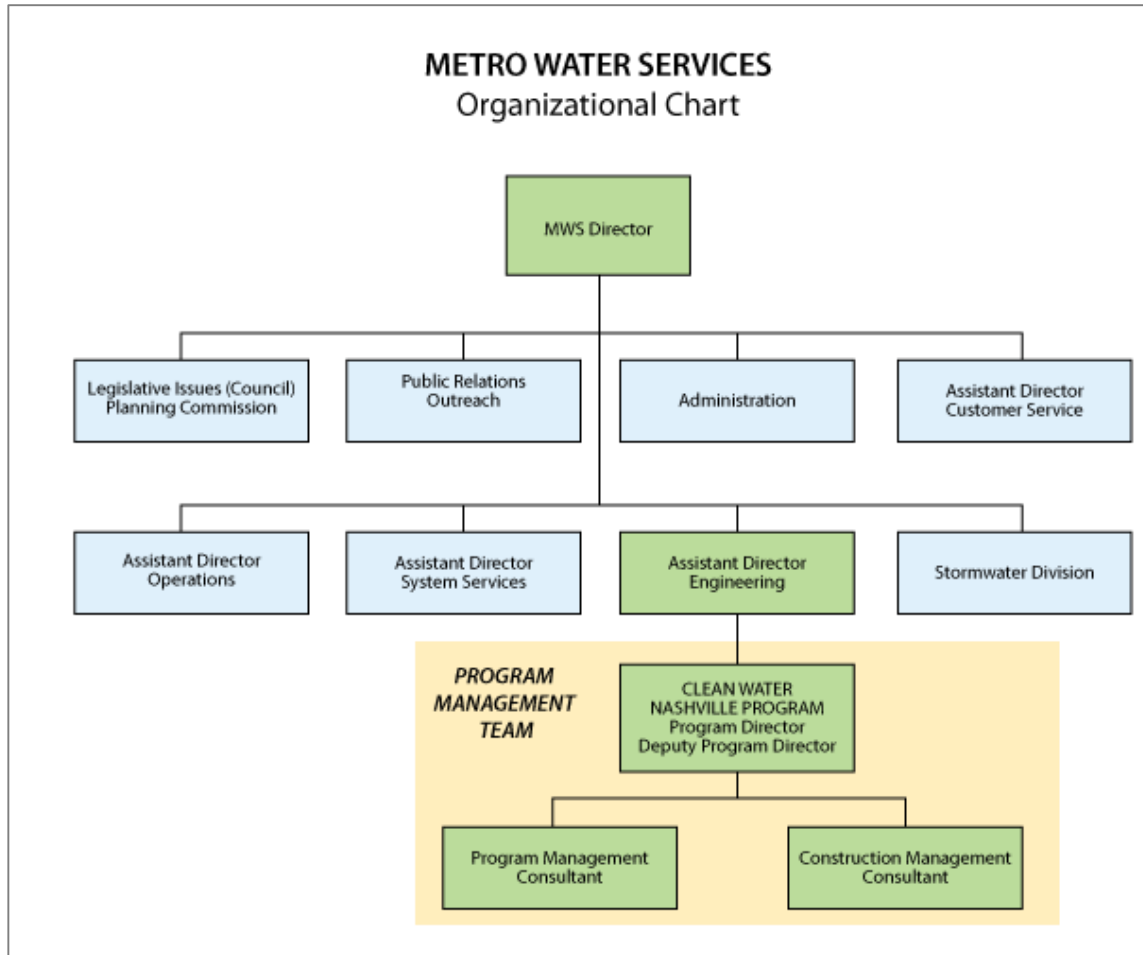


Figure 2-1 Program Management Team Relationship to MWS

2.2.2 MWS Division Functions

Within the MWS organization, several Divisions are important to the coordination of many activities and functions during the development and implementation of the Program. The roles of the Division leads as related to interfaces with the Program Management Team are generally outlined below:

- **Metro Water Services Director.** The overarching role of the Metro Water Services Director is to provide executive leadership and management oversight for the Program through the Assistant Director of Engineering and the Program Director. Responsibilities include facilitating the resolution of issues that may arise with regulatory agencies and other Metro Departments including the Finance, Legal, Public Works, Parks and Recreation Departments, etc.
- **Assistant Director of Engineering.** A primary role of the Assistant Director of Engineering is to provide direct support and oversight to the Program Director. This support includes oversight of any discussions with EPA and TDEC and overseeing activities involved with these agencies. The Assistant Director of Engineering coordinates with the Metro Finance Department and oversees all coordination activities with other MWS Divisions as requested by the Program Director. The Assistant Director of Engineering utilizes Engineering staff as needed for reviewing Program contracts, standards, model updates, easement acquisitions, and record drawings.

- **Administration.** The Administration Section provides management oversight of several important functions within MWS that require interfacing with the Program Management Team. These functions include accounting, public relations, legislative issues, and interfacing with the Planning Commission. The Accounting Section coordinates with the Engineering Division for the review of all Program financial management matters and with the Program Management Team for payment processing. The Public Relations Section is responsible for communicating with stakeholders and has direct involvement with Program Management Consultant's communication tasks.
- **Assistant Director of Operations.** The general role of the Assistant Director of Operations is to manage operations and all interfaces with the Program Management Team regarding Program activities at the wastewater treatment plants, the pumping stations, and the storage facilities. Any activities requiring lab services and facility security are coordinated through the Operations Division and the Assistant Director. During the execution of the Program, the design review meetings periodically require participation by MWS Operations staff to ensure that future facilities are being designed in accordance with MWS Operations' procedures and practices. During construction of facilities, the operations staff may be required to attend construction progress meetings, provide coordination services, review and approve temporary operating procedures, and be involved in final acceptance reviews. The construction phase requirements also require coordination for diversion pumping and the temporary diversions of systems.
- **Assistant Director of Customer Service.** The Assistant Director of Customer Service coordinates with the Program Management Team on all matters that impact Customer Service including communications with the MWS Call Center. All matters that may impact customer billing and collections and/or require coordination with MWS' Information Technology and Systems and/or need involvement by the Program Management Team with inquiries/complaints are handled through the Assistant Director of Customer Service.
- **Assistant Director of System Services.** The Assistant Director of System Services and staff coordinate with the Program Management Team regarding work to be performed in the wastewater collection and water distribution systems. The Assistant Director coordinates the collection (or contracts for collection) of assessment data including, but not limited to, closed-circuit television inspections, smoke testing, manhole inspections, maintenance records, and other relevant data. During the design and construction phases of the Program, System Services staff may be required to provide review and coordination services to the Program Management Team in a manner similar to that described for the Operations Division. In addition, System Services staff may be required to provide utility locations for Program-scheduled excavations.
- **Assistant Director of Stormwater.** The Assistant Director of Stormwater oversees the maintenance of compliance with MWS' stormwater discharge permits (MS4 and NPDES). This position coordinates with the Program Management Team for the issuance of Grading and Building Permits as well as potential impacts to stormwater infrastructure. These activities include the initial and final approvals of temporary and permanent measures for erosion prevention and sediment control, stormwater-specific pre-construction conferences, Metro erosion prevention and sediment control inspections, and NPDES Construction Stormwater Permit compliance inspections. The staff of the Stormwater Division addresses complaints related to alleged pollutant releases by the contractor during construction. The Stormwater Division is also engaged in efforts to further utilize green infrastructure under the Program and has input into the Program's guidance for sustainable design.

2.2.3 Program Management Team Functions

The Program Management Team, as defined previously, is focused on MWS' compliance with the Consent Decree - specifically on Program CSO/SSO abatement goal attainment, affordability, quality, and stakeholder communication. While not repeated for each position, all Program Management Team staff have responsibility for safety and providing quality services. In general, the roles and responsibilities of the MWS staff assigned to the Program and other Program Management Team members are outlined in the following sub-sections.

2.2.3.1 Metro Water Services Management Staff

- **Metro Water Services Program Director.** The Program Director reports to the Assistant Director of Engineering and provides daily oversight, management, and coordination of the Program and resources assigned to the Program. The Program Director's functions include the following:
 - The successful completion of the overall Program including compliance with the Consent Decree
 - Serving as the primary liaison between the Program Management Consultant, the Construction Management Consultant, MWS staff, and other Metro departments
 - Serving as the primary point of contact for EPA, TDEC, and other regulatory agencies
 - Verifying that the data management and reporting processes developed and maintained by the Program Management Team meet the needs of MWS and the Metro Finance Department for proper oversight of the Program
 - Ensuring that corrective action occurs as needed to address identified deficiencies for cost overruns or scheduling delays
 - Overseeing the Program Management Consultant's activities related to established procedures for quality control, scheduling, change management, and project performance
- **Metro Water Services Deputy Program Director.** This position reports directly to the Program Director and provides specialized support to the Program Management Team to coordinate Program activities. The Deputy Program Director's functions include the following:
 - Interfacing with all members of the Program Management Team to advise and assist in facilitating business processes associated with executing the Program including real estate acquisition and permitting activities
 - Serving as the Procurement Coordinator, who is responsible for facilitating and tracking procurement activities with Metro Procurement
 - Assisting the Program Management Team with coordination within the MWS Divisions, as needed, to ensure adequate review and input from MWS staff for Program projects
 - Coordinating with MWS Engineering and Accounting to ensure the integrity and timeliness of the payment review and approval process
 - Supervising MWS employees that may be assigned to the Program
 - Coordinating with Metro Public Property in support of project land and easement acquisition

2.2.3.2 Program Management Consultant Key Staff

- **Program Manager.** The Program Manager provides leadership and management of the Program Management Team and reports to the Program Director. The Program Manager's functions include the following:
 - The successful implementation of the overall Program including compliance with applicable Consent Decree-related milestones
 - Meeting established Program milestones, developing and maintaining a uniform Program Controls approach, and monitoring and reporting on Program budgets and schedules
 - Assisting the Program Director with liaison services to MWS, the Construction Management Consultant, Designers, and outside agencies
- **Deputy Program Manager.** The Deputy Program Manager provides support to the Program Director and Program Manager, as requested, for the implementation of the Program's policies and processes. Additionally, the Deputy Program Manager oversees the development and update of content for the Program's website (www.cleanwater-nashville.org).
- **Planning and Technical Support Manager.** The Planning and Technical Support Manager is responsible for the development and implementation of the on-going planning and analysis processes, including the following functions:
 - Overseeing the development of Project Summaries
 - Providing all technical scoping documents required for the development of standard Requests for Qualifications (RFQs) and Requests for Proposals (RFPs) for the procurement of design consultants
 - Quarterly and annual reporting of the Program's progress to EPA and TDEC
 - Identifying data collection needs, scheduling the timing for delivery of the data from MWS, and analyzing the data collected
 - Maintaining for MWS the separate sanitary sewer system model, the combined sewer system model, and the river system model
 - Evaluating changes and updates to the LTCP and CAP/ER
 - Providing planning support for rehabilitation activities outside LTCP and CAP/ER areas
 - Coordinating post-construction monitoring and analysis
 - Supporting MWS with land and easement acquisition
 - Supporting planning and design submittal reviews by providing personnel with technical and specialty expertise
- **Design Manager.** The Design Manager provides leadership and oversight of Project Managers and has ultimate responsibility for the following tasks:
 - Assisting the Planning and Technical Support Manager in the technical review of Project Summaries and Scopes of Work
 - Providing management and guidance to assigned Project Managers in execution of their project responsibilities
 - Monitoring and administering the Designer's compliance with contract documents including project budgets, schedule, and quality assurance through the design, construction, and closeout phases of the project

- Overseeing design-phase permitting activities including coordination with the Project Managers
- Coordinating the updating and application of Program design and construction standards
- **Program Quality Manager.** The Quality Manager has Program-wide responsibility for the following functions:
 - Verifying that the Program Management Consultant staff complies with requirements of the *Quality Management Plan*, including deliverable review obligations for Program Management Consultant work products
 - Through audits, verifying that staff complies with all of the Program’s procedural requirements
 - Preparing and delivering training to the Program Management Team regarding the quality guidelines and procedures
- **Controls Manager.** The Program Controls Manager has responsibility for following tasks:
 - Updating and managing the *Master Program Schedule* compiled from the project phase schedules
 - Overseeing the maintenance of the Program Management Information System (PMIS), the primary tool for tracking and reporting the Program’s performance information
 - Providing monthly *Program Performance Assessment Reports* to the Program Manager, Program Director, and other Program Management Team staff
 - Coordinating with the Program Manager, the Construction Manager, and other Program leadership to implement the Program’s business processes using PMIS
 - Maintaining the document control systems related to the implementation of the Program
 - Coordinating with MWS Administration, particularly MWS Accounting, regarding the status of invoice processing
 - Maintaining the Program’s cost estimating database
 - Tracking Program risks in compliance with the Program’s *Risk Management Plan*
 - Annually updating the Program’s *Risk Management Plan*
 - Providing cash flow forecasts/analyses, look-ahead schedules for procurement, and general information required for funding and budget planning and analysis
 - Overseeing the activities of the Program Management Consultant and the Construction Management Consultant regarding the annual Metro audit of the Program
- **Procurement Coordinator.** The Procurement Coordinator, a role currently held by the Deputy Program Director, has the responsibility for the following tasks:
 - Serving as the primary point of contact for the Program with the Metro Finance Procurement Division to facilitate coordination of tasks such as soliciting proposals for design, transmitting bid packages, coordinating the responses to questions during bidding, and making award recommendations
 - Providing information to the Program Controls Group regarding the scheduling and tracking of all deliverables to and from the Metro Finance Procurement Division including Change Orders, Change Authorizations, etc.

- **Real Estate Coordinator.** The Real Estate Coordinator reports to the Planning and Technical Support Task Manager and is responsible for the following functions:
 - Working closely with Metro to coordinate land acquisition tasks to ensure an approach and methodology consistent with Metro guidelines
 - Supporting land acquisitions by providing project details and other requested information and serving as a resource for Project Managers
- **Permitting Coordinator.** The Permitting Coordinator serves as a resource for the Project Managers.
- **Communications Coordinator.** The Communications Coordinator reports to the Program Manager and has the responsibility for the following tasks:
 - Working closely with the Program Management Consultant and Construction Management Consultant leadership as well as the task leaders to identify the needs for communications and public relations planning
 - Working closely with MWS' Public Information Officer and other Metro leadership staff, as needed, to seek input into the planning process
 - Planning, scheduling, and coordinating communications activities of any public relations firms contracted to MWS and/or working on the Program Management Team
 - Working with the Program Management Team to draft and distribute team-approved periodic or special public reports
 - Serving as a liaison between the Program and stakeholders, including Metro Council

2.2.3.3 Construction Management Consultant Key Program Staff

- **Construction Manager.** The Construction Manager provides leadership and management of the Construction Management Consultant staff and reports to the Program Director. The Construction Manager works closely with the Program Manager to ensure that the activities of the consulting teams are integrated and functioning effectively during the construction phase of each project. The Construction Manager is responsible for the following tasks:
 - Managing the overall budget and staffing of the Construction Management Consultant
 - Resolving any identified non-conformance issues to the satisfaction of MWS
 - Providing oversight of the contract change process including resolution of contractor claims
- **Field Services Manager.** The Field Services Manager reports to the Construction Manager and acts in place of the Construction Manager when the Construction Manager is not available. The Field Services Manager is responsible for the following tasks:
 - Supervises all field staff and activities, including managing Site Construction Managers
 - Monitoring contractor performance compliance with project construction requirements
 - Ensuring that the Site Construction Managers and other field staff maintain project data, upload it to PMIS, and comply with all Program controls and Program reporting requirements
 - Assumes the lead role in reviewing and recommending approval of payment applications, change requests, and claims prior to forwarding to the Construction Manager
 - Assumes the lead in identifying and resolving resident complaints with the assistance of the Site Construction Manager

- Conducting constructability reviews during design as needed
- Serves as the primary point of contact with the Program Management Team during the Planning and Design phases of projects
- **Controls Manager.** The Controls Manager reports to the Construction Manager and is responsible for the following activities:
 - Tracking project status including cost and schedule information
 - Manages activities of the schedulers, document managers, and cost control staff of the Construction Management Consultant
 - Acts as the Quality Management Supervisor for the Construction Management Consultant
 - Manages project controls guidelines outlining the daily processes and procedures followed by the Construction Management Consultant's Controls staff
 - Reviews and approves contractors' final cost and schedule data prior to incorporation into the *Master Program Schedule* and Program budget
 - Responsible for the quality of document management activities, cost control functions, and reporting

2.2.4 Project Management Team Functions

Managing individual projects within the Program expands the functional organization of the Program Management Team and adds the key implementation entities of Designer and construction contractor as critical interfaces. The Program Management Consultant provides a Project Manager, as needed, for projects without a Metro Project Manager. It is the Project Manager's responsibility to manage the project for the Program Management Team through the procurement, design, construction, commissioning, and post-construction phases of the project. During the construction phase, the Project Manager relies on the Site Construction Manager assigned by the Construction Management Consultant to provide oversight and management of the construction contractor.

Figure 2-2 depicts the functional relationships of project staff and the Program management support.

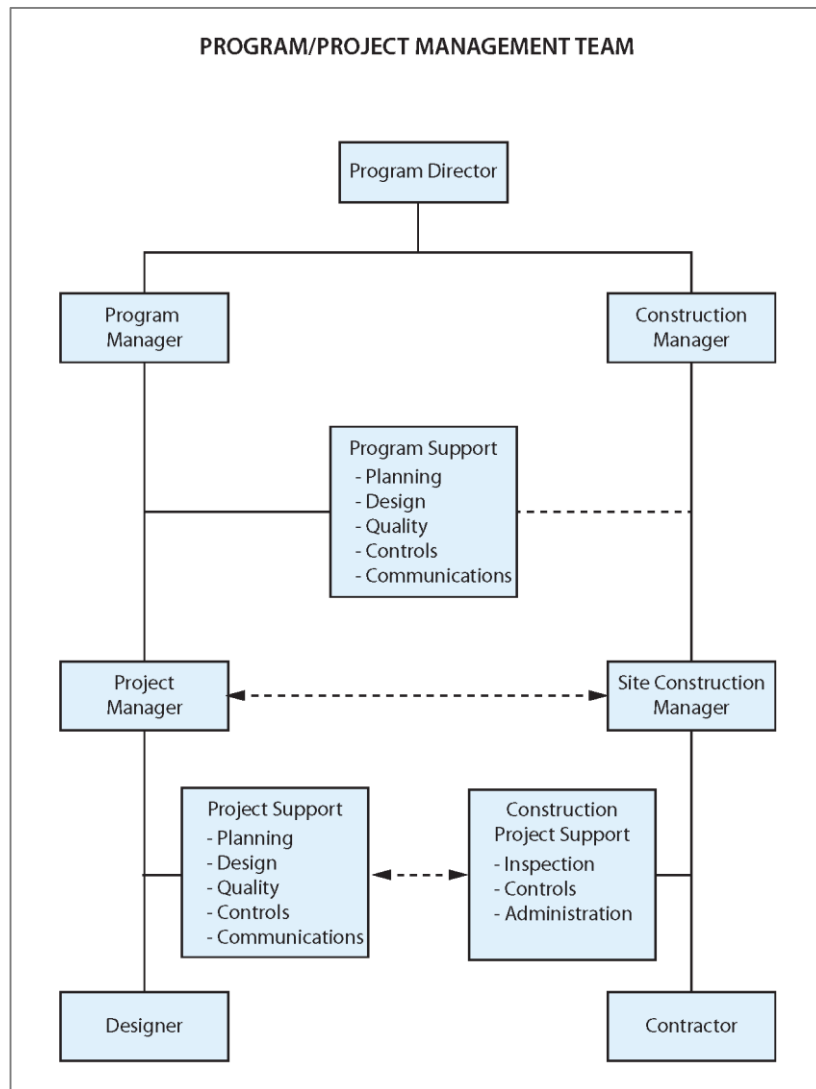


Figure 2-2 Functional Relationships of Project Staff and Program Management Support

In general, the roles and responsibilities of the members of the Project Management Team are as follows:

- **Project Manager.** The Project Manager provides leadership and management of the assigned projects from Designer procurement through design, contractor procurement, construction, and project closeout. The Project Manager reports to the Design Manager and is responsible for monitoring project budget, schedule, quality, contract compliance, and coordination with other projects. The Project Manager provides day-to-day oversight of the Designer, coordination of issues during bidding, and coordination with the Site Construction Manager during construction.

Additional responsibilities of the Project Manager include the following:

- Supporting MWS procurement of Designers

- Providing sufficient instructions for the Designer to be able to deliver appropriate design services for each project
 - Coordinating the design review and peer and value engineering sessions
 - Monitoring Designer QA/QC
 - Providing coordination and oversight of permitting and MWS easement acquisition activities during design
 - Supporting MWS' procurement of construction contractors
 - Coordinating with the Site Construction Manager in managing the Designer's services during construction
 - Administering the design contract by monitoring contract compliance and providing an analysis of any requests for design contract changes
 - Coordinating progress meetings during the design phase and periodically attending progress meetings during construction
 - Reviewing the Site Construction Manager's analysis of the cause of any construction delay or request for budget increases
 - Reviewing monthly updates provided by the Site Construction Manager and providing insight to Program Controls
 - Assisting with community and public relations in accordance with Program policies through interfaces with the Communications Coordinator
- **Designer.** The Designer is the Engineer of Record and is responsible for final design, the preparation of pre-construction permit applications, and quality control during the design process. The Designer's responsibilities include the following:
 - Developing final design based on an approved preliminary design and preparing bid documents within the established scope, quality, budget, and schedule
 - Preparing cost estimates as part of design submissions
 - Preparing environmental permit applications associated with individual projects
 - Supporting land and rights-of-way acquisition and easement procurement efforts by MWS
 - Providing engineering services during construction per contract specifications
 - Developing and updating a schedule and budget for all activities associated with its design contract and cooperating with the Project Manager's review of these deliverables
 - **Site Construction Manager.** The Site Construction Manager provides the contract administration of the contractor's contract. The responsibilities associated with this role require the following:
 - Coordinating and tracking document control system activities related to shop drawing review, leading monthly progress meetings with contractors, and providing up-to-date coordination of issues
 - Validating progress payments, reviewing the contractor's schedule for compliance with milestones and completion dates, and preparing time/cost impact analysis required for contract Change Order evaluations
 - Processing and managing the communications between the contractor and the Designer including RFIs and contractor submittals requiring review

- Providing quality assurance during construction, primarily to ensure that the contractor is complying with its own *Quality Control Plans*
- Coordinating testing programs and providing initial document interpretation in the case of a dispute
- Working with the contractor to resolve non-conforming items
- Coordinating with the Project Manager on all issues that have a the potential to impact a project's scope, budget, schedule, or quality, as requested
- **Resident Project Representative.** The role of the Resident Project Representative is to be on site when the contractor is working and to complete the following tasks:
 - Providing project-specific quality assurance during construction
 - Observing construction activities for compliance with contract documents
 - Monitoring the contractor's compliance with its *Safety Plan*
 - Preparing daily reports, documenting work-in-place, and monitoring the project's progress for compliance with milestones and the completion date
 - Maintaining red-lined plans depicting the status of construction activities
 - Monitoring construction startup and commissioning
 - Acts as the first line of communication with the public, particularly in matters relating to construction on private property
- **Construction Contractor.** The construction contractor is responsible for compliance with contractual requirements including means and methods of construction, protection of materials and equipment, traffic maintenance, coordination with utilities, quality control, schedule, site safety, and security. The construction contractor reports the progress and submits deliverables to the Site Construction Manager in accordance with contract requirements.

2.2.5 Interface with Other Metro Nashville Departments

In addition to coordinating activities with MWS' Divisions as described in Section 2.2.2, the Program Management Team coordinates with other Metro Departments/Offices within the Metropolitan Government as required by current operating practices and as requested by MWS. In general, these Departments/Offices include the following:

- **Metro Nashville Department of Law.** The Department of Law provides legal support services for contracts, real estate, permitting, funding agreements, compliance, and other areas, as needed.
- **Metro Public Works.** The Clean Water Nashville Program interfaces with this Department when construction activities impact streets and rights-of-way, both from a traffic control and pavement repair standpoint.
- **Metro Nashville Finance Department**
 - **Procurement Division.** This Division provides procurement services to support the Program.
 - **Metro Nashville Government Office of Minority and Women Business Assistance.** MWS is committed to meaningful and substantive participation in the Program by small businesses and firms owned and managed by members of disadvantaged groups. To meet this commitment, Metro has established the Business Assistance Office (BAO) to oversee the

development and management of the BAO requirements for Small Business Enterprise (SBE), Minority Business Enterprise (MBE), and Women Business Enterprise (WBE) participation.

- **Public Property Division.** This Division provides services related to land and easement acquisition for the Program.

2.2.6 Interface with Outside Agencies, Utilities, and Others

Other governmental agencies, municipalities, and utilities play a role in the Program. Some may review and/or approve elements within the Program or may be affected by project delivery activities during planning, design, and construction of the various projects. All communications and coordination with these agencies are led by MWS with support from the Program Management Team as requested.

- **U.S. Environmental Protection Agency (EPA).** The EPA enforces regulations through National Pollution Discharge Elimination System (NPDES) permit process and the Consent Decree. In compliance with the Consent Decree, MWS provides periodic reports to EPA regarding the status of the Program and formally requests modifications, if required, during the implementation of the Program.
- **U.S. Department of Justice (DOJ).** The DOJ is also a party to the Consent Decree and is to be included in the distribution of periodic communication and reporting regarding status of the Program.
- **Tennessee Department of Environment and Conservation (TDEC).** TDEC is the principal environmental regulating agency in Tennessee and is a party to the Consent Decree. It monitors all activities that may affect the environment and/or violate state environmental regulations. TDEC approves consultants' plans and specifications for construction, excluding rehabilitation projects. In compliance with the Consent Decree, MWS provides periodic reports to TDEC.
- **Other governmental agencies, municipalities.** Other governmental agencies, municipalities, and entities that may require coordination include the following:
 - Tennessee Department of Transportation (TDOT)
 - Railroads – CSX, Norfolk Southern, Nashville & Eastern
 - Metropolitan Transit Authority
 - U.S. Army Corps of Engineers
 - Tennessee Valley Authority
 - Satellite communities
- **Utilities.** Various underground and overhead utilities, existing and planned, require close coordination to lessen the impact to consumers. Some of the utilities that the Program Management Team may be coordinating with include the following:
 - Nashville Electric System (NES)
 - AT&T (Phone, Data)
 - Level 3 Communications (Data)
 - XO Communications (Data)
 - Texas Eastern (Interstate Gas)
 - Colonial Gas (Interstate Petroleum)

- Comcast/Charter Communications (Cable, Data)
- Piedmont Natural Gas (Gas)

Section 3

Program Controls: Scope and Document Management

3.1 Overview

Program Controls are developed to provide a forward-looking performance analysis and to facilitate management decision making at multiple levels – Program, project, and contract. The approach to Program Controls is described in Sections 3 through 6 of the *Program Management Plan*, Volume I.

The primary responsibilities of the Program Controls group include the following:

- Evaluating proposed project scope changes against project baseline scope
- Managing the formatting, sharing, tracking, and archiving of Program documents
- Reviewing and recommending for approval appropriate changes to the baseline scope, schedule, and budgets for each project or the entire Program
- Coordinating the review of consultant claims
- Administering the Program Management Information System (PMIS)
- Preparing monthly *Program Performance Assessment Reports* that describes key issues, trends, and observations
- Producing the most current information regarding the Program and all of its projects and transmitting that information to Program team members and project teams
- Evaluating proposed schedule changes against the project's baseline schedule (Section 4, Schedule Management)
- Reviewing and documenting monthly updates to phase schedules (Section 4, Schedule Management)
- Conducting regular Master Program Schedule updates based on monthly updates of detailed phase schedules (Section 4, Schedule Management)
- Conducting regular Master Program Budget updates based on monthly updates of project budgets and supporting MWS' annual capital budgeting (Section 5, Financial Management)
- Tracking Program expenditures as well as generating cash flow forecasts to support MWS with short- and long-term requirements for maintaining sufficient funds for payments (Section 5, Financial Management)
- Tracking the sources of project funding (Section 5, Financial Management)
- Maintaining a database of consultant fees and contractor as-bid unit prices (Section 5, Financial Management)
- Monitoring the development of project *Risk Management Plans* and tracking project risk management activities (Section 6, Risk Management)
- Managing Program risk and tracking mitigation activities (Section 6, Risk Management)

3.2 Work Breakdown Structure

The Work Breakdown Structure provides the critical “backbone” for organizing and managing all the work required to plan and execute the Program. The hierarchical Work Breakdown Structure configuration is coded to allow all Program elements and respective information to relate back to a consistent, Program-wide structure.

During execution, the Work Breakdown Structure enables progress assessment in each area of operations, thereby providing a higher level of monitoring and control. The association of scope to both cost and schedule is of critical importance. Specific coding allows the precise identification of project information and associated documents for accurate tracking and retrieval.

As shown below, the Work Breakdown Structure for the Program has five levels. Each level represents increasing detail in the work.

- **Level 1 – Program**
This is the highest level within the Work Breakdown Structure. It is used for summarizing Program-level activities into one of three Programs - Early Action Projects (EAP), Clean Water Nashville Overflow Abatement Program (OAP) projects, and other Metro Water Services’ *Capital Improvements Plan* projects (CIPs).
- **Level 2 – Sub-program**
Three sub-programs are defined within the Program—*Long Term Control Plan* (LTCP) projects, *Corrective Action Plan/Engineering Report* (CAP/ER) projects, and *Annual Rehabilitation* projects.
- **Level 3 – Consent Decree Projects**
At this level, information related to each defined Consent Decree project within the Program, i.e., those listed in the *Long Term Control Plan* and *Corrective Action Plan/Engineering Report*, is summarized.
- **Level 4 – Project**
This level is used to summarize information related to individual projects executed in order to more effectively implement the Consent Decree projects by geographical area or within an economical size of contract. For non-rehabilitation projects and rehabilitation projects with only one area, the information summarized at this level is identical to Level 3.
- **Level 5 – Phase**
This level identifies the phase of the work within a project. For all projects in the Program, the phases are planning, real estate, design, permitting, bid and award, construction, and closeout. This level may include stand-alone contracts and/or other implementation activities internal to the Program.

A unique project number is assigned to each project using the Work Breakdown Structure. This project number is used within PMIS to link information to projects. Section 3.4.2, Document Naming Convention, contains additional details about this topic.

See below for an example name for an LTCP project.

Table 3-1 Example Document Naming Convention

Example Document Naming Convention	
OAP.L.02.02	
Level 1 - Program	OAP = Clean Water Nashville Overflow Abatement Program EAP = Early Action Projects CIP = Capital Improvements Projects
Level 2 - Sub-Program	C = <i>Corrective Action Plan/Engineering Report</i> L = <i>Long Term Control Plan</i> A = Annual Rehabilitation E = Engineering B = Biosolids Facility
Level 3 - Consent Decree Project	01, 02, 03, 04...
Level 4 - Project	01, 02, 03, 04...
Level 5 - Phase	

3.3 Scope Management

The scope of each project in the Program is documented in the *Master Program Budget and Schedule Report* included in the *Program Management Plan*, Volume III. The *Master Program Budget and Schedule Report* contains a description of each project in the Program as well as a conceptual cost estimate from which the project's scope is defined. Additional details regarding the scope of each project are also contained within the Project Summary for each project. The *Program Management Plan*, Section 7, Planning and Technical Support, provides details about the Project Summaries.

The Project Manager is responsible for understanding the scope of each assigned project and for managing each project to achieve its documented objectives. This comprehensive understanding is facilitated by a "cradle to grave" assignment that starts during planning and ends with project closeout. During project execution, changes to a project's scope are possible, and it is the Project Manager's responsibility to identify these changes in a timely manner and communicate them to the Program Management Team for approval. During planning and construction, as opposed to design where the Project Manager is directly involved with design scope, the Project Manager relies on the Planning and Technical Support Manager or the Site Construction Manager to make the initial identification of a scope change. The Project Manager presents a description of the scope change and a justification for the change to the Program Management Team for review and approval or rejection. It is the Program Controls Manager's responsibility to review the proposed scope changes and make recommendations to the Program Manager about whether or not the proposed change should be approved. The Program Controls Manager works closely with the Planning and Technical Support Manager and the Design Manager regarding the interpretation of scope information contained within the Project Summaries and Scopes of Work in order to prepare the recommendation.

The management of changes to project scopes has implications for both project cost and schedule; therefore, a single, comprehensive approach to managing project change has been established. Section 3.5 provides a detailed description of the project change management procedure that addresses scope, schedule, and budget.

3.4 Document Management

Document management is the system of managing, formatting, sharing, tracking, and archiving of all Program documents. There are many facets to document management in the Program, and the approach to each are described in the following sub-sections and in more detail in the Document Control Guidelines in the *Program Management Plan*, Volume III.

3.4.1 Document File Index

The Program Management Team utilizes document file indices for project and Program documents. The main folders in the document file indices are:

Section No.	Program File Index	Project File Index
100	Contracts	Contracts
200	Communication/ Correspondence and Meetings	Communication/ Correspondence and Meetings
300	Controls	Controls
400	Planning and Technical	Planning and Technical
500	Deliverables	Design
600	Construction	Construction
700	Quality	Quality
800	Safety	Safety

The project-related documents are captured and filed at Level 3 in the Work Breakdown Structure (see Section 3.2). The Program-related documents are captured and filed at Level 1 of the Work Breakdown Structure. This differentiation between project and Program files allows for ease of locating documents based on whether they are associated with a project or are Program-related.

The Standard Project File Index and Standard Program File Index in the Document Control Guidelines provides a breakdown of the sub-folders, e.g., 100 – Contract has sub-folders for Procurement, Contracts, Contract Modifications, etc., and details regarding which files are stored as hard copies versus electronic only.

3.4.2 Document Naming Convention

Team members identify all project and Program correspondence, documents, and deliverables using a standard naming convention. The key element of the naming convention for projects is the project number. The project number is followed by a short identifier that is assigned and defined in the Standard Project File Index and Standard Program File Index. All Program-level documents begin with the letters “OAP” instead of a number. An example is described in Section 3.2.

3.4.3 Controlled Program Documents

The *Program Management Plan*, standard procedures, and other referenced Program documents that guide or direct the implementation of the Program are considered controlled documents, i.e., documents that require the latest revision of the contents and can be changed only after written approval of a written request. The Program Controls Manager is responsible for reviewing and routing to appropriate Program personnel for approval any requests to change controlled Program documents. The standard procedure for changing controlled documents is defined in the Controlled Document Revision Procedure and is included in the requirements of the Quality Review of PMC-

generated Documents Procedure. The *Program Management Plan*, Volume II, contains copies of these procedures.

The following are considered controlled Program documents:

- *Program Management Plan*, Volume I
- *Program Management Plan*, Volume II - Procedures
- *Program Management Plan*, Volume III - Reference Documentation

3.4.4 Standard Templates

Standardized document templates are available for use by all team members to provide Program-wide consistency and to facilitate the identification, filing, and retrieval processes.

A non-inclusive list of standard templates is provided below:

- Letter
- Memoranda
- Meeting minutes
- Phone log
- Agenda
- Transmittals
- Presentation
- Report
- CD Labels
- Notice of Surveying
- Construction Bid Proposal Form
- Project Closeout Checklist

The *Document Control Guidelines* in the *Program Management Plan*, Volume III, provides details about the use of templates and notification and documentation requirements for all Program communications.

3.4.5 Hard Copy Resource Library

The Program Controls Manager administers and maintains a hard copy library of frequently used reports and reference documents. Examples of documents that the Program Controls Manager maintains in a hard copy library include the Consent Decree, CAP/ER, LTCP, and other documents needed by the Program Management Team.

3.5 Change Management

Change management is the system for reviewing and approving changes to the baseline scope, schedule, and budgets for each project or the entire Program.

There are two types of project changes:

- Minor changes based on established limits that the Program Controls Manager has the authority to make

- Major changes that require approval from various levels of management within the Program Management Team

Requests for major changes are initiated using the Change Justification business process (BP) within PMIS that is routed to the Program Controls Manager. This BP is used for all project changes including contract and non-contract changes. The information in an approved Change Justification is used to prepare standard contract change forms used by MWS. These standard contract change forms are then routed for signatures in accordance with MWS' requirements.

3.5.1 Minor Change

Minor project changes are generally those associated with adding or subtracting detailed information about project scope, schedule, or budget to the established baseline. The minor project changes are documented in PMIS but do not require approvals from the Program Management Team.

The table below provides examples of minor project changes that can be accomplished by the Project Manager and executed by Program Controls without Program Management approvals (e.g., Design Manager, Program Manager, or Program Director).

Table 3-2 Minor Change

Event	Condition	Example
SCOPE		
Change the project name	Must receive verbal approval from Deputy Program Director	Adding further detail to a rehabilitation project name that is currently identified as Area 1, Area 2, etc.
SCHEDULE		
Phase Schedule Update	Phase Duration Less than Baseline or Previous Revision	Designer schedule to be completed ahead of schedule, construction duration reduced based on Designers opinion of construction duration and Bid & Award duration to be completed ahead of schedule
BUDGET		
Reduce budget of an individual cost account	Remaining budget must be transferred to project contingency	Updated OPCC, design contract awarded at an amount lower than current budget for that cost-account
Transfer from project contingency to Program Reserve	None	Project contingency is more than is necessary considering the project's risk profile

3.5.2 Major Change – Non-Construction

Major project changes are those that significantly modify the project scope, schedule, or budget estimated in the baseline. Unlike minor project changes, a major project change must receive Program Management approval before the change can be implemented.

The tables below provide listings of major project changes that are not construction related (e.g., changes identified during the project's planning and/or design phase), conditions associated with each change, and the primary approval needed to authorize the change. Major changes that are not related to active construction contracts are initiated by either the Planning and Technical Support Manager or the Project Manager.

Table 3-3 Major Change—Non-contract Changes

Major Change Description	Condition	Primary Approval	Notes
SCOPE			
Change to project description	None	Design Manager	Used to include more detail about the current project scope
Change to project scope or the change impacts the scope of other Program project(s)	None	Program Director	Examples include; addition/deletion of projects or modification of project scope
SCHEDULE			
Modify project schedule logic or increase to active phase duration	Resulting float to Consent Decree milestone is > 180 days	Design Manager	
	Resulting float to Consent Decree milestone is < 180 days	Program Director	
Modify start or finish of a future project	None	Program Director	Requires review of impact on Program cash flow
BUDGET			
Transfer to Contingency from Project Phase Budget	None	Project Manager	
Increase budget of an individual cost account	Increase is less than 10% of current budget	Design Manager	
Increase project budget above baseline	None	Program Director	Requires transfer from Program Reserve

Table 3-4 Major Change—Professional Services Contract Changes

Major Change Description	Condition	Recommended By	Primary Approval
CONTRACT CHANGES			
Increase Design Contract Amount	Any increase in contract amount	Project Manager	Program Director
Increase Design Contract Duration	Any increase in contract duration		

The Project Change Justification Procedure included in Volume II of the *Program Management Plan* provides details about the review and approval of non-construction related changes.

3.5.3 Major Change – Construction

Major changes during construction are managed according to the requirements of the construction contract and initially developed as described in the procedures included in the *Construction Management Manual* in Volume III of the *Program Management Plan*. MWS' standard construction contracts handle changes during construction using Field Authorizations, Change Authorizations, or Change Orders. The table below provides listings of major project changes related to construction contracts and the primary approval needed to authorize the change.

Table 3-5 Major Change—Construction Contract Changes

Major Change Description	Recommendation Initiated By	Primary Approval
Field Authorization	Site Construction Manager	Deputy Program Director
Change Authorization	Site Construction Manager	Program Director
Change Order	Site Construction Manager	Program Director

To provide accurate documentation of the change, the origin of the request for a construction contract change is classified into one of the following categories:

- Adjustment for Add/Deduct Contract Scope
- Adjustment to Contract Allowance Quantities
- Owner Requested Change
- Unforeseen Site Conditions
- Design Change
- Substitution
- Contractor Requested Change

While these classifications can indicate a significant issue with the design on that project, it is the review at the Program-level of all construction contract changes that can identify broader trends with specific Designers, contractors, or even owner-directed modifications – all impacting the Program's ability to meet its initial budget projections.

The interfaces between the Program Management Consultant, Construction Management Consultant and MWS in regards to identifying, reviewing, approving, tracking, and processing construction contract changes are detailed in the Field Authorization, Change Authorization, and Change Order Procedures in the *Construction Management Manual* in Volume III of the *Program Management Plan*. At a high-level, the approach to these interfaces is as follows:

- The Site Construction Manager is initially responsible for identifying, evaluating (including the development of fair cost estimates), reviewing with the Contractor, coordinating with the Project Manager, and issuing the recommendation for action for any type of construction contract change. The Site Construction Manager is also responsible for clarifying to the Contractor that no work shall be performed on any pending change until approved by MWS.
- The Project Manager is responsible for reviewing the recommendation provided by the Site Construction Manager and engaging the resources of the Program Management Consultant including the Program Manager, and MWS if necessary, to determine whether the change should be approved. In those cases where a construction contract change triggers a major

change on the project (refer to criteria in Table 3-3), the Project Manager must also prepare and route for approval a Change Justification. For example, a change to the construction contract requires that additional project budget be transferred from the Program Reserve.

- The MWS staff responsibilities differ depending on the change mechanism used:
 - Field Authorization. The Deputy Program Manager has the final review and approval on behalf of the Program Management Team.
 - Change Authorization and Change Order. The Program Director has the final review and approval on behalf of the PMT prior to routing to other Metro departments for processing.
- Program Controls is responsible for the quality review of the final Change Authorization and Change Order packages and transfer of hard copies to MWS Accounting.
- The Deputy Program Director is responsible for tracking the status of the Change Authorization and Change Order and serving as the liaison if there are any questions or issues that arise during processing.

3.5.4 Program Change

A change that impacts multiple Program projects or general Program requirements/milestones is considered a Program change and is addressed through the Change Justification Procedure included in Volume II of the *Program Management Plan*. This procedure is used to track Program changes including, but not limited to, adding a new project, changing the balance of the Program Reserve (defined as the summation of unused construction contingency and referenced in Section 5, Program Controls: Financial Management), or changing the assumptions stated in the *Master Program Budget and Schedule Report*. Program change requests can only be initiated by the Program Manager or the Program Director.

3.6 Claim Management

An important component of Program Controls is the need to effectively manage and resolve contract claims. While construction contracts, which account for the majority of contract claims filed, give the contractor the right to claim for damages incurred by delays and/or changes beyond its control, measures must be taken to ensure that any compensation given to the contractor is fair and equitable to both the contractor and Metro Water Services and is well documented.

Types of claims to be handled include the following:

- Extra work/ constructive changes
- Time-related claims (delay, acceleration, disruption)
- Differing site conditions
- Defective/rejected Work
- Termination

The Construction Manager is responsible for leading the review of contractor claims, engaging resources of the Construction Management Consultant as needed, and obtaining input and approvals from the Project Manager, Program Manager, and Program Director. It is anticipated that MWS will play a critical role in determining how a claim is handled.

The Claim Review Procedure in Volume II of the *Program Management Plan* provides details about the assessment, review, and approval of claims.

3.7 Information Management using PMIS

The Program Management Team utilizes PMIS, a Program Management Information System, to facilitate business processes and team collaboration, communicate to stakeholders, control operations, provide transparency into Program performance, and support management decision making. The Program Controls Manager has PMIS administration responsibility on behalf of the Program Management Team.

Key capabilities of PMIS include:

- Hierarchical, multi-level organization. Information, documents, and performance assessment must be managed at multiple levels in line with the Work Breakdown Structure.
- Internet-based access. PMIS can be accessed from any computer with a network connection at any time of day through a single point of access.
- Role-based security. The ability to access and/or edit is based on role assignments.
- Integrated Workflows. Workflows manage and track processes across Program operations.
- History Tracking. All correspondence, documents, and changes are tracked to support record access and auditing.
- Flexible Framework. PMIS allows configuration adjustments and the addition of components as required to support changes in operational needs.

Individual sections of this *Program Management Plan*, Volume I, refer to the functional use of and interface with PMIS. Refer to the *PMIS User Manual* in the *Program Management Plan*, Volume III, for details on functionality of PMIS.

3.8 Program Performance Assessment and Reporting

A monthly assessment of the Program's progress is conducted by the Program Controls group under the leadership and direction of the Program Controls Manager. This assessment is based upon the timely receipt of monthly schedule updates for active phases (planning, design, procurement, permitting, and construction) for all active projects as well as monthly actual cost updates for all active contracts.

The Program Controls Manager prepares a monthly *Program Performance Assessment Report* that describes key issues, trends, and observations based on examination of the prior months' data. The monthly *Program Performance Assessment Report* is a memorandum containing key observations and a set of standard reports structured as follows:

- *Program Summary Report – Consent Decree Level*
- *Project Summary Reports* (active projects only)
- *Consent Decree Completion Milestone Trend Report*
- *Consent Decree Start Milestone Report*
- *Consent Decree Finish Milestone Report*
- *Construction Contract Pay App Status Report*
- *Service Contract Invoice Status Report*
- *Small, Minority and Women Business Enterprise Utilization Report*
- *PIF Look Ahead Report*

- *Procurement Summary Report*
- *Procurement Look Ahead Report*
- *Procurement Monitoring Report*

The Program Controls Manager reviews the monthly *Program Performance Assessment Report* with the Program Manager, incorporates comments, finalizes the document, and submits it to the Deputy Program Director and Program Director. The Program Manager discusses the key observations during the weekly Program Management Meetings and documents action items and/or resolution of items in the meeting's minutes.

3.9 Program Team Communication

Program Controls produces the most current information regarding the Program and all of its projects. This information is in a central location provided through PMIS allowing for the effective transmittal of information to all Program team members and project teams. PMIS is most effective when the Program Management Team routinely reviews and updates the information provided in PMIS.

Internal team coordination and communication is facilitated by the use of both face-to-face communication and regular reviews of the information in PMIS. To enhance internal communications between team members, the meetings discussed in the following sub-sections are considered as part of the regular communication process within the Program.

The *Program Management Plan*, Section 10, Stakeholder Communications and Community Outreach, provides details on external communications.

3.9.1 Program Management Meetings

The Program Management Consultant convenes a regularly scheduled (typically held biweekly) meeting of the Program Management Team to address Program issues including schedule, budget, quality, monitoring, compliance, coordination of activities, and timely decision-making processes. Attendees include representatives of MWS, Program Management Consultant, Construction Manager Consultant, and others, as appropriate.

3.9.2 Project Coordination and Management Meetings

Designated representatives of the Program Controls group and representatives of the project management team (typically the Project Managers and Design Manager) meet monthly, at a minimum, to share information and lessons learned. These meetings may also be attended by the Program Director, Deputy Program Director, Program Manager, and Construction Manager, as deemed appropriate. This meeting provides a forum to address Program-level policy and procedural issues affecting a project and allows team members to assist in the resolution of issues and address current and potential conflicts. Additionally the project budgets and schedules are confirmed at that time. Updates and issues identified in these meetings are recorded and tracked in PMIS by the Program Controls Team.

A representative of the Program Controls group chairs these meetings. Generally, the team meets to accomplish the following:

- Provide effective communication between various phases of the projects

- Review progress compared to the schedules for each project/phase and contract
- Resolve outstanding issues from previous meetings
- Discuss and resolve new issues and identify those issues with potential impact on project scope schedule, budget, cost, or funding
- Review the status of permitting, easement and land acquisition, and procurement
- Review the status of requests for information; submittals; change orders or active disputes; and evaluate potential budget, schedule, or funding impacts
- Address any public concerns

3.9.3 Documentation

All meetings held as part of the Program are conducted in accordance with the *Document Control Guidelines* that require, among other things, the use of standard templates for agendas and minutes (refer to Section 3.4.3, Standard Templates), the assignment of a meeting facilitator, and the preparation of minutes and itemizing or highlighting of action items, responsible parties, and due dates.

3.10 Project Closeout

Project closeout is a collaborative process between the Construction Management Consultant, the Project Manager, and the Program Controls Team. Refer to Section 4.3.7, Closeout Phase, for details.

Section 4

Program Controls: Schedule Management

4.1 Overview

The Program Management Team utilizes the Master Program Schedule to provide and display an understanding of all project durations within the Program.

As summarized in Section 3, the schedule management responsibilities of the Program Controls Group include the following:

- Evaluate proposed schedule changes against project baseline schedule
- Review detailed schedules developed by phase leads
- Conduct regular Master Program Schedule updates based on monthly updates of detailed phase schedules

4.2 Schedule Management Approach

4.2.1 Master Program Schedule

The Master Program Schedule establishes an overall Program schedule that includes all projects with milestones, sequencing priorities, float values where appropriate, and logical relationships by which the work is executed. Project schedules are linked within the Master Program Schedule, and dependencies between projects are identified and tracked for the timely mitigation of any potential impacts. Each project schedule includes phases for planning, design, real estate, permitting, bid and award, construction, and closeout activities. As projects advance, each phase requires the development and submission of more detailed phase schedules that are reviewed by the Program Management Team.

4.2.2 Detailed Schedules

Detailed schedules represent the sequence of activities that are performed to accomplish a phase within the Master Program Schedule. Each phase of the Master Program Schedule has a phase lead that is responsible for developing a detailed schedule for that phase. During the construction phase, the Site Construction Manager reviews and accepts the schedule. The Project Manager retains ultimate responsibility for meeting the project schedule, but the phase lead develops an acceptable baseline schedule of activities. Table 4-1 identifies the phase leads. The *Master Program Budget and Schedule Report* details the events that start and end each phase.

Table 4-1 Detailed Schedule Responsibility by Phase

Phase	Phase Lead
Planning*	Planning and Technical Support Manager
Design	Project Manager
Permitting	Project Manager
Real Estate	Real Estate Coordinator
Bid & Award	Project Manager
Construction	Construction Manager
Closeout	Project Manager

*The Planning and Technical Support Manager is the phase lead only until the Scope of Work is transmitted to Metro for the procurement of the Designer; then it is transitioned to the Project Manager.

Once the phase lead develops or accepts an approved detailed schedule, the key sequences of activities are summarized and linked within the Master Program Schedule by the Program Controls Group. The Master Program Schedule does not contain all activities from the detailed schedules but only those key activities necessary to complete the following tasks:

- Properly represent the project and track its progress toward milestone achievement
- Link to related activities or phases of other Program projects and contracts

4.2.3 Monthly Schedule Update

Section 4.3, Detailed Schedules by Phase, provides an overview of the responsibilities for updating the detailed schedules. The Schedule Review Procedure in the *Program Management Plan*, Volume II, details the review and approval of monthly updates to phases schedules.

4.2.4 Schedule Change Management

The initial schedule for each project in the Program is documented in the *Master Program Budget and Schedule Report*. The *Master Program Budget and Schedule Report* describes the establishment of the phase durations and dependencies. The Project Manager is responsible for understanding the project schedule and managing the project to meet or exceed the Consent Decree milestones. During project execution, if significant changes to the project schedule occur, it is the Project Manager's responsibility to, in consultation with the phase lead, identify potential deviations in a timely manner and to communicate them to the Program Management Team to allow time for a thorough review. The communication from the Project Manager needs to describe the extent of the schedule change and to justify the deviation from the baseline project schedule. It is the responsibility of the Program Controls Manager to review the proposed schedule changes; determine if the proposed change has implications on other Program projects; and provide an assessment to the Project Manager, Program Manager, or the Program Director to support sound decision making.

The management of changes to the schedule has implications on both project scope and cost. Therefore, a single, comprehensive approach to managing project change is expedient. Section 3.5, Change Management, details the project change management procedure that addresses scope, schedule, and budget.

4.3 Detailed Schedules by Phase

The following sub-sections describe how the status of detailed schedules are obtained by phase and then updated to the Master Program Schedule. Additional detail is provided regarding the roles and

responsibilities associated with the design and construction baseline schedules and monthly schedule updates because of the increased importance of these phases and interrelations with contract requirements.

4.3.1 Planning Phase

Planning phase activities are provided by the Program Management Consultant and are led by the Planning and Technical Support Manager. The activities within the planning phase include the following:

- Coordinating the collection of condition assessment data and pre-construction flow monitoring data, routing studies, and additional modeling
- Preparing the Project Summaries
- Preparing the Designer's Scope of Work
- Procuring Designers

The planning activities are not standard and depend on the type of facility needed. Therefore, the representation of the sub-key activities needed to represent the general planning activity in the Master Program Schedule is coordinated between the Planning and Technical Support Manager and the Program Controls Group. Key progress milestones provided by the Planning and Technical Support Manager is tracked in the Master Program Schedule.

The Project Manager, who becomes involved in project planning after the initial draft of the Project Summary is prepared, is the phase lead once the Designer's Scope of Work is transmitted to the Metro Finance Procurement Division for the procurement of a Designer. The Project Manager remains in close contact with the Planning and Technical Support Manager and is supported by the Procurement Coordinator who serves as the primary point of contact with the Metro Finance Procurement Division. This position is discussed further in Section 4.3.5, Bid and Award.

4.3.2 Design Phase

4.3.2.1 Design Schedules

The Designer develops a proposed design schedule and narrative that describes how the schedule was prepared and demonstrates the Designer's plan for preparing and delivering final design documents. The proposed design schedule is reviewed by both the Project Manager and the Program Controls Group. The Project Manager reviews the proposed sequence of work and confirms that the schedule coordinates with other phases of the same project. The Program Controls Group performs a technical review of the schedule as well as an examination of intra-project dependencies within the Program. After the Project Manager and Program Controls Manager both accept the proposed schedule, it is used to track and monitor the progress of the Designer for that specific contract. The Designer's schedule includes activities from the submittal of a *Project Work Plan* through the 100% Design Submittal at which time the Program Management Team is responsible for preparing and forwarding the prepared bid package to Metro Finance Procurement Division. During this time, the Project Manager is responsible for providing an update to the Program Controls Group about the status of these activities.

4.3.2.2 Design Schedule Updates

Via the Program Information Management System's (PIMS) Designer Submittal Business Process, the Designer submits schedule updates as required in their Scope of Work. This may include monthly

schedule updates, updated schedules when requested by the Project Manager, or revised schedules when a schedule slippage of more than 21 days for the 100% Design Submittal is anticipated. When the Designer is not required to submit monthly schedule updates, the Project Manager coordinates with the Program Controls Group to update the Master Program Schedule to reflect the key milestone dates. The Project Manager reviews the updated schedule, confirms that the status reflects the work completed, accepts or rejects the schedule update, and utilizes the Designer Submittal BP to forward the schedule to the Program Controls Group. The Program Controls Group performs a technical review of the schedule and, if there are any issues to resolve, advises the Project Manager of findings in writing.

The Project Manager remains the primary point of contact with the Designer when it comes to the acceptance of the schedule updates. . The Program Controls Group updates the Master Program Schedule to reflect the key milestone dates from the design schedule.

Significant changes to the Designer's approved design schedule, whether through the addition of scope or changes to the approach, require modifications to the schedule. The same process by which the proposed design schedule was formulated is used to modify the design schedule. Once accepted by both the Project Manager and the Program Controls Group, it becomes the approved design schedule and the benchmark from which performance is measured. Section 3.5, Change Management, details more about this process.

4.3.2.3 Opinion of Probable Construction Duration

For non-rehabilitation projects, an opinion of probable construction duration derived from an assumed construction methodology is submitted by the Designer. For rehabilitation projects, an opinion of probable construction duration is developed by the Project Manager with review and approval by the Design Manager. These requirements are discussed further in the *Design Management Manual* in Volume III of the *Program Management Plan*. The Project Manager reviews the suggested "time to construct" and, in coordination with the Program Controls Group, determines if the construction duration in the Master Program Schedule needs to be modified. Modifications to the construction schedule during the design phase must be performed in accordance with the Change Justification Procedure in Volume II of the *Program Management Plan*. Section 3.5, Change Management, details more about this process.

4.3.3 Permitting Phase

In order to monitor permitting progress and mitigate potential schedule impacts, projects' permitting activities are included in the Master Program Schedule. The Designer identifies permit requirements from the Project Summary and their own detailed permit review. Permit documents are submitted to the Project Manager for review via the Designer Submittal Business Process (using the Permit Tracking Form). The Permit Coordinator is available as a resource when needed. The Project Manager enters all supporting documentation for permits into the Permit Tracking log in PMIS. The Project Manager, in consultation with the Designer, is responsible for managing the projects' permitting activities and maintaining the information contained in the Permit Tracking log. The Project Manager tracks permit applications, staggered submittals, approval times, permit conditions, and all active permits from project planning through the start of construction. Unless otherwise directed by the Project Manager, the Program Controls Group utilizes information within the Permit Tracking log to update the project's permitting activity in the Master Program Schedule. As a baseline, the permitting duration is assumed to begin at the beginning of 60% design and end at the beginning of the Bid and Award phase.

During the construction process, the Construction Manager coordinates with the Project Manager, regarding the verification of site compliance with permit conditions, particularly in regard to Construction Start Notices to TDEC and maintaining approved plans at the jobsite.

4.3.4 Real Estate Phase

Because they typically occur during different phases of the project, land and easement acquisition activities are included in the Master Program Schedule and monitored individually.

4.3.4.1 Land Acquisition

The land acquisition activities are the responsibility of the Real Estate Coordinator and are typically started and completed before the start of planning.

The Real Estate Coordinator identifies known land acquisition requirements prior to and during the development of the Project Summary and monitors the flow of work between the various acquisition steps involved to ensure that parcels are acquired in a timely manner to minimize risk to the project. This includes coordination with the Deputy Program Director who serves as the primary point of contact with Metro Public Property services. The Real Estate Coordinator is also responsible for maintaining the Real Estate Acquisition Log, an element of PMIS that tracks land acquisitions as well as right-of-way easements. The Real Estate Coordinator uses data from the Real Estate Acquisition Log to provide schedule updates to the Program Controls Group about the status of the real estate activity as well as updates on any project-specific acquisition issues.

4.3.4.2 Easement Acquisition

The easement acquisition activities are the responsibility of the Project Manager and typically commence after completion of the 30% Design Submittal. During design, the Designer identifies the easements to be obtained for the project and submits the information (using the Easement Acquisition Tracking Form) to the Project Manager via the Designer Submittal Business Process in PMIS. The Project Manager or designee monitors the flow of work between the various acquisition steps involved to ensure that easements are acquired in a timely manner to minimize risk to the project. This includes coordination with the Deputy Program Director who serves as the primary point of contact with Metro Public Property services. The Project Manager is also responsible for maintaining the Real Estate Acquisition Log, an element of PMIS that tracks land acquisitions as well as right-of-way easements. The Project Manager uses data from the Real Estate Acquisition Log to provide schedule updates to the Program Controls Group about the status of the real estate activity as well as updates on any project-specific acquisition issues.

4.3.5 Bid and Award

The Project Manager is the phase lead during Bid and Award but is supported by the Program Controls Group who takes the lead in tracking the status of construction procurement by working directly with the Procurement Coordinator, a role filled by the Deputy Program Director. The Procurement Coordinator serves as a single point of contact for procurement tasks such as transmitting bid packages, coordinating the response to questions during bidding, and assisting with preparation of bid addenda. This single point of contact with Metro Finance Procurement Division reduces the number of interactions and communications on procurement related issues. The Program

Controls Group meets frequently with the Procurement Coordinator and tracks the status of construction procurement at key milestones (e.g., date advertised, date contract awarded, date purchase order issued, etc.) in support of the Project Manager. Each month the Program Controls Group updates the project schedule using the actual construction procurement milestone dates and sends this information to the Project Manager for review and approval. Upon approval by the Project Manager, the Program Controls Group uses the information to status the Master Program Schedule.

The Contract Initiation and Update Procedure in the *Program Management Plan*, Volume II, provides details about how contracts and their associated funding are tracked and monitored.

The Procurement Guidelines in the *Program Management Plan*, Volume III, provides information about how the Metro Finance Procurement Division procures Designers and construction contractors.

4.3.6 Construction Phase

4.3.6.1 Construction Schedules

The awarded contractor for a project submits a proposed construction schedule in accordance with the construction scheduling specifications. The proposed construction schedule is reviewed by the Site Construction Manager or his/her designee who examines the proposed sequence of work and performs a technical review of the schedule. The Program Controls Group also reviews the proposed construction schedule but only from the perspective of intra-project dependencies within the Program and only after it has been accepted by the Site Construction Manager. Once the proposed construction schedule is submitted and accepted by the Site Construction Manager and the Construction Manager, the approved construction schedule is used to monitor the contractor's performance. Documenting the approval of this schedule is critical because it is the basis for evaluating delays, change orders, and claims should they arise during construction. The Program Controls Group receives a copy of the approved construction schedule submittal and updates the construction activity for that project in the Master Program Schedule. Special attention is paid to the Notice-to-Proceed and Substantial Completion dates. The review of the contractor's schedule is consistent with procedures contained in the *Construction Management Manual* and the Schedule Review Procedure in the *Program Management Plan*, Volume II.

Based on the project's complexity, one of two standard schedule specifications is used by the Program Management Team to evaluate the base contractor schedule. For more complex projects, Contractors are required by the specification to prepare construction schedules that are resource loaded by activity with unit costs (e.g., cost per linear foot of pipe) and associated labor hours by trade and labor category. The sum of the costs assigned to all activities equals the total contract value. Additional information for this process is contained in Section 5, Program Controls: Financial Management, and Section 8, Construction Management.

4.3.6.2 Construction Schedule Updates

This schedule is updated monthly by the contractor, transmitted as a submittal, reviewed and accepted by the Site Construction Manager or his/her designee, and provided to the Program Controls Group. The updated schedule is used to monitor and track the contractor's progress at the activity level. During the monthly pay period, construction inspectors document actual progress and compare it to the contractor's planned schedule. At the end of each pay period, the Site Construction Manager and inspectors meet together with the contractor to validate the progress. The contractor updates the schedule based on the validated progress, and the updated schedule becomes the basis for the progress payment.

4.3.7 Closeout Phase

The closeout phase starts with the Notice of Final Completion and ends on the date the warranty period expires (typically one year from the substantial completion date). The Project Manager is the phase lead for closeout and, therefore, provides monthly schedule updates for this phase. Project closeout is a collaborative process between the Construction Management Consultant, the Project Manager, and the Program Controls Team. The Construction Management Consultant completes the Construction Closeout Checklist soon after final completion of the construction contract and notifies the Project Manager that construction closeout is complete. The Project Manager notifies the Program Director and Program Manager prior to the end of the warranty period (typically twelve months after substantial completion) of the appropriate date when all direct charges to the project will cease. The Project Manager then completes the appropriate portion of the Project Closeout Checklist and notifies the Program Controls Team. The Program Controls Team then completes the appropriate portion of the Project Closeout Checklist and returns the checklist to the Project Manager for signature, thereby officially closing the project. All checklists and supporting information are documented in PMIS.

Below is a listing of tasks that must be completed before the project can be considered to be closed:

- Final change order executed (when applicable)
- Final payment to contractor issued
- Designer purchase order closed
- Lessons learned memo written
- Required documents confirmed in project file (including digital records for rehabilitation projects, record drawings, warranties, bonds, etc.)
- Warranty review held
- Completion of the Construction Closeout Checklist
- Completion of the Project Closeout Checklist
- Project closed in PMIS

Some projects, such as rehabilitation projects, within the Program may require additional post-construction flow monitoring to demonstrate that the projects have achieved the desired objectives. The schedule for these activities are not tracked within the Master Program Schedule but are conducted by MWS and the Program Management Team as part of the overall Program management activities, as opposed to being conducted on a project-specific basis.

4.4 Master Schedule Revisions and Updates

The project schedule updates for all work phases are accepted, evaluated, and integrated into the Master Program Schedule monthly. This process provides a system for monitoring progress and a triggering mechanism for the early identification and mitigation of potential issues that could negatively affect the schedule.

The Master Schedule Update Procedure included in Volume II of the *Program Management Plan* provides details about the monthly Program schedule updates.

Section 5

Program Controls: Financial Management

5.1 Overview

Achievement of the financial management functionality is facilitated by the Program Management Information System (PMIS). PMIS is designed to provide the Program Management Team with the timely, accurate, and useful information required for critical decision-making and evidence of sound fiscal practices and is discussed fully in Section 3 and throughout the *Program Management Plan*, Volume I.

As summarized in Section 3, the financial management responsibilities of the Program Controls Group include the following:

- Conducting regular Master Program Budget updates based on monthly updates of project budgets (Budget Management)
- Supporting MWS annual capital budgeting (Budget Management)
- Tracking and controlling Program expenditures as well as generating cash flow forecasts for MWS to achieve short- and long-term requirements for maintaining sufficient funds for payments (Cost Management)
- Tracking the sources of project funding (Fund Management)
- Maintaining a database of estimates and contractor bids (Financial Services)

5.2 Budget Management

Budgets define the anticipated project implementation costs at the following various times throughout the planning, design, and construction phases of the project:

- At the beginning of the Program when conceptual planning is estimated for the initial definition of the improvements to be implemented
- At individual contract awards when bid and negotiated project values replace the conceptual estimates
- When changes occur to a contract
- At project completions when changes and expenditures for the facilities are reconciled with earlier baseline expectations

Management of these budgets is required to maintain the integrity of the early estimates and to address changes as they arise during the Program. There is also the expectation that MWS management will control these changes in the best interest of the community and be able to explain any changes at all times while the Program is progressing.

5.2.1 Program Budget

The MWS-approved Master Program Budget was developed to include all costs associated with the implementation of each of the projects that comprised the Program at its onset. Each project budget consists of an Opinion of Probable Construction Costs (OPCC) developed by the *Corrective Action Plan*/

Engineering Report (CAP/ER) and *Long Term Control Plan (LTCP)* team, property acquisition and right-of-way costs, and additional implementation costs that represent the total costs to MWS of delivering a completed project. These costs, referred to as project development costs, are added to the sum of the OPCC and real estate costs to determine the Total Project Cost.

5.2.1.1 Opinion of Probable Construction Cost (OPCC)

The OPCC includes direct construction costs, indirect construction costs, general conditions, and contractor overhead and profit. A standard 30% contingency amount is added to the OPCC for each project. This contingency (including both design development contingency and construction contingency as discussed in the *Design Management Manual*, Appendix K) was developed at the conceptual phase of the Program in the Program Master Budget and is intended to account for the following:

- Uncertainties associated with conceptual-level planning estimates
- Professional service contract changes when unanticipated scope issues must be addressed
- Changes to construction contracts that arise during construction
- Scope changes from baseline construction conditions identified during planning and design phases that modify the construction scope to be bid

The *Master Program Budget and Schedule Report* included in Volume III of the *Program Management Plan* provides details about the OPCC.

5.2.1.2 Property Acquisition and Rights-of-Way Costs

CAP/ER and LTCP teams identified property to be acquired and the easements needed. Land acquisition costs were established based on Metro appraised values. Easements required an estimate of parcels affected along alignments and a unit cost per property. Additional details are provided in the *Master Program Budget and Schedule Report* included in Volume III of the *Program Management Plan*.

5.2.1.3 Project Development Costs

The project development costs are expressed as percentages of the Total Construction Cost and are projected to be incurred during a specific project phase (planning, design, or construction) or are spread across the total project duration, if appropriate. They were calculated as percentages of the sum of the OPCC and the estimated real estate costs for non-rehabilitation and rehabilitation projects.

The *Master Program Budget and Schedule Report* provides details about the project development costs.

5.2.2 Current Program Budget

The Program Management Team updates the Master Program Budget based on periodic updates of project budgets as discussed later. The Program Controls Group generates a monthly Program Summary Report that includes the Current Program Budget, which is a summary of all project budgets and their respective estimates at completion (EAC).

Each Current Program Budget reflects the total of line item cost elements updated to allow a direct comparison to the baseline Master Program Budget. Each Current Program Budget maintains the same format during the life of the Program to allow comparisons with previous monthly revisions. While project budget variances are analyzed by project management personnel, it is only at the

Program level through the Current Program Budget updating process that Program-level impacts, trends, and risks can be identified and addressed.

The monthly Current Program Budget variances are analyzed by the Program Controls Group for the potential of impacting the bottom-line value of the baseline Master Program Budget and the feasibility of cost recovery techniques when needed. Each analysis initially addresses the availability of construction contingency. Recovery recommendations may include possible transfers and re-allocations consistent with established contingency management standards as discussed later in this Section. The transfer of budget funds between projects as a re-allocation option requires a Program Change Request as referenced in Section 3.5, Change Management.

It is the intent of the Program budgeting process that the Current Program Budget value being updated does not exceed the baseline value for the total Program without the approval of the MWS Program Director. Differences between a Current Program Budget and the previously accepted revision are considered as “potential” until the analysis/recommendation by the Program Management Team, implementation of mitigation strategies, and acceptance by MWS are all documented.

5.2.3 Project Budget Management

While project budgets were initially estimated during the development of the Master Program Budget, actual project budgets for management purposes are established at the time that detailed Scopes of Work are available, typically after the procurement process for project-related services.

For example,

- Construction contract values are substituted for the baseline project budget when awarded. Cash flow information available from the contractor (after review and acceptance by the Construction Management staff) replaces conceptual curves for this work.
- Negotiated planning and design contract values are substituted for the baseline project budget estimates for this work.
- It is critical that project management staff enforce all contract requirements related to the consultants and contractors providing sufficient detail about their awarded contract values. Contract specifications should clearly define the requirements for detailed schedules, resource loading of these schedules, and Schedule of Values deliverables. All reviews of these submittals for reasonableness and accuracy are the responsibility of either the Project Manager (design contracts) or the Site Construction Manager (construction contracts). Results of these reviews and acceptance of budget-related project information signal its usefulness to Program Controls in the Program’s budget assessments.

Variances between the baseline project budgets and the Current Project Budget either add to or subtract from the construction contingency for that project. This calculation is made after normalizing the quantities compared by escalating conceptual estimates from 2011 dollars. This process is discussed further in sub-section 5.2.6.

5.2.4 Budget Progress/Performance

Budget monitoring is accomplished at both the project and Program levels. For projects, whether it is for planning, design, or construction, monitoring is primarily focused on verifying that the established contract values are not being exceeded and that all contract scope requirements have been

met/provided in a quality manner. While a large part of this work involves validating the actual progress of the project work including the payment requests submitted for monthly services (see discussion in sub-section 5.3.1) and change requests for added scope, another critical need is to proactively look for indicators that provide early suggestions that budget variations, primarily through changes, may be on the horizon.

However, management of budgets at the project level is limited to the narrow focus of ensuring that considered changes are legitimate for the requirements of that project, that the price for a change is reasonable, and that all options to mitigate the cost of a change are understood and pursued in MWS' best interest.

5.2.5 Contingency Management

As discussed previously in sub-section 5.2.1, the Program utilizes a 30% contingency for all projects. Established at the start of the Program when the scopes of all projects were conceptual, this contingency addresses all changes in scope that may be required because of additional information obtained as the project evolves from conceptual definition through construction implementation.

Additional reasons for using the contingency may include:

- Changes imposed by federal, state and/or local authorities through the permitting and review process
- Project re-sequencing, including acceleration, to benefit the costs or funding of other Program projects
- Higher than anticipated design costs including cost-at-award scope changes during design, unforeseen delays in design, or expanded engineering services during construction
- Unanticipated rights-of-way needs or property acquisition costs
- Cost of inflation beyond what could have been expected for certain material and equipment sectors
- Market conditions and contractor capacity in the area that impacts expected levels of competition
- Delay claims due to unusually adverse weather or third-party interferences
- Unknown site conditions identified during construction

The contingency budget is calculated for each project based on estimated total construction costs (OPCC). It is owned by MWS and managed at the Program-level. While the contingency amount for the project is uniformly spread during construction for cash flow purposes, it is a specific line item for each project in the Program Budget that changes as variances are identified in contract budgets. These variances, when approved as change orders to increase the contract cost, are offset by a transaction from the contingency budget to re-allocate budget items but keep the contract budget "whole," i.e., within the same budget identified for that project in the Master Program Budget.

It is expected, with the aggressive budget management of new scope requests and early mitigation of potential budget impacts, that some projects may be completed with "unused" contingency. In this situation, the budget with "unused" contingency remains with the project unless removed or reallocated with MWS' approval through the Change Justification Procedure as referenced in Section 3.5, Change Management.

The summation of project contingency across the Program is tracked and reported at the Program level. Use of any of these contingencies is trended by Program Controls to identify excessive transactions in an area and the development of mitigation strategies to reverse negative trends.

5.2.6 Escalation Management

The historic inflationary decrease in the buying power of Program dollars over time is assumed to be 3% per year. While the Program Master Budget was initially defined in 2011-dollars, all contracts starting after 2011 are bid and awarded in current-year dollars. For construction contracts that last multiple years, these “current” dollars, as defined by the bidding contractors, are typically the year-dollars coinciding with the mid-point of construction.

MWS addresses escalation by maintaining the 2011-dollar budget from the *Master Program Budget and Schedule Report* while also calculating a parallel Program budget and cash flow with all budgets escalated by 3% per year for the 11-year duration. This approach anticipates the cost of inflation on an 11-year Program and does not anticipate adjusting this 3% rate during the Program. If the escalation realized during this period varies significantly from the historic 3%, it may necessitate reporting on the difference between the “real” escalation for Metropolitan Nashville and Davidson County and the assumed 3% per year factor.

If this situation does occur, the Program Management Consultant utilizes the *Engineering News Record’s* Construction Cost Index (20-city average) (CCI) as the standard tool for identifying escalation factors during the Program. The CCI does not include Metropolitan Nashville and Davidson County in its list of 20-cities. With the three cities from that list in closest proximity to Nashville varying in average escalation over the last 25-years by 50%, it makes sense to use the available, broader 20-city average for ease of calculation purposes. This index is also utilized for any requests to de-escalate actual Program costs for comparisons with the 2011-dollar Program Master Budget.

5.2.7 MWS’ Annual Budgeting

MWS approves capital and operating budgets during an annual *Capital Improvements Plan* (CIP) budgeting cycle and reviews and accepts Program projects for implementation concurrently with the annual CIP budgeting cycle. This project approval process involves those projects already expected in the Program as well as new projects that may arise during implementation of the work in the previous fiscal year. The Program Management Team supports this budget cycle with a summary of all of the Program’s budget activity during the previous cycle and an updated projection of the work expected during the next fiscal year (or five-year cycle, as needed) including highlighting variances from baseline forecasts.

The Program Management Consultant-generated information expected to assist with annual budget decisions includes:

- Updated encumbrance forecast (future design and construction contracts)
- Updated cash flow curves and an analysis of variances identified
- Updated project budgets and an analysis of variances identified
- Analysis of changes encountered, potential changes expected, and trends associated with all budget actions

5.3 Cost Management

Cost management pertains to tracking and controlling the expenditure side of the financial ledger for the Program. This sub-section discusses the handling of the invoices from the many sources that require review and a finding of acceptability before MWS can process the payment within the required contract time frames. For those services that are general in nature and not specifically chargeable to a project (e.g., flow monitoring, CCTV data collection, MWS labor, etc.), separate cost accounts are used to track and control those expenditures. The approach to these Program-level costs is also discussed here.

5.3.1 Invoices

Timely payment for services provided to MWS is one of those obligations that, if not performed as required by established procedures, has far-reaching implications to not only continued performance by contractors and consultants but to the positive relationships that must exist between all Program contracting parties.

Equally critical is the assurance that payments are being made only for quality work that complies with the intent and direction envisioned for the Program. Invoices contain details about the sub-contractors being utilized, and Program Controls records Small Business Enterprise (SBE), Minority Business Enterprise (MBE), and Women Business Enterprise (WBE) expenditures by contract in PMIS.

5.3.1.1 Professional Service Invoices

Designers and other professional service providers generally provide invoices based on the actual labor expended each pay period with coding to identify the applicable project for which costs are valid. Based on specific contract specifications, not to exceed payment values may be assigned to interim milestones for deliverables or services (e.g., Design Submittals for 30%, 60%, 90%, and 100%), and reimbursements to consultants may not exceed that value until each submission has been reviewed and accepted. Final payments for completed services are made once the Program Management Team documents that all scope requirements have been accomplished in a satisfactory manner for that contract.

5.3.1.2 Construction Pay Applications

Construction pay applications are prepared by contractors and approved by the Site Construction Manager each pay period – typically monthly. Construction payment requests are developed in accordance with the contractor’s Schedule of Values approved at the beginning of the work by the Site Construction Manager. Before receiving a payment request, the Site Construction Manager and the contractor’s supervisory staff meet and agree on the actual progress accomplished during that period. This process ensures agreement on the work acceptable for inclusion in the invoice before the formal submittal of the pay estimate and the start of the review period “clock.”

The Invoice Review Procedure in the *Program Management Plan*, Volume II, provides details about reviewing and approving professional services and contractor invoices. It is important to note that the *Construction Management Manual*’s procedure for reviewing contractor invoices is a step embedded in the Invoice Review Procedure.

5.3.2 Payments and Actual Cost Reconciliation

Program Controls is responsible for updating PMIS to reflect payments made under the professional services and construction contracts. The payment information is provided to Program Controls on a

periodic basis from MWS Accounting. On a monthly basis, Program Controls reconciles the record of payments in PMIS with those provided by MWS Accounting. On a quarterly basis, Program Controls reconciles the record of payments in PMIS with those in Metro's Enterprise Business System (EBS). Any discrepancies in either reconciliation are resolved and documented within PMIS.

The Actual Cost Update Procedure in the *Program Management Plan*, Volume II, provides details about how the payment of invoices is tracked, reported, and reconciled.

5.3.3 Cost Accounts

All documentation of contract-coded expenditures are collected, validated, and tracked against associated line items at the lowest appropriate project budget element levels within PMIS. While progress payment information provided for construction contracts delineates "earned" from "retained" amounts on the invoices, "total earned" is used to measure progress against the planned cash flow.

Many cost sources are not required to code services to specific projects. That does not, however, eliminate the value of knowing how general Program expenditures should relate to projects, i.e., getting an estimate for the "true" cost of project implementation.

Examples of these general cost sources include:

- **MWS Labor Costs.** The cost of MWS labor for administering the Program is obtained from MWS Accounting on an annual basis at the end of the fiscal year. These costs are assigned to a Program-level cost account.
- **Program Management Consultant Costs.** Those costs for planning and design management incurred by the Program Management Consultant team that are charged to individual projects are captured from the Program Management Consultant's invoices and allocated to that project. The costs associated with management and control of the overall Program are taken from the Program Management Consultant's invoices and assigned to a Program-level cost account.
- **Construction Management Consultant Costs.** Those costs for construction inspection and management incurred by the Construction Management Consultant team that are charged to individual projects are captured from the invoices and allocated to that project. The cost associated with the general management of multiple construction projects is, as described for the Program Management Consultant, taken from Construction Management Consultant's invoices and assigned to a Program-level cost account.
- **Condition Assessment Data and Flow Monitoring Costs.** The costs associated with collecting condition assessment data such as closed-circuit television (CCTV), etc., and flow monitoring data are obtained from MWS Accounting. These costs are assigned to separate CCTV or flow monitoring cost accounts at the Program-level.
- **Real Estate Payments.** Payments made to third parties for land acquisition or easements are obtained and applied to the real estate phase of the relevant project by internally coding payments to project-specific Work Breakdown Structure (WBS) numbers.

5.3.4 Cash Flows

Cash flow forecasts are developed to provide MWS with both short- and long-term requirements for maintaining sufficient funds for payments. Expected cash flows are estimated initially for the Master Program Budget with monthly incremental values to address invoice submittal expectations. Program

cash flows are updated as requested by MWS. Future cash flows beyond the most current revision are re-forecasted if identified variances are significant and may affect the amount of the monthly cash out-flow beyond baseline expectations. Knowing cash needs at all times during the Program allows management the option of utilizing cash through a short-term investment strategy if pursued by MWS.

Policy requirements for managing cash also mandate that funds are available when a planned financial commitment such as a contract, purchase order, or contract change order is executed. The need to encumber a certain amount of funds at a certain time is addressed by a “cash-on-hand” curve. It is important to note that the cash flow curve and the “cash-on-hand” curve do not include construction contingency because it is expected that the contingency budget will be spent over time. However, there exists no long-term, accurate means of predicting when these costs may arise and on which projects. All efforts are made to quantify the short-term changes to cash flows when potential issues first arise.

5.4 Fund Management

MWS Accounting and the Metro Finance Procurement Division are responsible for securing project funding and for the procurement of design and construction contractors, respectively. It is the responsibility of Program Controls to coordinate with MWS Accounting and Metro Finance Procurement Division on behalf of the Program Management Team to track and report on the status of these activities and post updated funding and contract information to PMIS.

5.4.1 Project Funding

MWS expects to utilize revenue bonds as the primary source of funding for the Program, but other means of funding may also be used during the life of the Program. The decisions to utilize different funding sources as well as the approval of requests for the funding of capital projects are the responsibility of MWS Accounting. MWS Accounting provides periodic updates about funding activity to the Program Management Team. The request for project funding is initiated through the submittal of a Project Initiation Form (PIF). Utilizing MWS’ periodic updates, Program Controls uses PMIS to track the PIFs and issue reports about the status of the PIFs and approved project funding.

The Funding Update Procedure in the *Program Management Plan*, Volume II, provides details about how the project funding is tracked and monitored.

5.4.2 Contracting

As described in Section 4.3.5, Bid and Award, the Program Management Team has a Procurement Coordinator that interfaces with the Metro Finance Procurement Division to track and report about the schedule status of design and construction procurements. The Procurement Coordinator works with Program Controls to track each step in the procurement process until a contract is issued. Program Controls also updates PMIS to allocate funds from the PIF to an individual contract and to file the purchase order (PO) issued by MWS Accounting.

The Contract Initiation and Update Procedure in *Program Management Plan*, Volume II, provides details about how contracts and their associated funding are tracked and monitored.

5.5 Financial Support Services

Support for Program budget, cost, and fund management activities requires additional processes, procedures, and tools. A discussion of the types of financial services provided by the Program Management Consultant follows.

5.5.1 Estimating

Cost estimates produced by the Program Management Consultant for CAP/ER and LTCP conceptual projects provide a consistent approach for Program cost definition and set the parameters and the format of the estimating approach to review consultant and contractor estimates during project implementation. Designers of non-rehabilitation projects independently prepare cost estimates concurrent with each design review submittal in accordance with the *Design Management Manual* included in the *Program Management Plan*, Volume II, and as discussed in Section 8 of this *Program Management Plan*, Volume I. All estimates prepared by the Designers during design development include suggested construction contingency amounts provided separately from the cost of construction estimate. The suggested contingency amount is based on the project's perceived level of complexity and difficulty. The Project Manager reviews the Designer's OPCC and may request that the Construction Management Consultant independently check the estimates especially if the Designer's estimate varies significantly from the conceptual baseline estimates.

Contractors prepare estimates for proposed changes and claims. The review of these estimates is performed by the Construction Manager. The Program Management Consultant monitors this review process to ensure that the Construction Management Consultant is enforcing its own review procedures.

The Program Management Consultant maintains a database of estimates and contractor bids in PMIS. The database includes lump sum pricing as well as unit pricing for standard items.

The Estimating Guidelines in the *Program Management Plan*, Volume III, provide details about the review of Designer estimates and maintenance of estimating database.

5.5.2 Documentation

Important to all Program management, including every aspect of financial management and control, is the availability of timely and accurate cost-related information, projections, and trending. Commitments, cost collection, timely payments, and reporting begin at the contract level with documentation of the decisions made and the basis for the options considered. The importance of trending for financial issues relies, not on the current status of the work, but on the monthly progression of financial change over time.

Centralizing financial information controls the quality of cost information available for use by all implementation staff and interested stakeholders. Comprehensive data and correspondence management eliminates re-tracing steps when similar issues arise and preserves defense options for MWS when consultant and contractor claims are filed.

Section 6

Program Controls: Risk Management

6.1 Overview

Managing risks associated with the Clean Water Nashville Overflow Abatement Program occurs at five key points during the project delivery process:

- A list of potential risks is developed during the planning phase and is included as a section of the Project Summary.
- The *Project Risk Management Plan* is initiated at the beginning of the design phase and is maintained throughout the design phase
- The *Risk Assessment Report* is updated and completed at end of design phase.
- Issues are addressed and managed during the construction phase.
- Issue management results in lessons learned from managing issues during construction. These are discussed, documented, and incorporated into the risk assessments, evaluations, and management on future projects.

The first three key points are associated with specific documents - the list of potential risks, the *Risk Management Plan*, and the *Risk Assessment Report*. These documents are developed by the Planning and Technical Support Manager (list of potential risks) and the Project Manager (*Project Risk Management Plan* and *Risk Assessment Report*). Issue management and lessons learned are conducted on an as-needed basis throughout the construction phase and serve to manage the impact of issues (risks that have been realized) and better prepare for the occurrence of similar issues in the future.

At the Program level, Program Controls maintains a *Program Risk Management Plan* included in Volume III of the *Program Management Plan*. This plan identifies the Program's risks and contains an assessment of those risks and recommended management strategies. In general, the risks included in the *Program Risk Management Plan* affect multiple projects, are not project related, and can only be managed at the Program level. The graphic depiction of the cycle for managing Program and projects risks is shown in Figure 6-1.

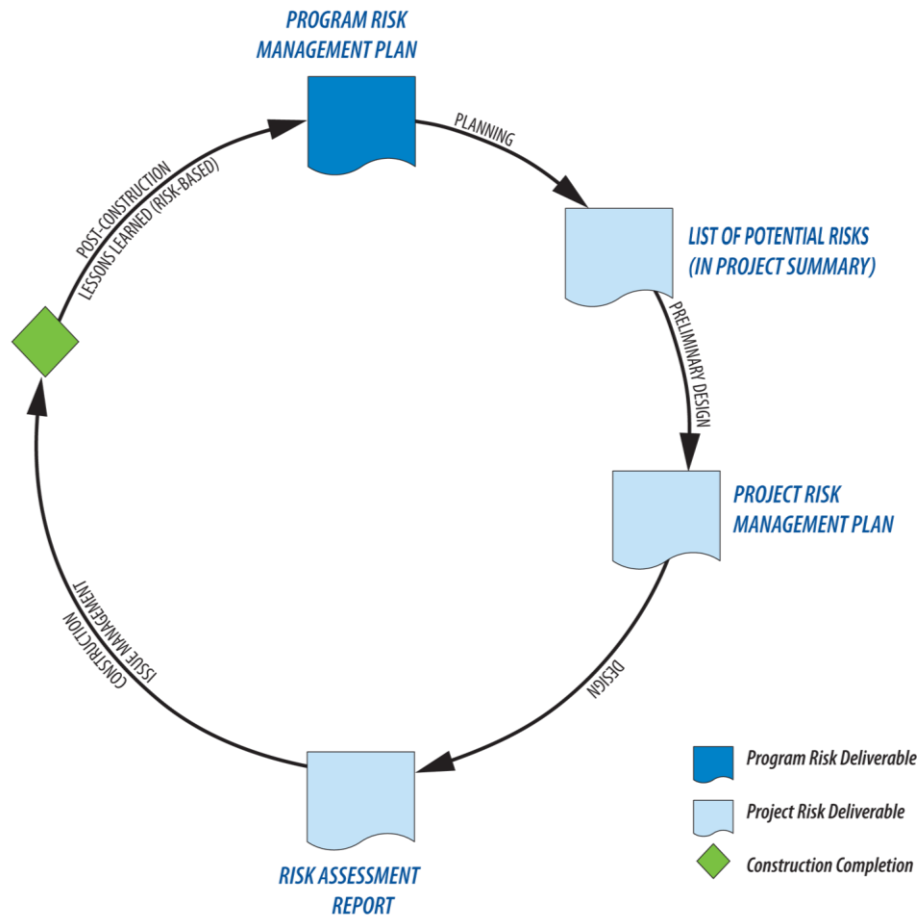


Figure 6-1 Program Risk Management Plan

The primary responsibilities of the Program Management Team members for risk management are the following:

- Program Controls.
 - Program Controls is responsible for managing Program risk via annual updates to the *Program Risk Management Plan* included in Volume III of the *Program Management Plan*. These updates are performed by analyzing available Program and project data in order to identify new and emerging risks to the Program and/or changes in existing risk profiles.
 - Program Controls is responsible for managing the lessons-learned procedure. Information is used to improve procedures and update the *Program Risk Management Plan*. Program Controls input for the risk aspects of lessons learned includes the identification of risks not realized or changes in predicted risk severity and allocation strategies.
- Planning and Technical Support Manager. The Planning and Technical Support Manager prepares the list of potential risks based on the completed conceptual design and includes it in the Project Summary. Program Controls assists the Planning and Technical Services Manager with the identification of Program-related risks at that time. Additional input from various

specialties such as real estate, permitting, and construction management is coordinated for inclusion as project-specific risks into the Project Summary.

- Project Manager.
 - The Project Manager uses the Project Summary’s list of potential risks to assess the risks, select a management strategy for each, and implement a risk response plan to mitigate risks. This is included in a *Project Risk Management Plan*.
 - The Project Manager prepares a *Risk Assessment Report* at the completion of design to document the status of risk management activities (responsibility allocation and strategy) prior to the start of construction.
 - The Project Manager oversees the Site Construction Manager’s management of issues during construction and identifies potential lessons learned to be used for all projects.
- Site Construction Manager. The Site Construction Manager aggressively identifies and manages issues during the construction phase.

6.2 Background

Following is a description of key terms that clarify the responsibilities of those members of the Program Management Team involved regarding risk management.

- Risk. A risk is an uncertain event that, should it occur, could have a negative effect on the Program’s or specific project’s objectives. Risk is evaluated often and is expressed by the formula below.

Risk Score = Consequences of Risk Occurring x Likelihood of the Occurrence

- Issue. An issue is an incident that has already happened and has immediate potential for adversely impacting a specific project. A risk often becomes an issue after it has been “realized” and begins to affect the project’s scope, schedule, budget, and/or quality. Not all issues can be referred back to identified risks nor do they exhibit the potential severity that warranted the initial risk tracking.
- Action Item. An action item is a specific task that requires follow-up analysis and/or execution. These are usually assigned to an individual to perform. Action items may be required to mitigate risks or manage issues.
- Project-level risks. Project-level risks are specific to an individual project.
- Program-level risks. Program-level risks are associated with multiple projects or a single risk that, if realized, would affect the overall Program.

6.3 Project Risk Management

6.3.1 Initial Identification – Planning

As stated previously, the management of project risk begins at the start of the project delivery process in the planning phase with the identification of risks specific to that project. A list of potential risks is developed by the Planning and Technical Support Team and included in a designated section of the Project Summary for each project. The list includes those risks that could impact project implementation and that need to be considered by the Project Manager for mitigation. Program Controls provides input into this list by drawing on knowledge of the *Program Risk Management Plan*, risk mitigation experience at the Program-level, and information assembled as coordinator of lessons learned for the Program.

6.3.2 Project Risk Management Plan – Preliminary Design

The Project Manager is responsible for preparing the *Project Risk Management Plan* after the approval of the Designer's first design submittal. The first step in preparing the plan is to review the list of potential risks and add any additional risks that may have been identified during discussions with the Designer. The Project Manager should consider whether involving additional stakeholders, such as the Construction Manager and MWS, would positively add to the discussion of risks at this preliminary engineering stage.

The Project Manager uses the risk rating criteria employed for the *Program Risk Management Plan*. A standard set of risk categories and sub-categories has been developed for the Program and are provided in Table 6-1. Additional categories and sub-categories can be added as necessary during the project. Assistance to the Project Manager to categorize risk for this deliverable is provided by Program Controls.

Table 6-1 Project Risk Categories and Sub-categories

CATEGORY	SUB-CATEGORY
Environmental, Health, and Safety	Contamination
	Protection/Preservation
	Safety
Legal/Purchasing	Contracts
	Liquidated Damages
	Property Damage Claims
	Lawsuits
Management/Financial	Planning
	Scope
	Schedule
	Budget/Cash Flow
	Mitigation/Permit Compliance
	Stakeholder Communications
	Easement and Land Acquisition
	Design
Technical	Construction Technology
	Construction – General
	Flow Diversion/By-Pass Pumping
	Traffic Control
	Trench Backfill/Paving Restoration
	Instrumentation and Controls
	Commissioning, Operation, and Maintenance

The Project Manager then calculates the risk score by estimating the consequence and likelihood of occurrence for each risk. Refer to Tables 6-2 and 6-3.

Table 6-2 Consequence Rating

CONSEQUENCE RATING	QUALITATIVE DESCRIPTION	MAXIMUM FORESEEABLE LOSS
1	Insignificant	< \$ 10,000
2	Minor Impact	\$ 10,000 - \$ 100,000; upset customer or small group of customers
3	Moderate Impact	\$ 100,000 - \$ 500,000;
4	Significant Impact	\$ 500,000 - \$ 5,000,000; missed CD schedule, Notice of Violation on applicable Permit
5	Major Impact	> \$ 5,000,000

Table 6-3 Likelihood of Occurrence Rating

CONSEQUENCE RATING	QUALITATIVE DESCRIPTION	MAXIMUM FORESEEABLE LOSS
1	Highly unlikely to occur	10%
2	Unlikely to occur	30%
3	Likely to occur	50%
4	Very likely to occur	70%
5	Highly likely to occur	90%

A risk severity classification is assigned to each of the Program risks based on the tables above and the resulting grid location on Figure 6-2 below.

Risk Severity Classifications Matrix						
Consequence	5	Low	Medium	High	Very High	Very High
	4	Low	Medium	Medium	High	Very High
	3	Very Low	Low	Medium	Medium	High
	2	Very Low	Very Low	Low	Medium	Medium
	1	Very Low	Very Low	Very Low	Low	Low
		1	2	3	4	5
		Likelihood of Occurrence				

Figure 6-2 Risk Severity Classifications Matrix

The completed *Project Risk Management Plan* is used to identify the project's highest risks. The Project Management Team and Designer must develop a project-specific risk management strategy (Avoid, Transfer, Manage, or Accept) and action items to mitigate and manage the potential consequences. In many cases, the contract specifications prepared by the Designer transfer risk to the contractor.

The Project Manager should update the *Project Risk Management Plan*, as needed, during the design phase to document new risks that have been identified and/or track actions taken to mitigate previously identified risks. Performing these updates during the design phase facilitates the preparation of the *Risk Assessment Report* discussed in section 6.3.4.

6.3.4 Risk Assessment Report – Design Completion

Upon completion of design, the Project Manager prepares the *Risk Assessment Report* by updating the *Project Risk Management Plan* to reflect the actions taken and decisions made during the design phase. This report is used to communicate project risks to the Construction Manager prior to the start of construction so that this information can be included in the *Project Work Plan for Construction Administration*. This report is also used by the Project Manager as a reference upon completion of the project to ascertain the plan's effectiveness at predicting and mitigating risk during construction.

6.3.5 Issue Management – Construction Phase

The Potential Issues Business Process (BP) in PMIS is used to log and track project issues during the construction phase. The Project Manager monitors this issue tracking system to verify that issues are being logged and responded to in an appropriate and timely fashion by the Site Construction Manager. The Project Manager also tracks the issues for trends or special circumstances that need a higher level of attention. Information gathered during this monitoring is referenced back to the *Project Risk Management Plan* and *Risk Assessment Report* to assist in correlating predicted versus realized risks for each project. The approach used by the Construction Management Consultant to manage issues during construction is described in the *Construction Management Manual* in Volume III of the *Program Management Plan*.

6.3.6 Lessons Learned – Post-Construction

Lessons learned can be submitted by any member of the project team during any project phase but are most likely to be generated by the Project Manager as a result of monitoring the issue management process during construction. The purpose of lessons learned is to benefit the development of future *Project Risk Management Plans* as well as an examination of whether changes to standard procedures and project approaches in the *Program Management Plan* are needed. Program Controls coordinates the lessons learned and processes them in accordance with the Lessons Learned Procedure in Volume II of the *Program Management Plan*.

6.4 Program Risk Management

As previously stated, Program Controls is responsible for updating the *Program Risk Management Report* on an annual basis. These updates include documentation of any new or emerging risks, risks deleted, risk responsibilities re-allocated, risk responses implemented during the previous 12 months, and progress of the *Project Risk Management Plans*. Program Controls uses information obtained from various sources to update the *Program Risk Management Report*.

The multiple information sources available to Program Controls for these updates include, but are not limited to, the following:

- **Monitoring of Key Performance Indicators.** This involves a review and assessment of overall Program and project metrics and background and historical information about past project issues. PMIS provides the data and viewing tools to evaluate this information.
- **Project Invoices Review.** This involves the assessment and review of invoice processing issues, timing, and turnaround of payments.
- **Change Management Monitoring.** This involves the monitoring of changes to all design and construction contracts (change requests), project scope, schedule, budget, or quality issues. Change requests are processed and tracked in PMIS.
- **Capture of Lessons Learned.** This involves monitoring to determine if any risks or issues are being captured as part of lessons learned. These assist the Program Management Team with past issues and can help better plan for risks and issues in the future.
- **Monthly *Program Cost and Schedule Reports*.** This involves monitoring the overall Program costs and progress schedule. In addition, the project managers monitor the same metrics on their individual projects, coordinate with the overall Program schedule, and address any project-specific cost or schedule concerns on the monthly *Project Summary Reports*.
- **Cost/Schedule Variances.** This involves monitoring and reviewing cost and schedule variances to identify any trends or changes in operating conditions of the Program that may be a result of an unknown risk or an ineffectiveness of the risk mitigation steps regarding reducing the probability of occurrences or the consequences.
- **Procedural Compliance Monitoring.** Through information provided by the Quality Assurance group, this involves assessing the negative trends with procedure implementation and identifying improvements.

Program Controls utilizes the PMIS reporting function and Lessons Learned Procedure to provide insight to the Program Manager regarding the health of the Program. Maintaining schedule and budget is of critical importance. Evaluating risks to these key indicators by encompassing all aspects of project implementation allows risk management to gauge the effectiveness of needed interfaces and the efficiency of the decision process. Similar to the quality assurance role of the Program Management Team, risk management anticipates where problems may occur and prepares for these potential impacts to the Program from the initiation of each project.

Section 7

Planning and Technical Support

7.1 Overview

Although initial planning activities for the proposed infrastructure improvement projects were conducted as part of the development of the *Corrective Action Plan/Engineering Report* (CAP/ER) and the *Long Term Control Plan* (LTCP), planning and technical support activities will continue throughout the implementation of the Program.

These activities are performed within the structure of the Program Management Consultant organization. Important interfaces within this structure include the following items.

- The Planning and Technical Support Manager functions as the phase lead for all project-related activities from project initiation through finalization of the Project Summary and the Designer's Scope of Work.
- The Planning and Technical Support Manager manages the Program Management Consultant's staff assigned to perform real estate activities during the planning phase.
- The Planning and Technical Support Manager is responsible for providing detailed schedules of planning activities and updating these schedules monthly for the Program Management Consultant's Program Controls staff to assess potential Program impacts.
- All reports, assessments, and other planning deliverables are developed in accordance with the Quality Review of Program Management Consultant-generated Documents Procedure contained in the *Program Management Plan*, Volume II. The Procedure is managed by the Program Quality Manager while the deliverables themselves remain a planning process.
- Planning phase lead responsibilities are assigned to the Project Manager upon completion of the Project Summary and Scope of Work. With the assistance of the Deputy Program Director, who serves as the Procurement Coordinator, the Project Manager has the overall responsibility for tracking the Designer procurement activities led by the Metro Finance Procurement Division.

The primary responsibilities of the Planning and Technical Support Team include the following:

- Development of Project Summaries used to establish the Scope of Work for Designers and to identify potential risks, if appropriate, prior to Designer procurement
- Coordination of data collection activities and analysis of the collected data as required
- Maintenance of the separate sanitary sewer system model, the combined sewer system model, and the river system model
- Evaluation of changes affecting to the CAP/ER and LTCP including developing and evaluating additional wet-weather solutions or the refinement of proposed solutions as needed
- Project planning for Metro Water Services' annual rehabilitation program for areas outside of the CAP/ER and LTCP
- Post-construction monitoring plan development and performance assessment of completed infrastructure improvements projects

- Specialized technical support to the Program Management Team as needed including periodic reporting of the Program's progress to the EPA and TDEC

The Program policies associated with each of these tasks are further described in the following sections.

7.2 Project Summaries

A Project Summary is developed for each infrastructure improvement project to be designed and constructed as part of the Program. The Project Summary provides the background and objectives of the project, identifies the design parameters developed as part of the CAP/ER or LTCP to achieve Program goals, and summarizes major feasibility elements or potential risks of which the Program Management Team should be aware as the project is designed and constructed. Where applicable, Project Summaries include the following components:

- Project Name and MWS Project Number
- Project Scope
- Location, including a map of the project area
- Background/Purpose
- Feasibility/Risk Assessment/Critical Path Items
- Permitting
- Public Outreach Efforts
- List of Available Reference Information

The development of the Project Summaries is the responsibility of the Planning and Technical Support Team and may include additional project evaluation activities to refine the conceptual CAP/ER and LTCP projects prior to the commencement of design activities. These project evaluation activities may include modeling of revised design scenarios, routing studies for pipe conveyance projects, or other activities when approved by the Program Director. Input from appropriate MWS divisions is requested to ensure that the proposed projects continue to capture MWS' current preferences to the extent possible. Input relative to the need for coordination with or consideration of other MWS and/or Metro infrastructure projects such as roadway or water system improvements is sought and utilized in project planning.

The Planning and Technical Support Team works closely with the Design Management Team and other Program resources such as the Construction Manager, Permit Coordinator, or Communications Coordinator, as needed, during the completion of the Project Summaries. In particular, the assigned Project Manager reviews the Project Summary prior to it being finalized, and the Project Manager, in conjunction with the Planning and Technical Support Manager and the Design Manager, may be engaged to support the development of certain aspects of the Project Summary.

As the Project Summary is finalized, the Planning and Technical Support Manager works closely with the Design Manager to develop the additional documents needed for the procurement of design services.

Final approval of a Project Summary and associated Designer procurement documents is made by the Program Director and the Program Manager. Other MWS personnel are engaged in the final review

and approval as recommended by the Program Director. The approved Project Summaries are provided to the Designers as part of the Designer procurement process.

7.3 Data Collection and Analysis

The collection, analysis, and use of various types of data are a critical component throughout the implementation of the Program to support the Planning and Technical Support activities. Data types, the parties responsible for the collection of the data, and the potential uses for the data collected are summarized below. The Planning and Technical Support Team tracks data collection and development activities to ensure receipt from the developer within the scheduled time requirements.

7.3.1 Rainfall and Flow Monitoring Data

MWS is responsible for contracting with specialty firms for the collection of rainfall and sewer system flow monitoring data. The Planning and Technical Support Team assists in the identification of proposed locations for the temporary flow monitors and rain gauges to support Program needs. When approved by the Program Director, gauge-adjusted radar rainfall data may be obtained by the Program Management Team to support the detailed analysis of corresponding flow monitoring data. Flow data for the Cumberland River and its tributaries is obtained by the Program Management Consultant from the United States Army Corps of Engineers and the United States Geological Survey.

When authorized by the Program Director, long term and temporary sewer flow monitoring data, rainfall data, and river flow data are utilized by the Planning and Technical Support Team to update and recalibrate the separate sanitary sewer, combined sewer, and river system models (see Section 7.4). In addition, these data sources are used, as needed, to refine infrastructure improvement projects during the planning and design phases. The data sources also are used after the completion of construction to confirm that the Program's goals, including the effectiveness of rehabilitation in reducing wet weather flows, are achieved.

7.3.2 Water Quality Monitoring Data

MWS is responsible for the collection, laboratory analysis, and maintenance of water quality monitoring data. Throughout Program implementation, water quality monitoring data is used by the Program Management Team as part of the LTCP compliance monitoring program to confirm that proposed combined sewer overflow control levels in the LTCP are being achieved (see Section 7.7).

7.3.3 Sewer System Condition Assessment Data

MWS is responsible for either collecting sewer system condition assessment data using in-house resources or contracting with specialty firms for the collection of sewer system condition assessment data. This may include closed-circuit television sewer inspections, smoke testing, manhole inspections, or other condition assessment techniques. Although a copy of the condition assessment data may be located at the Program office, MWS is responsible for archiving and maintaining the collected condition assessment data.

The Planning and Technical Support Team identifies the locations where sewer system condition assessments are needed and the types of condition assessment data required to support the Program's goals. These locations are provided to MWS, and MWS coordinates the collection of the requested data. Once the requested data has been collected, the Planning and Technical Support Team completes quality reviews of the data and packages the data for use by the Designer during the design of improvements.

7.3.4 Geographic Information System Data

Updated Geographic Information System (GIS) data that has been developed and maintained by MWS is obtained monthly by the Planning and Technical Support Team to ensure that the Program Management Team is utilizing the most recent GIS data. GIS data from other Metro departments and state agencies is obtained every six months per data use agreements with the respective agency. It is anticipated that this data will be utilized in a variety of ways by the Program Management Team including developing figures and confirming existing infrastructure data. In addition, the Planning and Technical Support Team packages applicable GIS data for use by the Designer during the design of improvements.

Recommendations for edits or updates to the GIS data provided by MWS or other Metro departments aligns with MWS' existing procedures. This includes the Construction Management Consultant's update of GIS data at the conclusion of rehabilitation projects, which is further described in the *Design Management Manual* included in Volume III of the *Program Management Plan*. Other GIS data created by the Program Management Team is provided to MWS upon request.

7.3.5 Other Data

In addition to the types of data listed, additional sources of data, such as overflow records, operational records, supervisory control and data acquisition (SCADA) data, or as-built data may be required by the Program Management Team to support Program goals. In order to acquire any of this existing data from MWS, the Program Management Consultant coordinates with the Program Director or Deputy Program Director as needed to identify the preferred process for obtaining that type of data. Data not currently collected by MWS is only to be collected by the Program Management Team after approval by the Program Manager and the Program Director.

7.4 Maintenance of Models

Hydraulic models of the separate sanitary and combined sewer systems and the river system were developed and/or refined to support the CAP/ER and LTCP. The Planning and Technical Support Team is responsible for updating and maintaining these existing system models throughout the term of the Program. Updates and maintenance primarily include the incorporation of project information from completed Program projects and other MWS improvements and the refinement of model parameters to reflect the data collected from both pre-project planning and post-construction monitoring. Although alternatives to evaluate the ability of improvements to achieve Program targets are modeled throughout the Program, changes to the existing system model are only made under the direction of the Planning and Technical Support Manager as approved by MWS.

The most recent version of the existing system model is provided to MWS following significant updates to the models or upon request by MWS. At a minimum, updated model files are provided annually to MWS. System-wide updates or the recalibration of the models may be conducted following significant changes to the system when approved by the Program Director.

The sanitary and combined sewer system model is maintained in DHI's MIKE URBAN 2014 software utilizing the Environmental Protection Agency's Stormwater Management Model (SWMM) 5.0.022 engine. The river model is maintained in CE-QUAL-W2 Version 3.5 that was developed by the United States Army Corps of Engineers. Updates to the models for compatibility with future software releases are conducted only after approval by the Program Director and Program Manager.

7.5 Changes to the *Corrective Action Plan/Engineering Report and Long Term Control Plan*

The Planning and Technical Support Team is also responsible for the evaluation of changes or updates to the CAP/ER and LTCP recommendations including developing and evaluating additional wet weather solutions or the refinement of proposed solutions and the preparation of associated documentation as needed. These changes may originate from regulatory review comments, changed field conditions, or other sources during Program implementation. An evaluation of additional or refined solutions may also be requested by the Project Manager for projects in the design or construction phases.

7.6 Annual Rehabilitation Planning

In order to achieve the targeted overflow reduction goals, improvements developed in the CAP/ER and LTCP use the key assumption that the system as a whole would be maintained and that the system condition in the areas not planned for CAP/ER and LTCP projects would not deteriorate significantly. In order to achieve this, MWS budgets a certain amount of funding each year for rehabilitation in these areas. MWS is responsible for collecting condition assessment data for these areas as described in Section 7.3.3. However, since no specific projects have been defined, the Planning and Technical Support Team collaborates regularly with MWS to determine which portions of the system should be targeted for rehabilitation within the funding limits for any given year. The Planning and Technical Support Team utilizes the collaborative decisions to define the scope, schedule, and estimated budgets for this work. Project Summaries are developed (see Section 7.2) and utilized by the Program in adherence with the design, construction, and project tracking control approaches discussed in other sections of this *Program Management Plan*.

7.7 Post-construction Monitoring Program

Post-construction monitoring information is used for periodic model updates. In addition to being a critical component of the Consent Decree requirements, post-construction monitoring also serves to verify that the constructed facilities perform as intended and achieve the design intentions for conveyance, treatment, storage, and/or water quality improvement.

Similar to the Program Management Consultant's tasks related to data collection and analysis (Section 7.3), the Planning and Technical Support Team identifies the locations for monitoring and types of assessment data needed to verify facility performance. These locations are provided to MWS for data collection. The data is reviewed, and the models are updated, as required, to identify the level of performance achieved. Reports are generated for all facilities that document the Consent Decree's success or opportunities for improvement.

7.8 Other Technical Support

On the basis of their expertise as well as the initial role of developing the CAP/ER recommendations, the Planning and Technical Support Team prepares the *Quarterly* and *Annual Reports* as required in the Consent Decree. Increased project activity as the Program matures requires that the Planning and Technical Support Manager utilize the PMIS data and facilitate interfaces with Program Controls to maintain consistency between the external and internal Program progress report functions.

In addition to the activities described above, the Planning and Technical Support Team is also responsible for providing specialized technical support to the Program as needed. This support may

include providing expertise in wastewater conveyance, wastewater treatment, storage facilities, green infrastructure improvements, sewer rehabilitation, or other items requested by the Program Management Team.

In the case of property acquisition, this activity is started during the planning phase and is managed for the Program Management Team by the Planning and Technical Support Team. The Planning and Technical Support Team also serves as a resource during the design phase when easements are required.

Section 8

Design Management

8.1 Overview

Section 2 of this *Program Management Plan* identifies the members and associated roles and responsibilities of the Design Management Team with the focus on a Project Manager for each design. The Program has a dedicated Project Management Team focused on technical support; risk management; quality assurance; and scope, budget and schedule compliance for each project. The Project Management Team functions as an extension of MWS with clear roles, responsibilities, and levels of authority. In general, it is anticipated that the full design effort for each project will be completed by an engineering firm from the pre-qualified Designer list or through the award of a specific contract.

This Section describes the policies and approach developed to manage and execute the design and Designer-related activities of each of the Program component projects. The tasks include:

- Support of Metro Water Services (MWS) in the procurement of Design consultants and construction contractors for projects
- Oversight and coordination of all Designer activities during the design phase including the compliance with standard specifications, details, and guidance. This task also addresses coordination of those functions performed during the design phase by others, such as permitting and land acquisition.
- Perform design reviews and value engineering as required
- Oversight and coordination of Designer and Construction Manager activities during the construction phase. This task also addresses the monitoring effort needed for issue management and to identify risk and quality trends that may impact the Program's progress.
- Administration of the Design Contracts for design consultants
- Project budget and schedule monitoring and updating

These tasks are described here to emphasize the important interfaces within the Program Management Consultant structure that support design management. Figure 8-1 represents a typical design process from initiation to start of construction, although it is important to recognize that all steps shown may not be necessary or scoped for every project. Rehabilitation and small conveyance projects in particular do not have all of these elements. The Designer's tasks and interfaces are discussed in more detail in the *Design Management Manual* contained in *Program Management Plan*, Volume III.

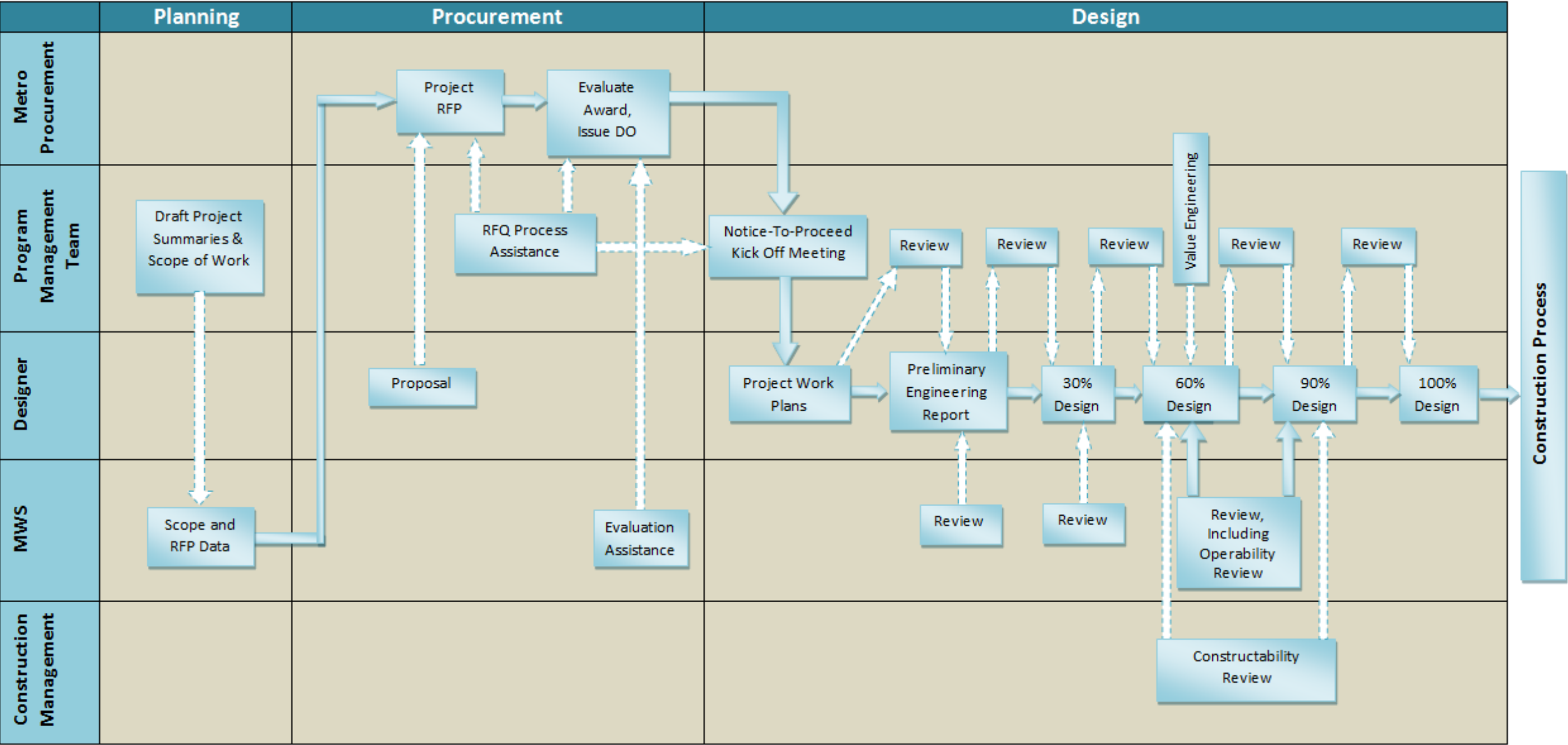


Figure 8-1 Design Process

8.2 Procurement Support

The Program Management Consultant supports MWS in the procurement process for contracting both Designers and construction contractors. A Project Manager is assigned to manage each project and reports to the Design Manager. The assignment of the Project Manager is made during the planning phase, typically near the completion of the Project Summary, in order to facilitate the Project Manager's understanding of the history, goals, and scope and to allow the Project Manager the opportunity to participate in risk discussions for that project.

In addition to awarding contracts to Designers who have been pre-qualified in accordance with purchasing procedures, the Program may also issue individual Requests for Proposals for the design of specific projects. These projects are generally larger or more complex. They may include wastewater treatment plant improvements or other specialty projects that justify an individual selection and award to the most qualified design firms with the documented experience to successfully complete the design of these types of projects.

The Design Management Team led by the Design Manager works closely with the Planning and Technical Support Manager to conclude the development of the Project Summaries and other documents required to procure design services as discussed in Section 7 of this *Program Management Plan*, Volume I. Once the documents required for procurement of design services have been prepared, the Procurement Coordinator, a role served by the Deputy Program Director, coordinates with Metro Finance Procurement Division to initiate the procurement of design services. The Project Manager and the Design Manager, with input from the Planning and Technical Support Manager, provide technical information and responses to questions during the Designer procurement process. This is generally accomplished in clarification meetings with named project Designers or by amendments to the Request for Proposals solicitations. The technical information required during the procurement of construction contractors is provided by the Project Manager and Designer to the Procurement Coordinator enabling documentation of information provided to MWS for the interface with Metro Finance Procurement Division.

8.3 Design Oversight and Coordination

The project's planning, design, and construction phases are managed using a Project Management Team structure as shown in Figure 8-2. This team is focused on managing project related risks, providing quality assurance, and delivering projects within budget and schedule constraints. Each project is planned, designed, and constructed to meet the requirements defined in the Project Summary and to achieve the Program's goals (see Section 1).

Open communication lines between the Project Managers, Designers, MWS Divisions, Metro Departments, construction managers, and others as appropriate are established to promote quality and consistency in the design effort and to minimize construction change orders.

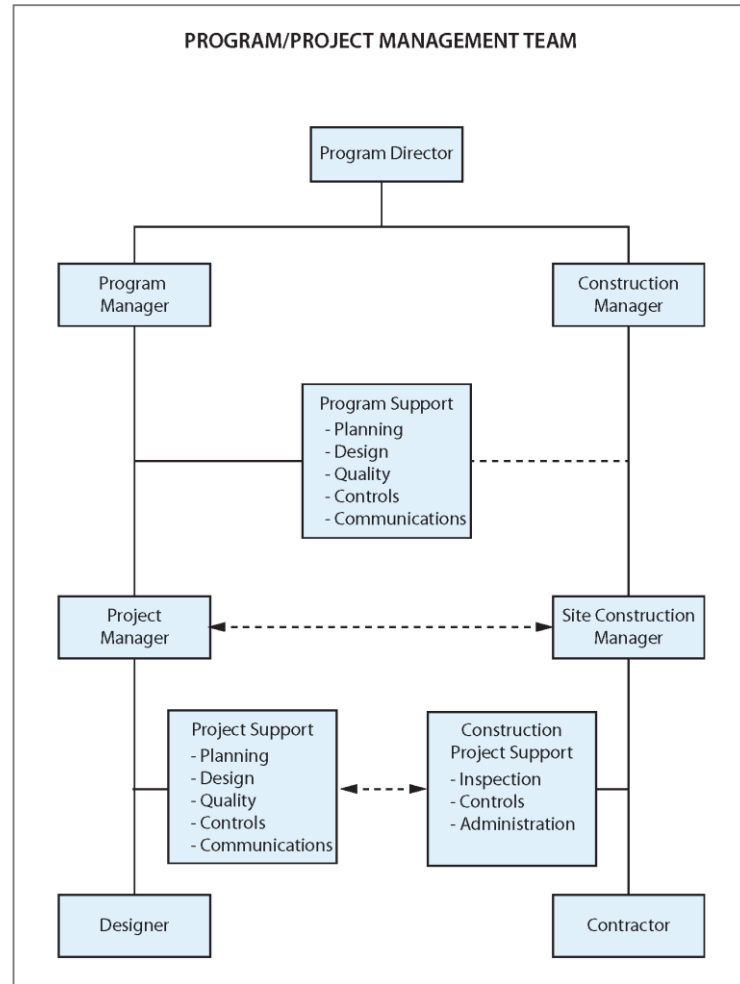


Figure 8-2 Functional Relationships of Project Staff and Program Management Support

Having pre-qualified Designers for the specific work types envisioned for the Program, the approach to providing quality designs relies on the capability of each Designer as well as the contract administration and compliance monitoring of these Designers to ensure that all Program requirements are achieved. The administration aspects of this approach are discussed in Section 8.6. Specific guidance through the *Design Management Manual* and *Quality Management Manual* in Volume III of the *Program Management Plan* is available for each Designer to ensure that its typical design approach includes those items and the functionality desired by MWS.

Some of the important topics discussed in the *Design Management Manual* include:

- *Project Work Plan.* Each Designer may be required to submit a *Project Work Plan* defining how the Designer intends to comply with contracted obligations upon project commencement. When defined as such in the Designer's Scope of Work, the *Project Work Plan* may take the form of the CWNOAP-developed *Project Work Plan Checklist*. See Section 3.3.4 of the *Design Management Manual*.
- *Coordination with the Project Manager.* The Designer coordinates with the Project Manager regarding various Program elements include permitting (application package review as well as review of compliance during and post-construction), real estate and easement acquisition, other MWS and Metro projects, other local jurisdictions, local utilities, and others that may be

identified. The Project Manager for each project coordinates project activities by working with the Program-designated representative for each area. Coordination issues for each project are monitored regularly to avoid schedule and technical conflicts.

- Providing assistance to the Project Manager. The Designer assists the Project Manager by identifying and recommending mitigative strategies for project-related risks that could prevent a successful delivery of the project. Risks that are identified as having a potential effect on the implementation of the project are tracked in a *Project Risk Management Plan* throughout the design process and documented in the *Risk Assessment Report* (see Section 6, Risk Management).
- Coordination with the community and other entities. For the betterment of the impacted neighborhood and the community at large, projects are designed and constructed in coordination with other ongoing projects including those planned and implemented by other Metro departments, local jurisdictions, and state and federal entities. It is the Project Manager, through interfaces with other Program Management Team members, who identifies coordination issues for Designer incorporation into the construction contract documents.
- Design criteria and standards. Utilizing common design standards provides a framework for achieving consistency in presentations, systems and facilities design, construction, and operations. The Designer incorporates the best industry practices for cost-effective environmental improvements and utilizes standard details and standard specifications provided by the Program where appropriate. The Designer is afforded review opportunities regarding standard details and standard specifications during project design development to ensure that every specification and detail is appropriate for the project being designed. Sound engineering judgment and a high-level standard of care is expected to be applied to each project as the design process is implemented.
- Design standards. The design standards incorporated in the *Design Management Manual*, *Program Management Plan*, Volume III, are listed below. Note that these documents are appended to *Design Management Manual*.
 - National and Tennessee standards for water and wastewater, as approved by MWS
 - Equalization facility and pump station guidelines (Appendix A)
 - Conveyance pipeline guidelines (Appendix B)
 - Rehabilitation project guidelines (Appendix C)
 - Computer-aided Design and Drafting (CADD) standards (Appendix D)
 - Key standard specifications to address major material and processes across the Program. These specifications are written in the 48 division-based CSI format and referenced in Section 5 and Appendix F.
 - Standard key details to address the assets that require consistent design across all projects. These details are referenced in Section 6 and Appendix G.
 - Survey standards (Appendix H)
 - Geotechnical standards (Appendix I)
 - Permitting guidelines (Appendix J)
 - Sustainability guidelines (Appendix L)

During design, the cost to construct a project is estimated, and these estimates are the basis of project budget control and variance reporting from the Program baseline. Projected increases/decreases in

the baseline budget are identified and used to evaluate the proposed design factors causing overruns or savings. On non-rehabilitation projects, the Designer utilizes its own internal estimating process and follows cost-estimating guidelines described in the *Design Management Manual*, Section 10 and Appendix K, and provides cost estimates as defined in the Scope of Work, typically occurring at the *Preliminary Engineering Report*, 30%, 60%, 90%, and 100% Design Submittals. Designers for rehabilitation projects prepare a List of Quantities as required in the Scope of Work and submit it as part of their design review for project cost estimate development by the Program.

8.4 Design Reviews

Designers are required to submit milestone documents for review by the Program Management Team as described in the Designer's Scope of Work. The submittal document review process includes a Program Management Team review covering all needed technical areas of expertise. Identification of potential impacts to project baselines, conformance with all Program standards and guidance, and management actions are included as part of the review process. Review of documents, as described in the following subsections, are typically required for large or complex projects such as equalization facilities or conveyance projects, but some projects require fewer or more limited design submittals for the Program's review. Required design review documents are described in the Designer's Scope of Work.

8.4.1 General

The Designer retains overall quality control responsibility for all design calculations, drawings, and supplemental project-specific specifications. Formal reviews during the design process are conducted by the Project Manager with the assistance of MWS, the Design Manager, Construction Manager, and others as appropriate. Reviews evaluate and compare the design's progress for compliance with the predetermined project baselines including scope, cost, quality, project objectives and schedule, and Program design criteria and standards. Reviews are accomplished in compliance with the Designer *Work Plan* Review Procedure and Design Deliverable Review Procedure included in *Program Management Plan*, Volume II.

8.4.2 Project Work Plan Review

The Designer may be required to produce a *Project Work Plan* that defines how the services are executed and how compliance with contractual obligations is achieved. The Project Manager coordinates reviews of the Designer's *Project Work Plan* for compliance with the contract, the *Design Management Manual*, and alignment with the Program's objectives. This review is conducted according to the Design *Work Plan* Review Procedure, *Program Management Plan*, Volume II. Details on this design deliverable are provided in Section 3.4.1 of the *Design Management Manual*.

When defined as such in the Designer's Scope of Work, the *Project Work Plan* may take the form of a *Project Work Plan Checklist*.

8.4.3 Preliminary Engineering Report Review

When a *Preliminary Engineering Report* is required in the Designer's Scope of Work, the review of the report is coordinated by the Project Manager before acceptance. The majority of the review team members are the Program Management Consultant's senior technical specialists, representatives from MWS Operations and/or System Services, and other MWS divisions as appropriate. Details about this design deliverable's requirements are provided in Section 3.4.2 of the *Design Management Manual* and the Designer's Scope of Work.

8.4.4 30% Design Submittal Review

A formal design review is typically scheduled in conjunction with the 30% Design Submittal. This review point is critical because it represents an opportunity to address significant changes to the design process or contract documents, if found to be necessary, without causing substantial impacts on design, construction costs, and the Program schedule. Although documentation of the 30% review meeting is the responsibility of the Designer, review of the 30% Design Submittal is coordinated and documented by the Project Manager. Details about this design milestone's requirements are provided in Section 3.4.3 of the *Design Management Manual* and the Designer's Scope of Work.

8.4.5 60% Design Submittal Review

A formal design review is typically scheduled in conjunction with the 60% Design Submittal. The requirements of this submittal are described in the Designer's Scope of Work, but it is intended that this submittal shows on-going progress towards completion of design, conveys an understanding of the design guidance, and provides adequate information to assess potential impacts to the *Master Program Budget and Schedule Report* with a reasonable degree of certainty. Although documentation of the 60% review meeting is the responsibility of the Designer, the review of the 60% design deliverable is coordinated and documented by the Project Manager. Details for this deliverable's requirements are provided in Section 3.4.4 of the *Design Management Manual*. Note that rehabilitation projects typically do not include a 60% Design Submittal.

8.4.6 90% and 100% Design Submittals Reviews

The formal design review scheduled at 90% design essentially represents a review of the Designer's completed design. Drawings and supplements to standard specifications are expected to be complete including final checks and final coordination. Detailed drawings, specifications, construction duration, cost estimates, or list of quantities are included in the 90% Design Submittal, as described in the Designer's Scope of Work.

The 100% Design Submittal is generally reviewed for conformance and a satisfactory resolution of the 90% review comments. All documents including plans, specifications, and construction cost estimates and construction duration are to be provided in final form. Approval of the 100% Design Submittal is considered to be the acceptance of the final design documents for regulatory submittals, advertising, and bidding. Details for the deliverables at both reviews are provided in Section 3.4.5 of the *Design Management Manual*.

Concurrent with the completion of the design, the Project Manager and Designer document the actions taken to mitigate risks as described in the Section 6 of the *Program Management Plan*, Volume I.

8.4.7 Constructability and Operability Reviews

Concurrent with, and as part of the identified technical design reviews, a specific emphasis is placed on constructability and operability. These reviews are typically expected to be completed at the 60% and 90% levels. For the *Preliminary Engineering Report* and 30% reviews by the Program, the principles of constructability and operability are considered by reviewers in other disciplines. The constructability and operability reviews ensure that any construction considerations identified in the Project Summary have been incorporated by the Designer into the design documents as appropriate. Operability reviews performed by MWS' Operations and System Services divisions identify functional and system concerns regarding the equipment and layout being designed.

Constructability reviews performed by the Program Management Team include reviews of completeness of the document, potential conflicts between drawings and standard details, inter-system compatibility, and field coordination issues. Field coordination issues may include consistency in addressing any potential impact on/from adjacent projects, traffic, neighborhood-specific issues, the location of contractor field offices, parking and materials/equipment, lay-down areas, material and equipment delivery constraints, contractor parking, long-lead procurement times, owner-furnished equipment and other issues identified in the project phasing and logistics plans.

8.4.8 Value Engineering

Formal value engineering sessions may be required as part of the 60% progress design review. When required they are identified in the Project Summary and described in the Request for Proposal for Designer services. As discussed in Section 3.4.6 of the *Design Management Manual*, the objective of the value engineering session, if required, is to maximize value while minimizing cost of design requirements consistent with performance, reliability, and maintainability standards. As a management tool, value engineering complements rather than replaces other cost-reduction and/or cost control techniques.

8.4.9 Special Reviews

On certain projects, the Program Management Team may determine that a special review is either appropriate or required due to circumstances such as management or operational concerns. Special reviews may also be considered if a design is observed as not proceeding as originally scoped, is over budget, or is behind schedule. This may initiate the use of special technical reviews and workshops to provide a second opinion and/or redirection of the project. Sometimes projects exceeding budget and schedule use the process to look at constructability improvements and value savings opportunities. Special review workshops may be held at later stages of the project and are more focused on technical adequacy and the approach of the design rather than cost unless specifically directed to reduce cost. Complex projects having state of the art treatment technologies or areas of practice with limited technical design experience are triggers to require an independent team of experienced experts to complete a peer type review workshop. Projects with emerging rehabilitation or conveyance technology or unusual project conditions are also candidates for the review workshop approach. At any given stage of a project, this approach can be undertaken by the Program Management Team to review a project of concern or controversy or one that has experienced a departure from Program goals.

8.5 Engineering Services during Construction

As outlined in their contract and Scope of Work, the Designer may be responsible for maintaining design integrity through review of contract submittals and by providing engineering support and other pertinent services during construction including review of testing data, start-up, and certification of constructed facilities. The Project Manager initiates and monitors these Designer activities to verify quality services and identify developing concerns.

Typical engineering services during construction include responding to requests for information, the review and approval of submittals and shop drawings, support in the change order process, periodic site visits, compiling or reviewing record drawings, and attending meetings as requested. The Construction Management Consultant typically responds to non-technical requests for information and reviews non-technical submittals. The Program Management Team may request assistance from the Designer for design clarifications, product substitution reviews, technical submittal reviews, and

project issues. These Designer services are requested and provided on an as-needed basis. Additional detail is provided in Section 3.5 of the *Design Management Manual*.

For rehabilitation and CWNOAP-designated small projects, construction support services from the Designer typically are very limited. The Program Management Team typically responds to requests for information and reviews submittals and shop drawings. The Construction Manager reviews non-technical items, and the Design Management Team reviews technical items when requested by the Construction Manager. The Program Management Team typically may require assistance from the Designer as needed for design clarifications, major product substitution reviews, and project issues.

All communication to and from the contractor occurs through the project Site Construction Manager or the Construction Manager or his designee (reference Section 9 of this *Program Management Plan*, Volume I) who logs, tracks, and documents the communication.

The Project Manager, as the lead project representative of the Program Management Team, also monitors the Site Construction Management staff to ensure that construction management processes and procedures are being utilized as expected. Taking the form of periodic, informal audits, these observations verify compliance with the approach described in the *Construction Management Manual* (*Program Management Plan*, Volume III) as well as effective communications and interfaces with the Program Management Team and its procedural requirements.

8.6 Administration of Design Contract

The Design Management Team also conducts regular coordination and progress meetings, usually monthly, with the Designer. The Project Manager schedules the meetings, supplements the Designer-prepared agendas, and reviews the Designer's written summary of each meeting. The minutes highlight concerns, actions, decisions, and the potential budget and schedule impact of agenda items. These activities are conducted in compliance with the guidance provided in the *Design Management Manual*. The Project Manager is responsible for verifying the project data provided by the Designer and used by the Program Controls group to update the Program Management Information System on a monthly basis. This data includes status updates; schedule compliance; the status of permits, rights-of-way and easements acquisitions; coordination activities required with other MWS divisions and Metro departments; and the identification and updating of new and unresolved issues. This information is used to update the *Master Program Budget and Schedule Report*. The Project Manager focuses on addressing issues related to the project design work completed, the near term project needs, communication support, and issues and risks of the project to achieve the project and Program goals.

8.6.1 Progress Payments

Progress payments are made as specified in the design contract. The Program expects the Designer to track and control the budgets established for each task. As such, the budget established for each task is treated as an individual task limit. However, Metro understands that, in the course of executing a project, additional effort may be needed for one task while less effort may be needed for another task. Therefore, the Designer is expected to prepare and submit to the Project Manager a condensed monthly budget report delineated by task that identifies any substantial variances from the proposal. It is anticipated that not-to-exceed payment values are assigned to the 90% Design Submittal and that payments to a consultant do not exceed that value until the submittal has been accepted as complete. Payment for final design services is made after MWS accepts the sealed contract documents and the Program Management Team approves the final design documents. Closeout only occurs after construction services are completed per contract terms.

If any issue or out-of-scope request from the Program arises that may impact the ability of the Designer to complete the design within the design schedule and budget, the Designer should immediately notify the Project Manager. Allowances and contingency fee tasks may be established in the design contract or the approved proposal for designated issues such as permit fees and small out-of-scope work items. Allowances and contingency fees may be utilized only with written authorization from MWS. In no case shall the total project upper limit be exceeded without a formal change order based on a change in the Scope of Work that has been approved by Metro Procurement.

8.6.2 Design Schedule and Budget

By contract, the Designer is responsible for scheduling its work and updating the schedule on a regular basis. Schedules are to be submitted to the Project Manager per the requirements in the Designer's Scope of Work.

Prior to the initiation of design activities, the Designer provides a baseline schedule via PMIS with key deliverable milestones in a Gantt-chart format. The schedule depicts the number of days from the Notice to Proceed to each milestone and includes a Program review period for each submittal. The frequency that the Designer is required to submit schedule updates is defined in the Scope of Work and may include monthly updates or updates only when the Designer anticipates a significant schedule slippage.

The Project Manager reviews the baseline schedule and subsequent updates for the accuracy of work completed and the reasonableness of proposed changes and confirms or provides schedule variance justifications to the Program Controls Group for the impact analysis needed to update the *Master Program Budget and Schedule Report*.

Similarly, the Project Manager ensures that the monthly budget updates provided by the Designer are consistent with work performed, costs invoiced, and change notifications submitted.

8.6.3 Design Changes

Changes to the scope of any project must be formally reviewed and approved in accordance with Design procedures regardless of whether or not they impact budget or schedule. A project scope change must comply with the Change Justification Procedure, *Program Management Plan*, Volume II. That procedure indicates how Project Managers should document and receive approval for all scope changes prior to directing the Designer to implement any such scope changes (see Section 5, Financial Management).

8.6.4 Designer Evaluation

The Program Management Team may prepare an evaluation of each Designer's project performance after their final design submittal and at the conclusion of construction for non-rehabilitation projects. In addition, the Program Management Team may perform interim evaluations of a Designer's performance. The goal of the interim evaluations is to inform the Designer of any problems and give them the opportunity to take corrective actions to benefit both the project and the Designer.

Evaluations may include a discussion of the Designer's principals' involvement, personnel commitment, project management, cooperation, quality control, cost control, sub-consultant management, responsiveness, schedule adherence, design innovation, technical competence, and value added quality.

8.7 Project Closeout

Project closeout is a collaborative process between the Construction Management Consultant, the Project Manager, and the Program Controls Team. Refer to Section 4.3.7, Closeout Phase, for details.

Section 9

Construction Management

9.1 Overview

The projects constructed under the Clean Water Nashville Overflow Abatement Program involve multiple locations and multiple types of projects. Program projects may be constructed on Metro properties, within rights-of-way, and on or through private property. The types of projects include sewer rehabilitation, sewer conveyance upgrades, equalization facilities, pump station improvements, and wastewater treatment facility improvements. The various types of construction have different risk profiles, construction schedules, and staffing requirements, but they are all managed in a similar programmatic fashion following similar workflows, inspection procedures, and quality management measures. The Construction Management approach is intended to be flexible enough to meet the specific needs of each project and to provide consistency across all projects as they are implemented.

The Construction Management Consultant leads the construction management oversight activities and fulfills the role of quality management during construction. The Construction Management Consultant has developed a *Construction Management Manual* that details the processes and procedures to be used in the implementation of the construction management activities for the Program. A copy of the *Construction Management Manual* is included in the *Program Management Plan*, Volume III.

The Project Manager, as the lead project representative of the Program Management Team, monitors the Construction Management Consultant's project-related activities on a periodic basis to verify that the administrative efforts of the Construction Management Consultant comply with the process requirements of the *Construction Management Manual*.

9.2 Approach

The general approach for managing and executing the construction of each of the Program's projects includes:

- Overseeing, coordinating, and administering all contracts for construction including submittal reviews, Request for Information (RFI) responses, daily inspection reports, payment requests, changes in the work, commissioning, and contract closeout
- Monitoring and reporting on the contractor's compliance with its submitted *Safety Plan*
- Managing safety of on-site construction management and inspection staff
- Monitoring and reporting on the contractor's progress and quality of the work

The majority of the effort performed by the Construction Management Consultant during the construction phase of a project is dedicated to on-site inspection of the work. This is accomplished by Resident Project Representatives overseen by Site Construction Managers at the project site. While work is being performed, the Resident Project Representative and/or Site Construction Manager

monitor the contractor's work for conformance to the contract documents. Such monitoring may include the quality assurance of testing and performance of special inspections for code compliance as called for in the applicable specification sections.

Field personnel of the Construction Management Consultant are also responsible for identifying and mitigating potential adverse impacts to nearby residences, traffic flow, and existing utilities. The *Construction Management Manual* details the means by which these issues are anticipated, prepared for, and averted, if possible, including jobsite meetings, public notification procedures, and permit compliance monitoring.

During the project's transition from the design phase to the bid and award phase, the Construction Management Consultant becomes increasingly involved in the delivery of the project. The *Construction Management Manual* outlines these activities specifically in the following sections:

- Section 7 – Services during Bid and Award. This section discusses the review of addenda, review of bid tabulations, the Project Transitioning Meeting, and the interface with the awarded contractor.
- Section 8 – Services during Construction. This section discusses workflows regarding Daily Reports, Submittal Reviews, RFI Reviews and Processing, Potential Issues Identification and Tracking, and Cost Management. The expectations and roles of inspection staff, both Site Construction Managers and Resident Project Representatives, are set forth. This section also discusses the Construction Management Consultant's role in dispute resolution and commissioning.
- Section 9 – Services during Closeout. This section discusses Final Completion activities such as warranty review, final payment, final Change Order, record drawings, and *O&M Manuals*.
- Section 10 – Quality Management. This section outlines the processes by which the Construction Management Consultant field staff maintains quality assurance of the construction and how the Construction Management Consultant management personnel implements quality control over those activities.

9.3 Construction Contract Administration

Construction management includes the monitoring and administering of all construction activities and related contract requirements, meetings, construction progress, schedules, quantity measurements and payments, cost controls, Change Orders and claims, records and documentation, reporting, commissioning of the constructed works, and closeout of the construction contracts. The transition from the design phase to the construction phase occurs at the issuance of the Purchase Order, a contract document communicated directly to the selected contractor from the Metro Finance Procurement Division, typically approximately one month after the effective date of the signed contract. However, in order for that transition to be as smooth as possible, a formal process is followed to transition the project from the Program Management Consultant's primary oversight to the Construction Management Consultant's primary oversight.

A Project Transitioning Meeting, as discussed in Section 7.2 of the *Construction Management Manual*, is held between the Construction Management Consultant and Program Management Consultant shortly after the Intent to Award has been issued by Purchasing. Prior to this meeting, critical project-specific information including the *Project Communications Plan*, *Project Risk Assessment Report*, and Designer points of contact, etc., are provided by the Program Management Consultant to the

Construction Management Consultant. After the Project Transitioning Meeting, the Construction Management Consultant does the following:

- Assumes coordination responsibility for the construction phase of the work
- Coordinates with the contractor for MWS' issuance of the Notice to Proceed and setting the Pre-construction Meeting date and agenda
- Prepares the draft Notice to Proceed letter for MWS' signature

The Construction Manager assigns a Site Construction Manager to manage each project and that individual reports through the Field Services Manager to the Construction Manager. The Site Construction Manager's responsibilities are defined in Section 2 of this *Program Management Plan*, Volume I, and include providing administrative support and directing Resident Project Representatives, as necessary, to perform quality assurance oversight, progress monitoring, and documentation of the construction activities. Details about the Construction Management Consultant's roles and functions are provided in the *Construction Management Manual* in the *Program Management Plan*, Volume III. Critical responsibilities that interface with other functions of the Program Management Team and Program procedures are summarized in the following sub-sections.

The goal of the Program Management Team is to function as a seamless organization with clear roles, responsibilities, and levels of authority. The Construction Management Consultant has developed a matrix of roles and responsibilities for members of the Construction Management Team. This list defines the responsibilities for anticipated construction processes, includes work flow diagrams of the processes, and describes the roles of individuals in the process. The matrix is included in the *Construction Management Manual* as a reference for all Construction Management Consultant team members.

9.3.1 Mitigate Impacts to the Community

The Construction Management Consultant mitigates the impact of disruptions to the community from traffic, noise, and air quality through proper oversight. The Resident Project Representative monitors construction-related inconveniences that disrupt the quality of living and working conditions and communicates timely information to the Project Manager and Contractor about any actions that are needed. Assistance with community contacts is the responsibility of the Construction Management Consultant during construction. The Resident Project Representative monitors the distribution of public notification information and addresses complaints or questions received directly from the public.

9.3.2 Scheduling and Budgeting Systems

After review and acceptance of the contractor's monthly schedule and budget updates, the Construction Management Consultant provides updates to the Program Controls Group in order for the Master Schedule and Master Budget to be adequately maintained. These contractor's monthly updates are documented using the Submittal Business Process (BP) in PMIS and analyzed by the Construction Management Consultant. Variances are resolved, as needed, before the Construction Management Consultant accepts the contractor's update. The Program Controls Group accesses the approved submittal and utilizes the information to update the Master Schedule each month. The Construction Management Consultant has access to the Master Schedule and Master Budget through PMIS as described in Section 3 of the *Program Management Plan*, Volume I. The Program uses this web-based information system to access official project communication, facilitate workflows, and

manage project costs and schedules. In addition to administering the construction business processes, the system is used for transmitting documentation between the contractor and the Designer.

9.3.3 Communications

Open, clear, and properly managed communications are essential for construction project success. Such communications contribute to clarity of understanding, reduction of misunderstandings, and the enhancement of constructive discussions. The Construction Management Consultant works closely with the Program Management Consultant and MWS to maximize the flow of open communication to all appropriate parties.

The Construction Management Consultant has developed and implemented a standardized communications protocol for use on all construction projects as defined in the *Construction Management Manual* and reviewed with each contractor. This protocol addresses MWS' approved procedures for the generation, distribution, tracking, and final disposition of all construction-related communications. Examples of documented communications include project correspondence, daily reports, field and inspection reports, meeting minutes, public complaints or inquiries, email, and photographic records. The Resident Project Representative has the primary responsibility for communications with the contractor.

All external communications are managed under the direction of MWS and in accordance with the *Program Management Plan's* Section 10, Stakeholder Communications. Prior to the Project Transitioning Meeting, the Construction Management Consultant receives a copy of the *Project Communications Plan* developed for each Program project, which the Construction Management Consultant reviews and updates, if needed, prior to issuance of the Notice to Proceed. The Construction Management Consultant provides information pertinent to the project collected through the design and bidding process to the contractor at the Pre-construction Meeting, and communications issues are discussed at construction progress meetings as needed.

Additionally, the Construction Management Consultant engages a public relations consultant as necessary through the course of the project, updating, if required, the approach to project communication.

Internal communications for each project follow the quality control measures outlined in Section 10 of the *Construction Management Manual*. During the course of construction, there are several points of interface between the Construction Management Consultant and the Program Management Consultant. The Project Manager is invited to project meetings as necessary, typically every two weeks, where project topics such as safety, schedule, RFIs, submittals, changes, etc., are discussed. Additionally, the Construction Management Consultant attends Program-level meetings weekly with the Program Management Consultant and Program Director to discuss topics relating to construction. The Construction Management Consultant attends periodic Controls meetings (usually held monthly) with the Project Managers to discuss various issues including the flow of information and general communication effectiveness regarding the project.

9.3.4 Construction Coordination and Progress Meetings

The Site Construction Manager facilitates regular (typically every other week) coordination and progress meetings with the contractor. The Site Construction Manager schedules meetings, prepares agendas, and provides minutes of each meeting highlighting concerns, actions, decisions, and potential

budget or schedule impacts. Documentation of these meetings is facilitated by the agenda and meeting minute templates available in PMIS.

9.3.5 Progress Payments

Contractor pay applications are reviewed and approved by the Construction Management Consultant each pay period using the payment terms identified in the construction contract. In conjunction with the submittal of the contractor pay application, a schedule update review is conducted as part of the progress meetings, and concurrence regarding the project's progress is reached between the Site Construction Manager and the contractor. Procedures for reviewing contractor pay applications are included in the *Construction Management Manual*. Processing of the approved contractor pay applications is described in the Program Management Consultant's Invoice Review Procedure included in the *Program Management Plan*, Volume II.

9.3.6 Changes to the Construction Contract

All potential changes should be identified early and discussed at the progress meetings. Items identified as potentially affecting the scope, schedule, or budget of a construction project are tracked in PMIS. Changes are authorized pursuant to the terms of the construction contract. The responsibility and authority with regard to construction contract changes are identified in the *Construction Management Manual* and Section 3 of the *Program Management Plan*, Volume I.

Change Orders are approved only after the submittal, review, and approval of the required backup documentation as discussed in the *Construction Management Manual*. The Construction Management Consultant provides an analysis of impact to the schedule as well as an independent cost estimate and recommendation for action.

In addition to providing a clear audit trail, contract changes that modify cost, schedule, or scope are classified as outlined in the *Program Management Plan's* Section 5, Program Controls: Financial Management. The Construction Management Consultant follows the procedures set forth in Section 8.3 of the *Construction Management Manual* regarding change management. This section discusses the specific roles of MWS, the Construction Management Consultant, and the Program Management Consultant regarding construction contract changes. Specifically, the Project Manager is fully engaged regarding potential contract changes.

9.3.7 Dispute Resolution

Specific roles for the Construction Management Consultant regarding Dispute Resolution are discussed in detail in Section 8.4 of the *Construction Management Manual*. As with changes to the construction contract, the Project Manager is included on all correspondence regarding disputes that might lead to a claim. All disputes are processed in accordance with the terms of the construction contract and procedures discussed in the *Construction Management Manual*.

9.3.8 Property Damage Claim

The Program endeavors to avoid damage to property through design requirements, hiring qualified contractors, and diligent contract administration of all site activities. However, when damage occurs, the Construction Management Consultant is prepared for a timely and appropriate response. Proper responses to claim notifications are addressed as described in the *Construction Management Manual*. If a MWS customer claims that property has been damaged as a result of MWS' activities, the assigned Resident Project Representative assists the Site Construction Manager by investigating the claim

situation for MWS. Any claim assessment or correspondence with the claimant is the responsibility of MWS with input from the Project Manager and Site Construction Manager.

Even when no claim is filed, the Construction Management Consultant utilizes and enforces standardized quality assurance procedures, as discussed in Section 10 of the *Construction Management Manual*, in order to consistently monitor the constructed works. The contractor's performance is monitored for compliance with the requirements in the contract documents and those outlined in the *Construction Management Manual*.

9.3.9 Construction Closeout

Construction closeout is documented via the Construction Closeout Checklist. Refer to Section 4.3.7, Closeout Phase, for details.

9.4 Safety

The Construction Management Consultant monitors the contractor's compliance with the contractually-required contractor *Safety Plan* that outlines the contractor's responsibility for applying safeguards, controlling and avoiding risks, and ensuring that construction is completed safely.

Section 5 of the *Construction Management Manual* contains the safety guidelines established by the Construction Management Consultant for their staff. Members of the Program Management Team are expected to adhere to the applicable portions these guidelines and the contractor's *Safety Plan* whenever on active construction sites for Program projects.

9.5 Quality Control and Quality Assurance

The Program recognizes that quality assurance and quality control during construction are two distinct functions with separate roles for the Contractor, Designer, Project Manager, and the Program's Construction Management Consultant. These respective functions are defined below:

- **Designer.** The Designer (Engineer of Record) retains responsibility for monitoring changes that may impact the intent of the design.
- **Contractor.** The contractor has the sole responsibility for maintaining quality through construction procedures, means and methods, processes, quality control, and compliance with the contract documents.
- **Construction Management Consultant.** The Construction Management Consultant provides quality assurance by monitoring the contractors' quality control programs and auditing contractor compliance with the construction contract. Quality assurance procedures for use by the Construction Management Consultant during the construction phase are included in Section 10 of the *Construction Management Manual*. These procedures are reviewed prior to the start of construction, and additional project-specific quality assurance processes may be developed and included in the project's *Work Plan for Construction Administration*.
- **Project Manager.** The Project Manager monitors the Construction Management Consultant's activities on a periodic basis to verify that the administrative efforts of the Construction Management Consultant comply with the process requirements of the *Construction Management Manual*.

Section 10

Stakeholder Communications and Community Outreach

10.1 Overview

Execution of the Program impacts neighborhoods, residents, businesses, institutions, and a wide range of civic enterprises, and it is important that the Program Management Team appropriately manages communications with those stakeholders. This section defines the communications approach, guidelines, and tools for Program communications.

10.2 Communications Team Structure

The Program Management Consultant Communications Team serves as an extension of the Program Director and MWS Public Information Officer (PIO). The team collaborates with various members of the Program Management Team to implement Program-level communications as described in this section and to develop/implement project-specific *Project Communications Plans*. The Communications Coordinator is a Program Management Team position responsible for planning, coordinating, and implementing communications activities approved by MWS. More specifically, this position fulfills the following tasks:

- Works closely with the Program Management Consultant and Construction Management Consultant leadership as well as the task leaders to identify the needs for communications and public relations planning
- Works closely with MWS' Public Information Officer and other Metro leadership staff, as needed, to seek input into the communications planning process
- Is responsible for planning, scheduling, and coordinating communications activities of any public relations firms contracted to MWS and working on the Program Management Team
- Is responsible for working with the Program Management Team to draft and distribute team-approved periodic or special public reports
- Serves as a liaison between the Program and stakeholders, including Metro Council and civic organizations.

10.3 Stakeholder Communications

The Program Management Team has identified several stakeholders with whom it is important to communicate as the Program progresses. These stakeholders are listed below along with the primary communications mechanisms to be used to provide information and solicit feedback.

- Communications with the Media. MWS leads all communications with the media. The Program Management Consultant and Construction Management Consultant support these communications efforts. These support activities may include gathering and summarizing Program data, preparation of media handouts, or other functions, as requested by MWS.
- Communications with the Mayor's Office / Office of Neighborhoods. MWS leads all communications with the Mayor's Office. The Program Management Consultant and

Construction Management Consultant support these communications efforts. These support activities may include gathering and summarizing Program data, preparation of handouts, or other functions, as requested by MWS. Support may also include attending briefings and preparing presentation materials as requested by MWS.

- Communications with Metro Council. Communication channels with Council may include workshops, one-to-one meetings, and other briefings to discuss the status of the Program. The Program Management Consultant and Construction Management Consultant support these communications efforts, as requested. Council members are notified of projects occurring in their districts as the design and construction phases are initiated. In most cases, this communication includes both a written notification, as well as one-to-one briefings conducted by MWS or the Communications Coordinator. Council members also receive periodic Program updates, as described in Section 10.4.1.
- Communications with regulatory agencies. Most communications with regulatory agencies occur through the Program Director or Deputy Program Director. The Program Management Consultant and Construction Management Consultant support these communications efforts, as requested. The Project Managers and Designers communicate directly with regulatory agencies regarding permit acquisitions.
- Communications with the public. Communications with the public regarding the overall Mission, goals, and progresses of the Program are directed by the Program Director or Deputy Program Director; however, all members of the Program Management Team may have interactions with the public through the design and construction phases of projects. It is important that those interactions remain courteous and professional and that inquiries from the public are addressed by the appropriate personnel. In addition to having access to the Program's website, members of the public may sign up to receive periodic Program updates, as described in Section 10.4.1. Additional mechanisms for communicating with the public regarding project-specific information may include notification letters, community meetings, informational door hangers, or other mechanisms identified as the project design and construction progresses.

If additional stakeholders are identified, the appropriate level of communications and parties responsible for leading those communications efforts is determined by the Program Director or Deputy Program Director with input from others from the Program Management Team. Additional information on specific tasks related to Program-level communications and project-level communications is provided in Sections 10.4 and 10.5, respectively.

10.4 Program-Level Communications Tasks

Program-level communications focus on the messages that inform the broad group of stakeholders affected by or interested in the Program. Key messages to this audience include, but are not limited to, the Mission, goals, and progress (discussed in Section 1), compliance updates, schedule and budget updates, communications strategies, and key risk management strategies. The primary tasks associated with communicating the Program message include periodic Program updates and the Clean Water Nashville website; however, additional communications mechanisms may be identified through the course of the Program.

10.4.1 Periodic Program Updates

The Program Management Team develops formal, periodic Program updates that are issued (via e-mail) to interested parties, including Metro Council and individuals who have requested updates

through the Program’s website. These Program updates are issued, in general, every six months or as requested by the Program Director. Content for the updates is prepared by the Program Management Team. Updates are approved by the Program Director prior to distribution.

10.4.2 Program Website

The Program maintains a website (www.cleanwaternashville.org) to provide on-going, regular updates to the public and other stakeholders. In addition to serving as the Public Documents Repository (PDR), the website informs visitors about the Mission and goals of the Program, provides background and educational information about SSOs and CSOs, and contains information about specific projects. Generally, website updates are conducted on a monthly basis under the approval and direction of the Program Director or Program Manager.

10.5 Project-Level Communications Tasks

Project-level communications focus on a more specific group of stakeholders affected by an individual project or a group of closely related projects (same geographic area). Key messages to each target group may include project background and objectives, field activities and project schedule, contact information, easement and land acquisitions, traffic, and other neighborhood disruptions from construction activities.

Although preparation for project-specific communications efforts may be initiated during the planning phase of a project, communications requirements for individual projects are generally assessed at the initiation of design. Based on the type of work and the location of the project, the Project Manager, in consultation with the Communications Coordinator, identifies those communications issues that warrant consideration or pose risks for the project. The results of that assessment, as well as proposed communications activities, are documented in a project-specific *Project Communications Plan*. Specific activities that may be part of the plan include:

- Provide Council Briefings. Program Management Team may provide verbal and written communications, approved by MWS, to Council members whose districts are affected by the project. Briefings include key Program messages, purpose and timing of the project, key contact information, and a map view of the project. Council briefings typically occur at the start of the design and construction phases of the project.
- Develop and Distribute the Pre-construction Notification Letter. The Program has a system of communications to the residential, industrial, and commercial owners and occupants of the affected properties. The need for notifications to affected properties during the design phase is assessed by the Project Manager in consultation with the Communications Coordinator and others in the Program Management Team. Notifications are conducted as needed. In most cases, affected property owners and residents are notified by mail prior to the initiation of construction activities. The notifications should include a description of the project and its anticipated impacts, schedule information, and contact information if more information is desired. Thoroughness and accuracy of the information transmitted to the property owners and businesses is critical to the integrity of any public notification.
- Provide Notifications to MWS and other Metro Departments. The Program Management Team notifies other MWS Divisions and Metro Departments (System Services, Operations, Customer Service, Public Works, and Neighborhood Services) about upcoming construction projects including the purpose, timing, key contact information, and a map view of the project.

- Conduct Community/Neighborhood Meetings. Community meetings may be held on a case-by-case basis depending upon the recommendations of Council Members and the Program's assessment of community impact.
- Update MWS Website. The Program Management Team keeps the Program's website updated with project related information including key Program messages, purpose and timing of the project, key contact information, and a map view of the project.

Additional communications activities may be identified as the project-specific *Project Communications Plan* is developed. This plan is updated, as needed, throughout the design phase and at the end of the design phase (*Project Communications Plan Update*) to capture any recommended changes related to the communications approach for the project.

During the transition of the project into the construction phase, the Project Manager discusses the *Project Communications Plan Update* with the Construction Management Team. During construction, many of the communications activities are handled by the Contractor, such as property notifications prior to excavation. The need for these activities is assessed during design and included in the project's contract documents. Communications activities conducted by the Construction Management Consultant during construction are described in the project-specific *Work Plan for Construction Administration*.

10.6 Managing Customer Issues

The Program strives to achieve effective communications in advance of all projects in order to minimize and avoid complaints, concerns, and claims. When concerns or complaints do occur, MWS expects a timely and appropriate response.

All members of the Program Management Team are expected to make it a priority to pay attention to the *Project Communications Plans* and *Project Communications Plan Updates* developed for individual projects and use their best professional judgment to respond to and resolve customer inquiries. If a team member is uncertain how to proceed, they should immediately notify a member of the Program Management Team leadership. Significant project issues should be brought to the immediate attention of the Project Manager, Program Director, and Program Management Team leadership. The Program Management Consultant should be engaged to assist with issue management and responses.

Potential issues during construction are tracked according to the business process described in the *Construction Management Manual* included in Volume III of this *Program Management Plan*.

MWS Customer Service is the front line for public inquiry into the Program. Customer Service is positioned to field phone calls, determine the project's location, and forward inquiries via e-mail or phone to the Project Manager or Site Construction Manager.

10.7 Quality Management

All deliverables and communications materials are reviewed pursuant to the *Program Quality Management Plan* referenced in Volume III of the *Program Management Plan*. Communications activities follow the specific quality management procedure referenced in Volume II of the *Program Management Plan* (Quality Review of Program Management Consultant-Generated Document Procedure) for the development and review of communications work products generated by these Section 10 tasks.

