TECHNICAL MEMORANDUM

Project Delivery Improvement Assessment and Roadmap

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2.0 Purpose

The District has a history of successfully delivering water and wastewater infrastructure projects to serve the member and customer cities in the northeastern areas of the Dallas-Fort Worth Metroplex. From the District's inception in 1951 to present day, the cities in its service area have experienced rapid population growth, which has resulted in a corresponding increase in the number, size, and scale of the projects that the District must deliver and then operate. The District will soon be undertaking the largest capital program in its history, the Lower Bois d'Arc Creek Reservoir, Treatment Pipeline, and Mitigation Program. Delivering this program in addition to the already elevated workload carried by the Engineering Department will stress District project delivery resources to levels not before experienced.

To ensure continued successful delivery of projects, the District engaged CH2M to perform a benchmarking assessment of its engineering (project delivery) organization. The goal of this Engineering Process, Structures, and Tools Evaluation, Project ENG 15-4, is to evaluate the District Engineering Department processes, staffing levels, and delivery tools against industry standards and make recommendations for both immediate and near-term improvements. The purpose of this document is to summarize the assessment activities and to present the resulting process improvement and implementation roadmap.

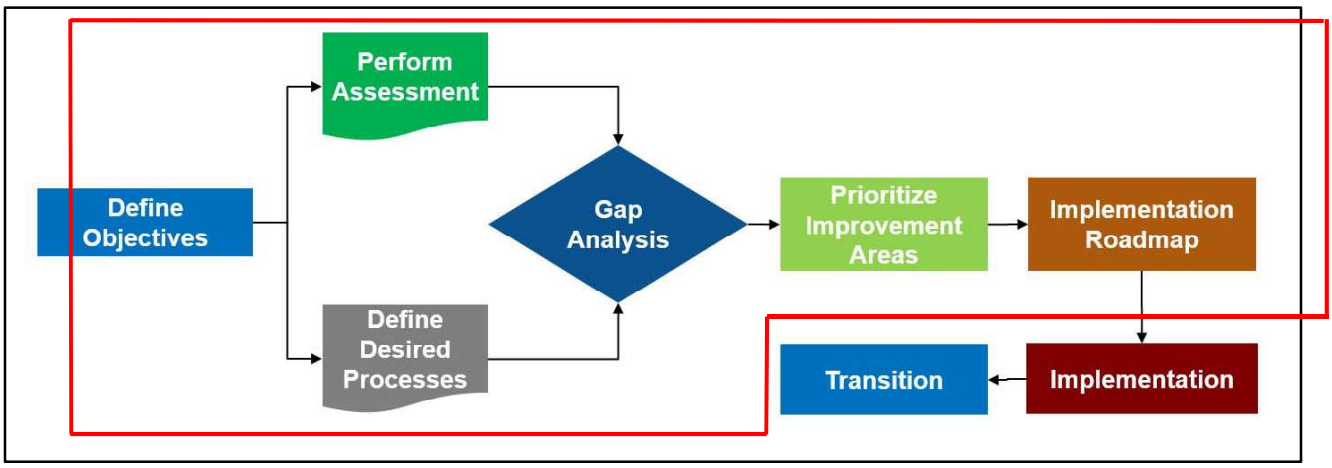
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3.0 Approach

While there are many variations used in gathering information and performing the assessments that can form the basis for organizational improvement and change, they all follow a basic framework of approach to establish objectives, assess existing and desired processes, develop a prioritized listing of improvements, and make recommendations, or a "roadmap", for improvement. Figure 3-1 presents this overarching framework and process flow, which is the general approach employed by CH2M for this assessment. A description of the process steps and general scope of work for the assessment is as follows:

1. Define objectives – setting the goals and objectives of the organizational assessment is critical to the success of the improvement recommendations and establishes the nuances of the approach to be used in the subsequent steps of the evaluation.
2. Perform assessment and Define desired processes – under this step, information about the District's existing processes, tools, and staff are gathered. Discussions are held with staff to understand any potential bottlenecks or inefficiencies in existing processes and staff input on desired processes are gathered.
3. Gap analysis – a comparison of the existing and desired processes, tools and staff are performed and compared to industry-standards and best practices.
4. Prioritize improvement areas – using the results of the gap analysis, areas of improvement are identified and prioritized for future implementation. For the District, identification of quick-start implementation items is a high priority.
5. Implementation roadmap – based on the prioritization, improvement areas are inserted on a "roadmap", which provides recommendations for methodology and timing of the improvements.

FIGURE 3-1
Assessment Approach Process Flow



The area outlined in red in Figure 3-1 presents the general scope of the Project. The remaining two steps in the process include Implementation of those areas of the roadmap that the District may elect to institute, followed by Transition of those process, tool, and staff improvements into District Engineering operations. As outlined further within this document, some implementation (once identified) of Quick Start improvement items was elected for performance concurrent with the assessment.

As with any assessment of this nature, once the project began in earnest, the approach required some adjustment as the priorities and needs of the organization became evident. The adjustments are outlined within the document and deal primarily with process definition. Based on the timeline of the assessment and the information gleaned around existing District processes, some of the detailed process definition is recommended as a future activity in lieu of a focus given to some of the higher-priority items identified during the assessment.

3.1 Overview

3.1.1 Project Goals and Objectives

At the outset of the Project, the District executive management team provided input as to the overall goals, objectives, and desired outcomes. This information helped guide the approach used to perform the assessment. The overarching goal of District management is to ***ensure that the Engineering division has both the appropriate staff capacity and capabilities to efficiently execute both the baseline capital improvements project management workload and the Lower Bois d'Arc Program needs while meeting schedule, cost, and quality***. Some of the objectives desired by District management to achieve this goal include:

- Development and implementation of new processes and tools that will benefit not only Engineering, but ultimately the entire organization, by allowing both internal and external Engineering client's infrastructure delivery needs to be satisfied.
- Improvements to existing processes to achieve additional efficiencies in delivery.
- Alignment of accountability, responsibility, and authority in NTMWD staff roles and responsibilities. This would include input on the delineation of responsibility between Engineering, Operations, and Maintenance.
- Implementation of systems and processes to facilitate information capture and use to improve organizational memory and address the inevitable retirement of knowledgeable staff from the District
- Development of an Engineering staffing plan with the flexibility to scale delivery capacity up and down commensurate with workload
- Creation and use of key performance metrics to monitor and manage project delivery at the District

At assessment completion, the vision set forth by District executive management is that current project delivery processes and communications both inside and outside of Engineering that affect project delivery would be fully characterized. The Project is to provide an opportunity for District Program and Project Managers to implement the changes that they need to operate efficiently and effectively, that are collaboratively identified during the course of the assessment.

3.1.2 Assessment Boundaries

The Engineering Department, by virtue of the capital project delivery services it provides in support of the entire District operation, has engagement or interaction with most of the Departments in the District. Analysis of the processes and tools used in support of the capital project delivery could quickly spill over to other Departments, so discussions were held with Executive Management at the outset of the Project to define the assessment boundaries. As identified, these included:

- The owner (and focus) of the assessment is the Engineering Department
- The assessment should include defining the needs of operation groups served by Engineering so far as they relate to successful project delivery.

- The assessment should include interactions with customer cities if deemed appropriate during the course of the Project.
- Engineering Department interactions with support groups such as finance, human resources, accounting, and information technology should be accounted for.
- An evaluation of approval processes and routing, including document formats and creation approach, should be included.
- The assessment should include recommendations for streamlining of key project delivery decision processes. There is a desire also for robust planning processes that adequately represent appropriate groups.
- Time is of the essence. The assessment, development of roadmap, and subsequent implementation should be expedited. The fiscal year (FY) 2016 budget (due in July) should reflect guidance for expedited changes. Quick-start improvement initiatives should be identified and started early where possible.
- Systems proposed to implement improved processes should be compelling to users (e.g., useful landing pages, software interfaces necessary to perform job, etc.). Information Technology (IT) Department capacity should be developed to implement and maintain desired systems.
- Key metrics proposed should help measure schedule and cost status of projects and programs.
- The assessment should provide guidance on levels of core team staffing for the Lower Bois d'Arc program versus recommended staffing levels for maintaining normal District project delivery.
- An assessment and recommendations for procurement processes related to project delivery (professional services and construction) should be included in the assessment.
- Improvements recommended should represent input from staff blended with best practices
- The assessment should have engagement from the right people at right time and the assessment processes should focus on promoting this approach (e.g., meeting purpose and key issues in agenda that is distributed in advance of meetings).

3.1.3 Assessment Collaboration Teams

Based upon the stated goals, objectives, and boundaries, CH2M proposed to utilize the team structure shown in Figure 3-2.

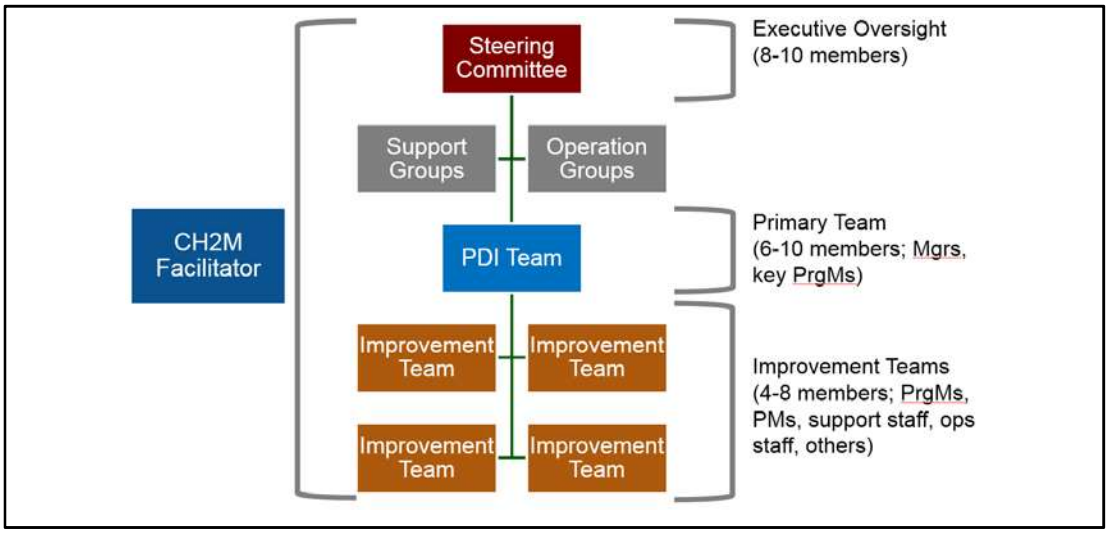
Under this structure, the CH2M facilitator worked closely with members of the Project Delivery Improvement (PDI) Team to conduct the overall assessment activities. The main purpose of the **PDI Team**, which was built primarily of Engineering Department senior management and program managers, was to provide input to the CH2M facilitator in the analysis of the assessment information and in the prioritization of identified improvement areas. The PDI Team also served to vet the improvement recommendations made by the individual Improvement Teams and solidify those recommendations prior to communication to the Steering Committee.

The **Improvement Teams** were comprised of 4-8 individuals that were identified by the PDI Team to work in detail on improvement items identified during the analysis. These individuals were those District staff members who would have effective input at developing collaborative solutions for presentation to the PDI Team; these teams were comprised not just of Engineering Department staff, but other District staff as needed that had key knowledge required for development of an effective improvement solution.

The **Steering Committee** was comprised of District Executive management (Assistant Deputy Directors, Deputy Directors, and the Executive Director). The purpose of the Steering Committee was to provide

overall direction to the findings and progress updates provided by the CH2M facilitator and feedback on the recommendations of the PDI Team.

FIGURE 3-2
Assessment Collaboration Team Structure



To provide for continuous, effective communication amongst the various teams and to ensure that improvements could be identified in a timely manner, weekly meetings were held throughout the assessment between the CH2M facilitator and the PDI Team. In addition, progress and improvement recommendations were communicated in bi-weekly meetings with the Steering Committee. Weekly email updates were provided to the PDI Team and the Steering Committee by the CH2M facilitator as well.

3.2 Staff Interviews

The first major effort in the assessment of existing and desired project delivery processes was to conduct interviews of those Departments within the District that are either part of the project delivery process, are directly affected or served by Engineering, or that interface in some way with Engineering during the project delivery process. The goal of the staff interview portion of the assessment is to receive feedback on the District delivery process as perceived from several staff levels and Departments to lead to a truer picture of the actual functionality of delivery at the District.

While the original intent of the effort had been to interview up to 10 groups of staff, based on feedback received at the project outset and to accelerate the scheduling of the interviews, multiple interviews with single individuals or small groups of staff representative of given departments were scheduled. In all, over 47 District staff were interviewed in over 33 separate interview sessions.

The interviews were conducted by the CH2M facilitation team using a set of standard questions developed to generate meaningful discussion and extraction of information related to project delivery processes and effectiveness. In general, District staff overall appeared to be on board and engaged in the process, although some staff did initially present some concerns as to the intent of the project and whether solutions to the problems identified would be implemented. During the interviews, however, as they were assured of the project goals and intended outcome, District staff were very willing to share information and were candid in responses.

The interview feedback was used to generate the issue listing contained in Section 4.1 of this report, which serves in large part as the basis of the Improvements Roadmap resulting from the overall

assessment. A summary of the staff interview feedback is presented in Appendix A2. The information is presented by general groupings of those staff interviewed as follows:

1. Engineering
   a. Managers
   b. Inspections
   c. Support
2. Executives (Director, Deputy Directors, Assistant Deputy Directors consolidated)
3. Planning
4. Operations (water ops, wastewater ops consolidated)
5. IT
6. Other groups

3.2.1 Data Collection

In addition to the issues listing gleaned from the staff interviews, data on existing processes and tools was collected through the staff interview process. Staff outlined the processes followed for the Administrative Memorandum (Ad Memo) and Board packet development, document management, invoice/pay application process, procurement, and many others. Tools such as those used to track project budgets and to evaluate engineering proposals and templates, such as the shut-down request form, were shared for use in the assessment as well.

3.3 Surveys

One of the tools used to assess the state of project delivery capabilities at the District was a survey developed and given to the Engineering Department staff. The survey provides an anonymous method for evaluating the staff's perceptions of their own and other project manager's management skill sets as well as a method to gauge the perceived importance of various areas of standard project management capabilities (schedule management, cost management, document management) at the District and the District tools to support those capabilities. The results of the survey are used to inform the overall delivery benchmarking assessment and guide the recommendations of the overall improvement roadmap.

The surveys were developed using an online survey tool and then distributed via email to Engineering staff. Two surveys were issued; one survey was a general survey of overall project management at the District, while the other was a PM self-assessment. A summary of results of the two surveys is presented below, while the more detailed survey information is contained in Appendix A1.

3.3.1 Project Delivery Improvement – General Management Survey Results

The general management survey consisted of 31 questions covering multiple project delivery topics. These topics can be generally grouped as follows:

- Project Delivery Tools
- Project Delivery Processes
- Project Delivery Organization and Governance
- Project Performance Metrics
- Career Growth and Development

The questions asked and associated topic categories are covered in Table 3-1.

TABLE 3-1
General Project Delivery Survey Questions
Project Delivery Improvement Assessment and Roadmap

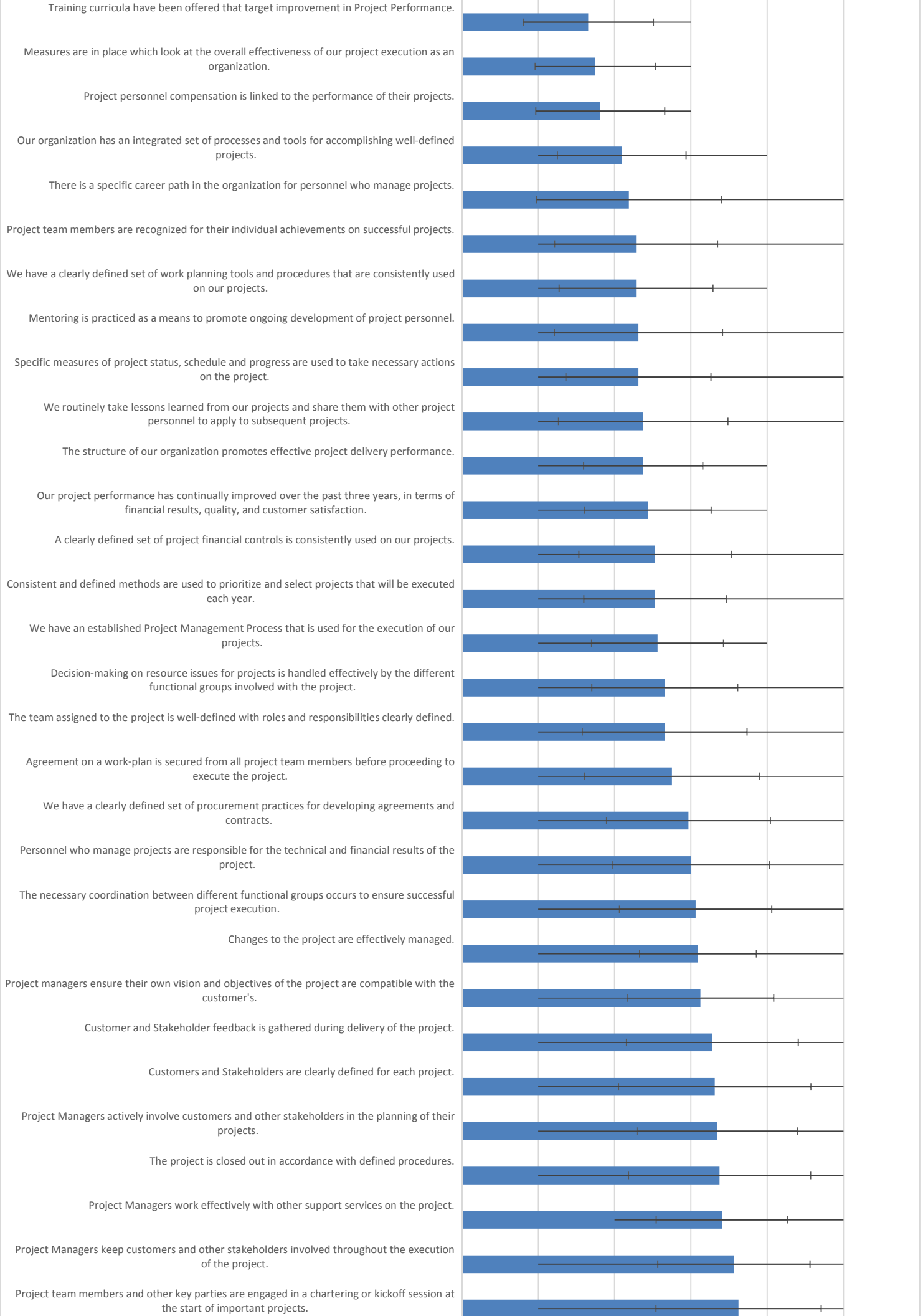
Number	Question	Category
1	Which of the following best describes your job role? (Program Manager, Project Manager, Other)	N/A
2	Project Managers actively involve customers and other stakeholders in the planning of their projects.	Processes
3	Project managers ensure their own vision and objectives of the project are compatible with the customer's.	Processes
4	Project Managers keep customers and other stakeholders involved throughout the execution of the project.	Processes
5	Customer and Stakeholder feedback is gathered during delivery of the project.	Processes
6	Customers and Stakeholders are clearly defined for each project.	Governance
7	We have an established Project Management Process that is used for the execution of our projects.	Processes
8	Project team members and other key parties are engaged in a chartering or kickoff session at the start of important projects.	Processes
9	Agreement on a work-plan is secured from all project team members before proceeding to execute the project.	Processes
10	Changes to the project are effectively managed.	Processes
11	The project is closed out in accordance with defined procedures.	Processes
12	Personnel who manage projects are responsible for the technical and financial results of the project.	Processes
13	There is a specific career path in the organization for personnel who manage projects.	Career Growth and Development
14	Project team members are recognized for their individual achievements on successful projects.	Career Growth and Development
15	Project personnel’s compensation is linked to the performance of their projects.	Career Growth and Development
16	Mentoring is practiced as a means to promote ongoing development of project personnel.	Career Growth and Development
17	We have a clearly defined set of procurement practices for developing agreements and contracts.	Processes
18	We have a clearly defined set of work planning tools and procedures that are consistently used on our projects.	Tools
19	A clearly defined set of project financial controls is consistently used on our projects.	Tools
20	Specific measures of project status, schedule and progress are used to take necessary actions on the project.	Performance Metrics
21	We routinely take lessons learned from our projects and share them with other project personnel to apply to subsequent projects.	Career Growth and Development
22	The necessary coordination between different functional groups occurs to ensure successful project execution.	Processes
23	Decision-making on resource issues for projects is handled effectively by the different functional groups involved with the project.	Governance
24	The structure of our organization promotes effective project delivery performance.	Governance
25	Project Managers work effectively with other support services on the project.	Processes
26	The team assigned to the project is well-defined with roles and responsibilities clearly defined.	Processes
27	Our organization has an integrated set of processes and tools for accomplishing well-defined projects.	Tools

TABLE 3-1
General Project Delivery Survey Questions
Project Delivery Improvement Assessment and Roadmap

Number	Question	Category
28	Consistent and defined methods are used to prioritize and select projects that will be executed each year.	Processes
29	Training curricula have been offered that target improvement in Project Performance.	Career Growth and Development
30	Measures are in place that look at the overall effectiveness of our project execution as an organization.	Performance Metrics
31	Our project performance has continually improved over the past three years, in terms of financial results, quality, and customer satisfaction.	Performance Metrics

Survey responses were recorded on a scale of 1 to 5 for each survey question, with 1 being a low score of “not at all” and 5 representing a high score of “always”. Figure 3-3 shows the results compilation, with responses ranked from the lowest overall score response on the left to the highest ranked responses on the right.

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Training curricula have been offered that target improvement in Project Performance.
Measures are in place which look at the overall effectiveness of our project execution as an organization.
Project personnel compensation is linked to the performance of their projects.
Our organization has an integrated set of processes and tools for accomplishing well-defined projects.
There is a specific career path in the organization for personnel who manage projects.
Project team members are recognized for their individual achievements on successful projects.
We have a clearly defined set of work planning tools and procedures that are consistently used on our projects.
Mentoring is practiced as a means to promote ongoing development of project personnel.
Specific measures of project status, schedule and progress are used to take necessary actions on the project.
We routinely take lessons learned from our projects and share them with other project personnel to apply to subsequent projects.
The structure of our organization promotes effective project delivery performance.
Our project performance has continually improved over the past three years, in terms of financial results, quality, and customer satisfaction.
A clearly defined set of project financial controls is consistently used on our projects.
Consistent and defined methods are used to prioritize and select projects that will be executed each year.
We have an established Project Management Process that is used for the execution of our projects.
Decision-making on resource issues for projects is handled effectively by the different functional groups involved with the project.
The team assigned to the project is well-defined with roles and responsibilities clearly defined.
Agreement on a work-plan is secured from all project team members before proceeding to execute the project.
We have a clearly defined set of procurement practices for developing agreements and contracts.
Personnel who manage projects are responsible for the technical and financial results of the project.
The necessary coordination between different functional groups occurs to ensure successful project execution.
Changes to the project are effectively managed.
Project managers ensure their own vision and objectives of the project are compatible with the customer's.
Customer and Stakeholder feedback is gathered during delivery of the project.
Customers and Stakeholders are clearly defined for each project.
Project Managers actively involve customers and other stakeholders in the planning of their projects.
The project is closed out in accordance with defined procedures.
Project Managers work effectively with other support services on the project.
Project Managers keep customers and other stakeholders involved throughout the execution of the project.
Project team members and other key parties are engaged in a chartering or kickoff session at the start of important projects.

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Table 3-2 presents the results depicted in Figure 3-3 in tabular form, with an indication of the overall category ranking.

TABLE 3-2

Project Delivery Survey Results in Tabular Form

Number	Question	category	Average
29	Training curricula have been offered that target improvement in Project Performance.	Career Growth and Development	1.66
30	Measures are in place that look at the overall effectiveness of our project execution as an organization.	Performance Metrics	1.75
15	Project personnel's compensation is linked to the performance of their projects.	Career Growth and Development	1.81
27	Our organization has an integrated set of processes and tools for accomplishing well-defined projects.	Tools	2.09
13	There is a specific career path in the organization for personnel who manage projects.	Career Growth and Development	2.19
18	We have a clearly defined set of work planning tools and procedures that are consistently used on our projects.	Tools	2.28
14	Project team members are recognized for their individual achievements on successful projects.	Career Growth and Development	2.28
20	Specific measures of project status, schedule and progress are used to take necessary actions on the project.	Performance Metrics	2.31
16	Mentoring is practiced as a means to promote ongoing development of project personnel.	Career Growth and Development	2.31
24	The structure of our organization promotes effective project delivery performance.	Governance	2.38
21	We routinely take lessons learned from our projects and share them with other project personnel to apply to subsequent projects.	Career Growth and Development	2.38
31	Our project performance has continually improved over the past three years, in terms of financial results, quality, and customer satisfaction. Â	Performance Metrics	2.44
28	Consistent and defined methods are used to prioritize and select projects that will be executed each year.	Processes	2.53
19	A clearly defined set of project financial controls is consistently used on our projects.	Tools	2.53
7	We have an established Project Management Process that is used for the execution of our projects.	Processes	2.56
23	Decision-making on resource issues for projects is handled effectively by the different functional groups involved with the project.	Governance	2.66
26	The team assigned to the project is well-defined with roles and responsibilities clearly defined.	Processes	2.66
9	Agreement on a work-plan is secured from all project team members before proceeding to execute the project.	Processes	2.75
17	We have a clearly defined set of procurement practices for developing agreements and contracts.	Processes	2.97
12	Personnel who manage projects are responsible for the technical and financial results of the project.	Processes	3.00
22	The necessary coordination between different functional groups occurs to ensure successful project execution.	Processes	3.06
10	Changes to the project are effectively managed.	Processes	3.09
3	Project managers ensure their own vision and objectives of the project are compatible with the customer's.	Processes	3.13

TABLE 3-2

Project Delivery Survey Results in Tabular Form

Number	Question	category	Average
5	Customer and Stakeholder feedback is gathered during delivery of the project.	Processes	3.28
6	Customers and Stakeholders are clearly defined for each project.	Governance	3.31
2	Project Managers actively involve customers and other stakeholders in the planning of their projects.	Processes	3.34
11	The project is closed out in accordance with defined procedures.	Processes	3.38
25	Project Managers work effectively with other support services on the project.	Processes	3.41
4	Project Managers keep customers and other stakeholders involved throughout the execution of the project.	Processes	3.56
8	Project team members and other key parties are engaged in a chartering or kickoff session at the start of important projects.	Processes	3.63

Some specific conclusions drawn from the survey information include:

1. **Staff consistently ranked those responses related to career growth and development lower than other responses.** Mentoring and training and the internal processes that encourage these practices were noted to be lacking within the Engineering Department. Staff expressed that there was little relation of compensation and career progression to job performance and there was indication of minimal career path definition for project management staff. Some statistics of note include:
    - Over 60% of the staff surveyed scored the availability of career path definition and advancement at the District as a 1 or 2 on the 5 point scale.
    - 87% of staff indicated that there was minimal to no recognition of good job performance or other achievements, although staff do indicate that this has improved some within the last few months.
    - 58% of respondents indicated that mentoring rarely occurs or does not occur at all as a means of project manager knowledge transfer and individual growth. Some comments indicated that mentoring would occur more frequently if staff were less overloaded.
    - 58% of respondents said there was no training at all available to project managers.
2. **Standard, well-defined processes and project management tools were noted by staff to be lacking across the board and improvements to both were noted as being needed and desired by Engineering staff.**
    - 60% noted that there were little to no clearly defined standard project management processes within Engineering. While some checklists exist, application of those checklists is not consistent.
    - 87% of those surveyed noted that there are inconsistent procedures used to identify projects for inclusion in the fiscal year capital improvements plan (CIP). Responses noted that there was some ineffectiveness in the current method of CIP prioritization. Project managers were not indicated to have much involvement in the CIP prioritization and planning process.
    - The project scope development process was noted to need some improvement. 46% of respondents indicated that agreement on a project's contents and work plan was only minimally or not at all obtained prior to project authorization.

- Responses were fairly evenly split in regards to close-out procedures existing and being followed, which may indicate the need for improved communication of existing processes to staff.

3. **Staff indicated there was no concrete linkage of project performance to advancement and no established way to measure project performance.**

   - There was an overall lack of performance accountability noted by survey respondents. 71% of those surveyed indicated that PMs were either "sometimes" or "rarely" responsible for technical and financial performance of their projects and that this was highly variable based on the PM. Comments as to why the lack of accountability ranged from "lack of PM authority to make decisions" to "lack of interest" to "lack of capability".
   - Over 77% of respondents indicated there was little to no measurement of performance results occurring for projects at the District; respondent feedback indicates that this Project is seen as the first step in that direction.
   - Feedback on recent project performance was split. 40% felt that project performance was diminished over the past three years, while 58% noted that there was some improvement. Only 4% of respondents responded with favorable scores.
   - 61% of respondents indicated that progress measures are not used to take specific actions on projects, indicating a lack of standard processes to assist PMs with project statusing and overall management.

4. **Better roles and responsibilities definition both within the Engineering Department and between Engineering and internal customer groups was a recurring note within the staff survey responses.**

   - 42% of respondents indicated a lack of effective decision-making both by lack of apparent "decision owners" within the Engineering Department and sometimes by unilateral decisions made by Executive Management.
   - 51% responded that the District organizational structure did not facilitate effective project management. Comments indicated that the ability to perform work was hampered by apparent micromanagement and lack of accountability standards for PMs.
   - 55% indicated that the roles and responsibilities for delivery of engineering projects (on District project teams) are not clearly defined.

5. **Survey responses were that overall, project managers communicate effectively in regards to their projects throughout the project execution phase.** The majority of those surveyed indicated that project managers ensure that stakeholders are engaged and effectively communicated to throughout the projects, however, respondents also indicated that many stakeholders do not in turn engage appropriately in the projects following that communication.

3.3.2 Project Manager Skills Self-Assessment Results

The second survey distributed to Engineering Department project and program managers was structured so as to provide feedback on each individual's perception of

a. The relevance of a variety of project management skill sets or practices to project delivery at the District and

b. The individual's assessment of their own expertise at that individual skill set or practice.

The survey also contained a section to classify which management duties PMs and program managers at the District spending their time addressing. Results from this survey were used to help identify the

largest gaps between those areas PMs felt were most important with current staff capability to perform those skills. These gaps were used to inform the benchmarking analysis and road map generation.

The survey instrument is depicted in Figure 3-4. The delivery skills assessed were grouped into categories of:

1. Understanding the Organization
2. Self-Management
3. Team Management
4. Interpersonal Skills and Communication
5. Leadership
6. Project Planning and Controls
7. Financial Management
8. Agreement and Contract Management

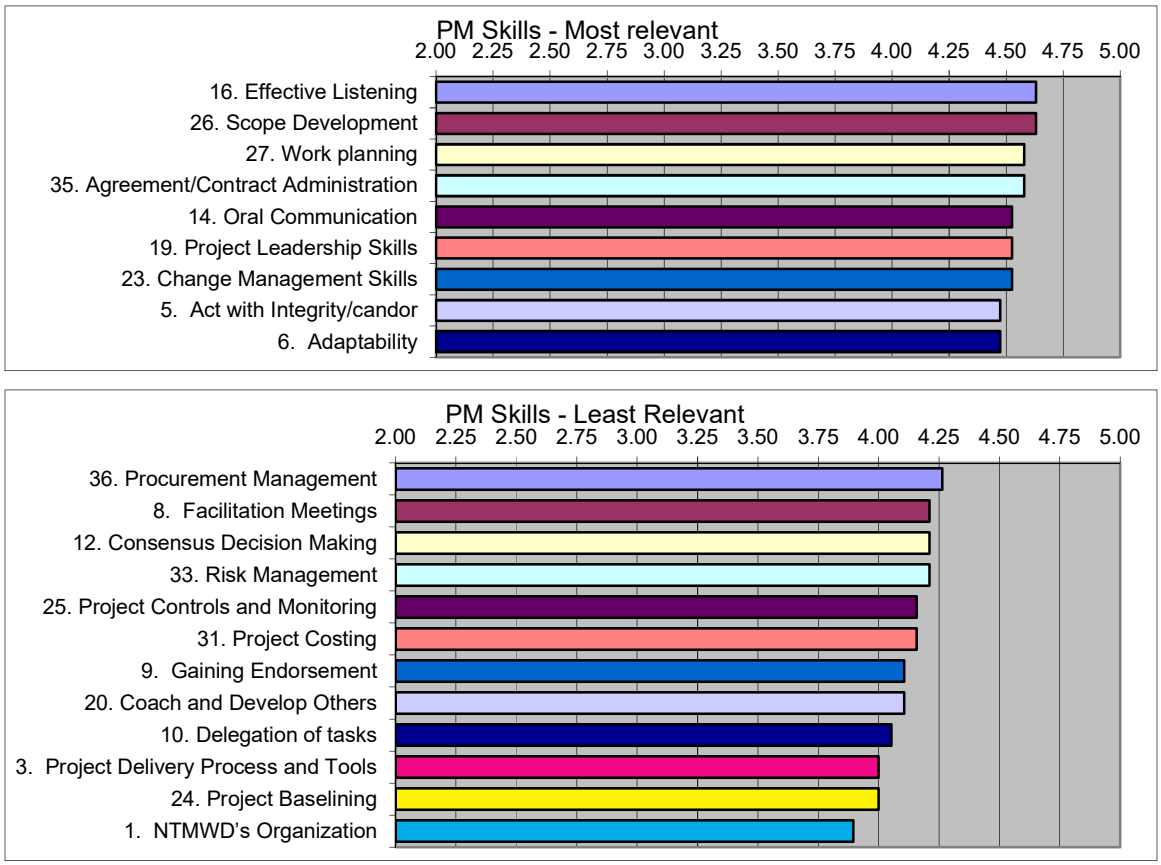
A definition of delivery terms was provided as part of the assessment to facilitate understanding of the terms referenced in the survey. A full copy of the survey instruments in contained in Appendix A1.

FIGURE 3-4
Project Delivery Skills Self-Assessment Tool

NTMWD Project Delivery Skills Self Assessment* *PMs respond to this as a personal assessment. Program Managers respond as an aggregate assessment of their group.*			
Project Delivery Skill/Knowledge	**Relevance**	**Expertise**	
Understanding the Organization	1 2 3 4 5	1 2 3 4 5	
1. NTMWD's Organization			
2. State/Regulations & Policies			
3. Project Delivery Process and Tools			
Self Management	1 2 3 4 5	1 2 3 4 5	
4. Self-Awareness/ Self-Motivation			
5. Act with Integrity/candor			
6. Adaptability			
7. Personal Time Management			
Team Management	1 2 3 4 5	1 2 3 4 5	
8. Facilitation Meetings			
9. Gaining Endorsement			
10. Delegation of tasks			
11. Giving/Receiving Feedback			
12. Consensus Decision Making			
13. Team Building			
Interpersonal Skills and Communications	1 2 3 4 5	1 2 3 4 5	
14. Oral Communication			
15. Written Communication			
16. Effective Listening			
17. Conducting Effective Meetings			
18. Conflict Management			
Leadership	1 2 3 4 5	1 2 3 4 5	
19. Project Leadership Skills			
20. Coach and Develop Others			
21. Developing Customer/Stakeholder relationships			
22. Continuous Improvement/Problem Solving			
23. Change Management Skills			
Project Planning and Controls	1 2 3 4 5	1 2 3 4 5	
24. Project Baselining			
25. Project Controls and Monitoring			
26. Scope Development			
27. Work planning			
28. Project Scheduling			
29. Documentation Management			
Financial Management	1 2 3 4 5	1 2 3 4 5	
30. Budgeting and Planning			
31. Project Costing			
32. Managing Project Financial Information			
33. Risk Management			
Agreement/Contract Management	1 2 3 4 5	1 2 3 4 5	
34. Agreement/Contract Development			
35. Agreement/Contract Administration			
36. Procurement Management			
37. Negotiation skills			
	1 - Not relevant 2 - Somewhat relevant 3 - Moderately relevant 4 - Relevant 5 - Very relevant	1 - No Expertise (Beginner) 2- Very limited Expertise 3 - Some Expertise 4- Significant Expertise 5 - Already an expert	

The survey results were summarized for both the relevance and capabilities aspects of the survey. The relevance results for the skills as ranked by the survey respondents are presented in Figure 3-5 presents a graphical view of most and least relevant skills.

FIGURE 3-5
Survey Results Summary - Relevance



The expertise rankings are presented in Figure 3-6.

FIGURE 3-6
Survey Results Summary - Expertise

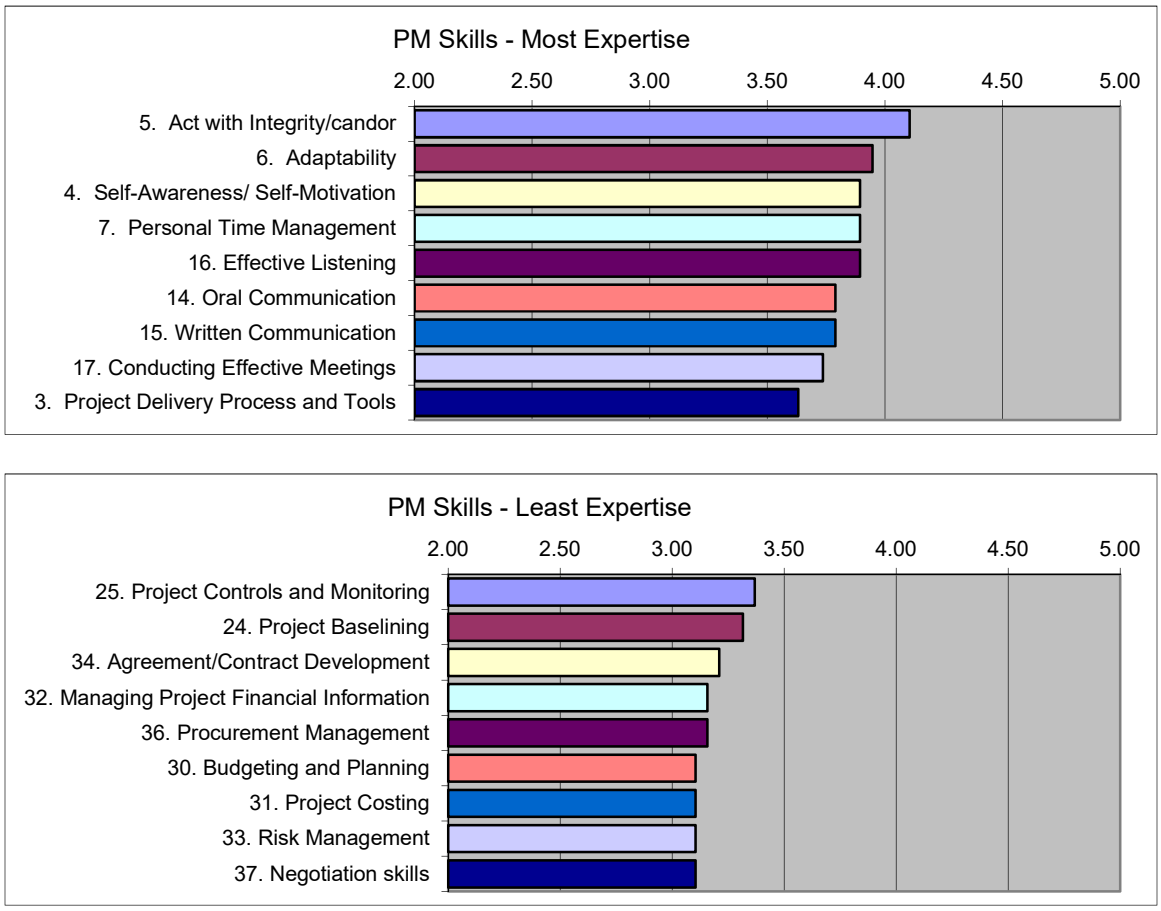


Figure 3-7 highlights the gaps between the survey respondents' perceived relevance of PM skills and knowledge and their perceived expertise or capability for each of those skills.

FIGURE 3-7
Survey Results Summary - Gaps

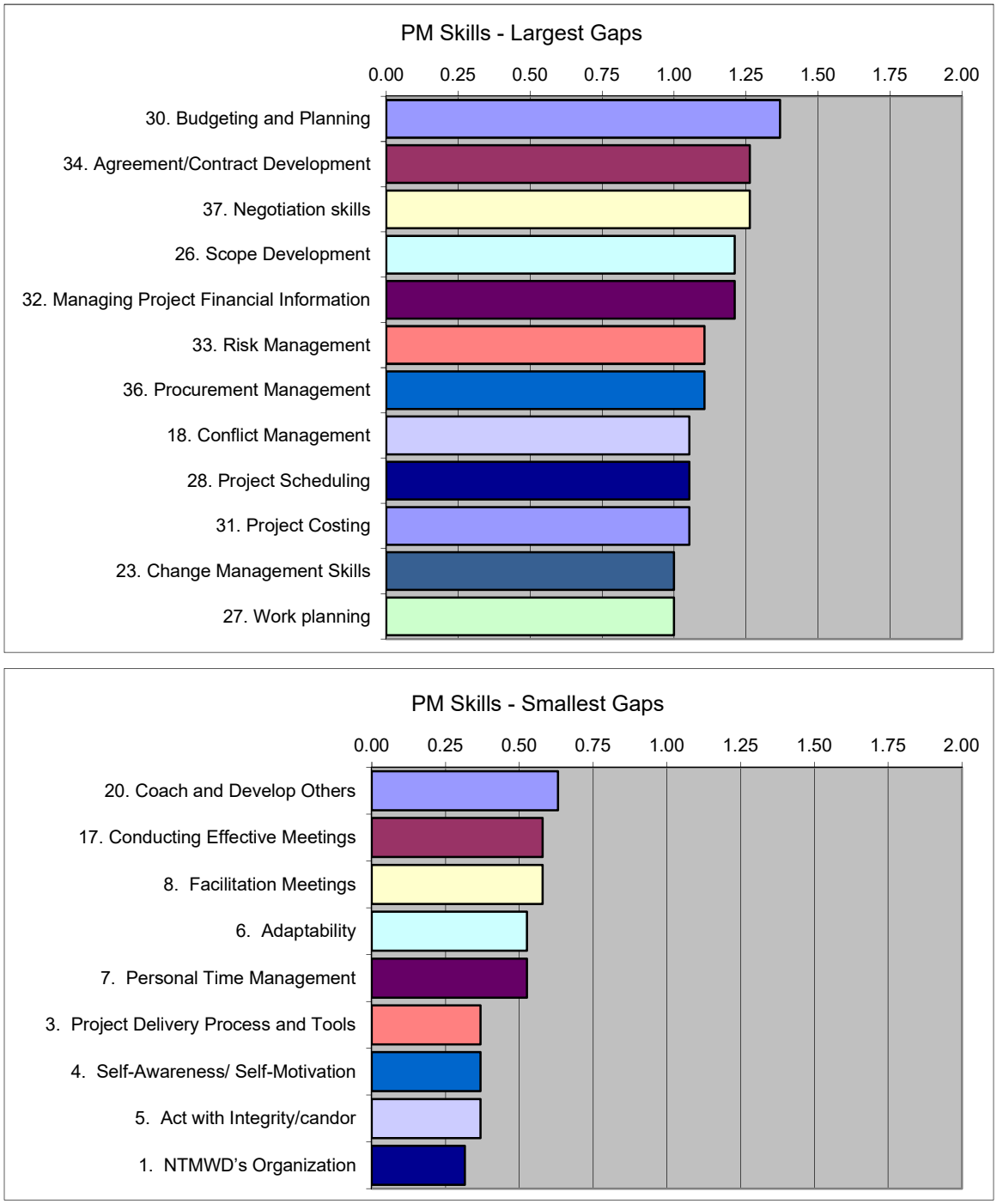


Table 3-3 presents the consolidated survey results for the PM skills assessment. The table is ordered by those skills with the largest average gap between relevance and PM experience.

TABLE 3-3
Consolidated Survey Results

		Average	Average Rel	Average Exp	Average Gap
30	Budgeting and Planning	1.37	4.47	3.11	1.37
34	Agreement/Contract Development	1.26	4.47	3.21	1.26
37	Negotiation skills	1.26	4.37	3.11	1.26
26	Scope Development	1.21	4.63	3.42	1.21
32	Managing Project Financial Information	1.21	4.37	3.16	1.21
33	Risk Management	1.11	4.21	3.11	1.11
36	Procurement Management	1.11	4.26	3.16	1.11
18	Conflict Management	1.05	4.42	3.37	1.05
28	Project Scheduling	1.05	4.47	3.42	1.05
31	Project Costing	1.05	4.16	3.11	1.05
23	Change Management Skills	1.00	4.53	3.53	1.00
27	Work planning	1.00	4.58	3.58	1.00
35	Agreement/Contract Administration	0.95	4.58	3.63	0.95
2	State/Regulations & Policies	0.89	4.37	3.47	0.89
19	Project Leadership Skills	0.89	4.53	3.63	0.89
21	Developing Customer/Stakeholder relationships	0.89	4.37	3.47	0.89
13	Team Building	0.84	4.42	3.58	0.84
22	Continuous Improvement/Problem Solving	0.84	4.37	3.53	0.84
29	Documentation Management	0.84	4.47	3.63	0.84
25	Project Controls and Monitoring	0.79	4.16	3.37	0.79
9	Gaining Endorsement	0.74	4.11	3.37	0.74
11	Giving/Receiving Feedback	0.74	4.37	3.63	0.74
14	Oral Communication	0.74	4.53	3.79	0.74
16	Effective Listening	0.74	4.63	3.89	0.74
10	Delegation of tasks	0.68	4.05	3.37	0.68
15	Written Communication	0.68	4.47	3.79	0.68
24	Project Baselining	0.68	4.00	3.32	0.68
12	Consensus Decision Making	0.63	4.21	3.58	0.63
20	Coach and Develop Others	0.63	4.11	3.47	0.63
17	Conducting Effective Meetings	0.58	4.32	3.74	0.58
8	Facilitation Meetings	0.58	4.21	3.63	0.58
6	Adaptability	0.53	4.47	3.95	0.53
7	Personal Time Management	0.53	4.42	3.89	0.53
3	Project Delivery Process and Tools	0.37	4.00	3.63	0.37
4	Self-Awareness/ Self-Motivation	0.37	4.26	3.89	0.37
5	Act with Integrity/candor	0.37	4.47	4.11	0.37
1	NTMWD's Organization	0.32	3.89	3.58	0.32

It should be noted that the average scores for most of the survey responses were above a score of 4 out of a possible 5, with 5 being "very relevant" to project delivery at NTMWD. For this reason, assessing

the gaps between the relevance rankings and the accompanying expertise rankings provides the most useful information from which to draw conclusions from the survey data.

1. Most of the higher-level gap ranking relate to areas of expertise primarily addressed currently at the District by the Engineering Program Management staff. As indicated in the general survey, training/mentoring is an area of improvement for the Engineering Department; one way to accomplish this is to push some of these responsibilities down to the project management level and promote PM engagement during some of the higher-level program manager discussions and activities surrounding the higher-level gap skill areas. This will be further addressed in the Recommendations section of this report.
2. Many of the higher-level gap rankings relate to areas of project management/delivery execution that can be addressed/facilitated by establishing and consistently applying standard processes and tools. Training to accompany those standard processes and tools will be beneficial to addressing some of the concerns related in the general survey.

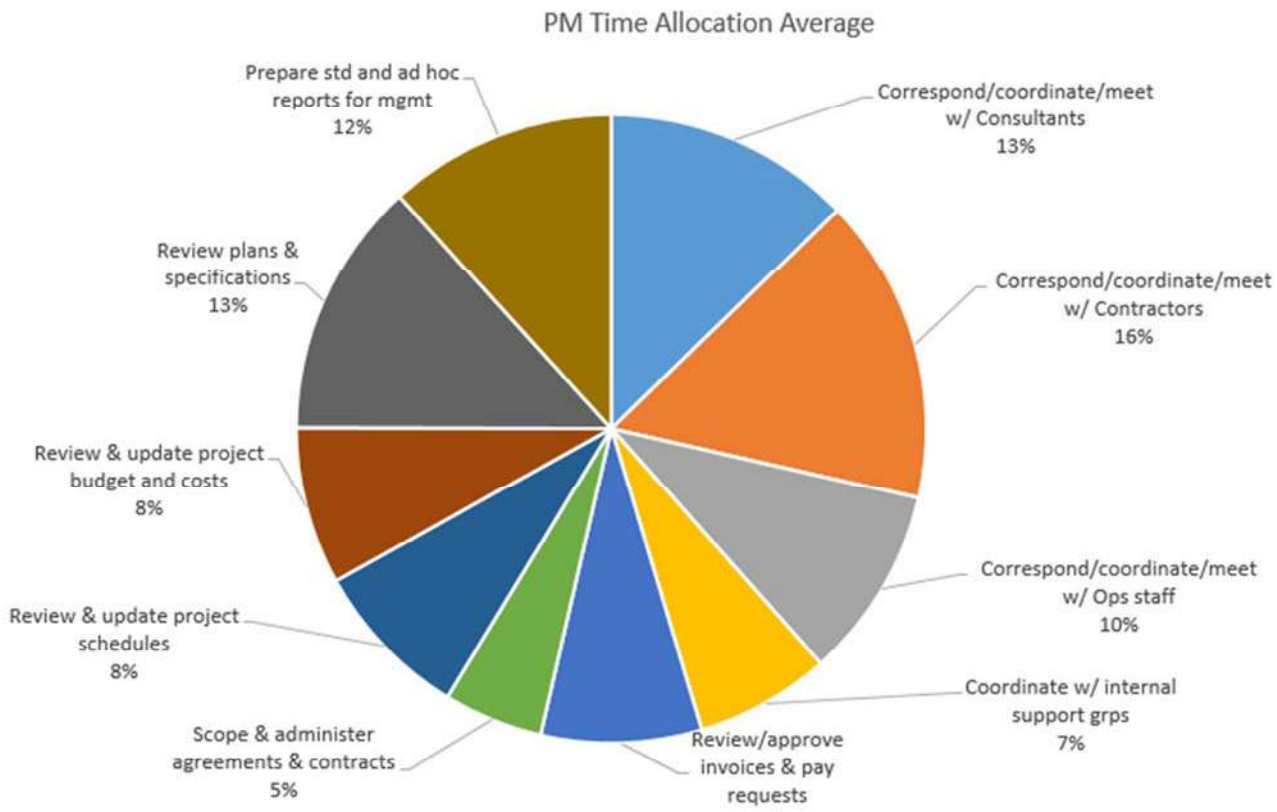
3.3.3 Project Manager Time Allocation

The final portion of the PM skills assessment related to the amount of time project managers spend on various tasks throughout their workday. The goal of this assessment action is to identify any work areas where PMs are either over-allocating or under-allocating their time resources based on industry trends for similar organizations. Figure 3-8 provides a pie-chart summary of the average time resource expenditures by District Engineering Department PM staff.

Approximately 46% of the project manager's time is spent communicating with project stakeholders and support staff. 29% of the project manager's time is spent performing routine management tasks, such as invoicing, statusing, and budgeting, while approximately 13% is spent performing technical roles on their projects. The remaining 12% of the time, PMs are preparing standard and ad-hoc reports for communicating to management.

This overall allocation of time is not uncommon for a project delivery organization and the District balance of activity appears appropriate. However, through conversations with staff, many things are not getting done at the speed or with the efficiency they should, particularly as relates to communication formats, document management practices, and data management to facilitate reporting and overall project management. These are some of the areas of focus that arose during the interviews and that are further detailed in the Issues section of this report.

FIGURE 3-8
Average PM Time Allocation



3.4 Project Delivery Staffing Level Benchmark Analysis

The staffing benchmark analysis used data from twelve similar public sector organizations (cities, counties, districts) nationally that included water and/or wastewater utilities and a project delivery function. District staffing levels, number of projects, and total dollar volume of projects were used in the benchmarking tool. The tool is designed to develop staffing level estimates for project manager and administrative technical staff in project delivery organizations. Figure 3-9 summarizes the basic data used in the model from the twelve public organizations, including data from organizations such as:

- City of Fort Worth, TX
- Northeast Ohio Regional Sewer District, OH
- City of Henderson, NV
- Collier County, FL

FIGURE 3-9.
Project Delivery Benchmark Data

Organization (CMM > 2)	Annual Project Volume (MM) Snapshot	Number of Projects Annually (Snapshot)	Average Project Size (MM)	Number of Project Managers (FTE's) *	Project Dollars per PM (MM)	Project per Project Manager	Number of Support Staff (FTE's)	PM/Support Staff Ratio
COMPARISONS								
Org #1	$235	145	$1.62	19	$12.37	7.63	8	2.38
Org #2	$140	125	$1.12	12	$11.67	10.42	5	2.40
Org #3	$100	150	$0.67	10	$10.00	15.00	8	1.25
Org #4	$185	84	$2.20	20	$9.25	4.20	14	1.43
Org #5	$55	45	$1.22	6	$9.17	7.50	4	1.50
Org #6	$65	75	$0.87	8	$8.13	9.38	10	0.80
Org #7	$125	75	$1.67	16	$7.81	4.69	11	1.45
Org #8	$100	150	$0.67	16	$6.25	9.38	9	1.78
Org #9	$25	30	$0.83	4	$6.25	7.50	3	1.33
Org #10	$141	47	$3.00	20	$7.05	2.35	12	1.67
Org #11	$200	67	$2.99	21	$9.52	3.19	14	1.50
Org #12	$33	31	$1.06	7	$4.71	4.43	9	0.78
AVERAGE	**$117**	**85.3**	**1.37**	**13.3**	**$8.83**	**7.1**	**8.9**	**1.52**
MIN	**$25**	**30**	**$0.67**	**4**	**$4.71**	**2.35**	**3**	**0.80**
MAX	**$235**	**150**	**$3.00**	**21**	**$12.37**	**15.00**	**14**	**2.40**

* Owner project managers

The NTMWD project data used to populate the model was based on the March 2015 "Incode Report" from Accounting and the Engineering Project List from February 25, 2015 prepared by the Department of Engineering. The combined information was used to prepare a summary of all projects that currently had started (i.e. had a project number assigned) and were in progress, including projects in the engineering phase or construction phase.

3.5 Information Systems Assessment

The District does not currently have an Enterprise Information System designed specifically to support program/project controls or delivery. This presents a unique opportunity to select and configure a leading-edge system designed to standardize processes, improve communication, and summarize project data. However, implementation of a Program Management System requires users to change their current ways of managing projects, diligently learn new processes and maintain quality data. The primary goal of an Information System implementation should be to deliver more efficient projects and transparent status information.

Industry Standards. In Municipal Water/Wastewater Industries there are a wide-range of project delivery standards and associated management processes. In a July 2013 ASCE technical paper "Municipal Water/Wastewater Project Delivery Performance Comparison"[1], a survey of water/wastewater facility owners was performed with data collected on 31 design-build projects and 69 design-bid-build projects. Analysis of the data determined that schedule delays for design-build projects were half that of design-bid-build projects. It also showed that more design-build projects finished at or under budget; and both project delivery methods produced projects of comparable quality. Although the study focused on delivery methods, the fact that industry standards are rapidly changing can't be overlooked. Regardless of industry standards of today, in the future greater and more flexible

1 http://ascelibrary.org/doi/10.1061/%28ASCE%29ME.1943-5479.0000139

collaboration will be required to align interests for more effective project execution. Next-generation project management tools and technologies are a critical part of the solution. Features such as intuitive, flexible, user-configurable, web and mobile enablement are essential as projects become more complex and uncertain.

Existing Information Systems Assessment. The District provides all Project Managers and their team members with computers (desktops, laptops, mobile tools) and software (Microsoft office, outlook email etc.) to meet their daily communication needs. Several of the staff have designed their own processes and tools to manage projects and provide executives with reports and status. Engineering is leveraging these tools (spreadsheets, templates, reports, etc.) to move their department toward standardization on shared resources. While not uncommon, managing projects with spreadsheets can be error prone. Spreadsheets do not have the error checking features that most packaged software solutions do. It is easy to make errors in entering or copying data that go unnoticed for a considerable period of time. According to some studies, as many as 80 percent of the moderately complex spreadsheets contain at least one error. In other words, four out of five moderately complex spreadsheets give incorrect results.

Document Management. Document collaboration and tracking is a significant area of responsibility for Project Delivery. Each District Project Manager establishes a filing system for active projects on a common filing system, the “Shares” drive. The number and organization of folders are largely driven by the preferences of Project Managers and their teams. District-wide naming conventions are not currently used on the Shares. File search down to “content” level is enabled on the Shares but many documents are in non-searchable .pdf format. Without a common organizational structure, broader searches will be required and as the file systems grow, search responsiveness will degrade and potentially impact other users.

Project Communications are primarily through email without standard tracking or filing. To: and CC: are elective by Project Manager and contractor/ consultant. Creating a clear communication thread of exchanges, comments and document versions can be challenging. Searching all emails and versions of attachments can be problematic.

Records Management. The District has a robust Enterprise Records Management System, LaserFiche. All externally submitted or received documents are District records and must be first scanned and filed by Records or Project Administrators. Documents received in electronic format are also stored in LaserFiche, though they are frequently duplicated on the “shares” drive for project use. As an Enterprise-class records management system, LaserFiche is architected to efficiently perform full text key word searches to locate documents without impacting system performance.

Schedule Management. The District does not currently have a master or program level schedule. A summary level schedule of major milestones across all projects can be a useful tool for resource coordination such as shut-down planning. Executive management does not have schedule performance metrics to identify delay risks during early project planning and execution. Project Managers in the Engineering department work closely with contractors to manage project schedule and issues. Typically schedules are provided and maintained by contractors while Project Managers track project status with spreadsheets.

Contract Management. The District has contract templates and standards. There is a manual approval process for any required variances to the standard contract. Contracts are recorded in LaserFiche and typically Project Managers keep a copy on their “Shares” drive. Change orders executed against these contracts are approved with manual workflows which are tracked by both Finance and Project Managers in spreadsheets. The relationships between Requests for Information (RFIs) and resulting change requests or change directives, change orders and board approval documents need to be tracked manually by Project Managers.

Budget and Cost Management. Project Managers track their project budgets, commitments and costs in spreadsheets. Finance operates Incode, the Financial Management system, that is the District's "system of record" for project budget and cost data. Reports are created from Incode that Project Managers can reconcile their records against.

Project Planning and Estimating. Project planning and estimating are currently supported with spreadsheets. Dynamic analysis of various scenarios is not available to planning teams. Estimating is supported with spreadsheets and industry reports. Job Cost reports from previous work are not readily available to estimators.

4.0 Findings

The Department of Engineering is a service organization, delivering projects that will be owned and operated by the District Operations staff. In general, staff at the District believe that project delivery staff in Engineering are technically sound, work hard, and are committed to the District's success. However there are always areas for improvement, and staff both internal and external to Engineering identified a number of issues that need improvement to increase project delivery quality and capacity. Common themes included the need for automation of manual and paper intensive processes, clarification of roles and responsibilities between departments, shortfalls in staffing levels, more effective and efficient communications, alignment of responsibility-accountability-authority, and better tools for managing projects, among others.

4.1 Observations Identified

Based on the assessment components (interviews, surveys, benchmarking, and evaluations) the key findings were synthesized into key observations by CH2M, and reviewed and discussed with the PDI Team. The information gleaned from the surveys and interviews was analyzed to identify potential areas of improvement to the District's project delivery organization and processes. These areas of improvement, or "observations", were summarized and presented to the Project Delivery Improvement team for further consideration and discussion. Improvements areas identified generally fell within seven observed categories:

- Communications
- Construction Processes
- Contract Management Process
- Delivery Process
- Document Management
- Governance
- Staffing

Table 4-1 presents the observations identified. These are organized by category noted above, with comments received or observations noted through conversations with District staff also presented to further outline the observations.

TABLE 4-1

Observations Identified

Observation	Category	Comment Summary
Meeting Management	Communications	Too many meetings are occurring right now with right people often not engaged/invited and wrong people in attendance. This adds to the staff workload with sometimes minimal perceived benefit. Meeting desired outcomes are often not clearly defined in the meeting invite, so staff can assess the appropriate individuals that should attend. Inviting everyone to every meeting is not the best use of District resources.
Emails	Communications	Too many important communications occurring via mass email instead of face-to face discussions.
Meeting Management	Communications	PMs often do not coordinate when inviting Operations to meetings; Operations staff members are often triple-booked to meetings.

TABLE 4-1

Observations Identified

Observation	Category	Comment Summary
Shut-down Process	Communications	PMs sometimes lack proactive communication with both Operations and Inspections staff on upcoming shut-downs. Improved communications would allow for better coordination of field activities on jobs.
Interface - PM/Inspector	Communications	Lack of timely PM response to inspectors on field issues often has adverse cost/schedule impacts in the field. More PM presence in the field would improve understanding and engagement on construction projects. PMs should copy inspectors on communications with contractors as well and ensure inspectors get submittal information in a timely fashion.
Interface - PM/Finance	Communications	PMs struggle to return monthly reports back to finance in a timely manner. This is partly caused by workload, partly caused by report organization by project number rather than assigned PM or PrgM (Program Manager), and partly due to training or lack of understanding of the importance of the effort. Finance needs to expedite the upgrade of Incode to allow more appropriate reporting for PMs, and PrgMs need to follow up and ensure that PMs respond to Finance. Also PMs need assistance either internally in Engineering or within Finance to follow-through on checking insurability and timeframes of certificates. Also, there is a need for project closures to happen more quickly.
Interface - Engineering/Ops	Communications	There is a need for better overall interdepartmental coordination and communication. Maintenance should be included in meetings and Operations should be more involved in construction, startup, and commissioning. It was noted that Operations should be more engaged in plan reviews. This is hampered by staffing levels in all of these organizations.
Interface - Planning/Finance	Communications	Process needed to reduce quick changes in CIP for large dollar amounts that create issues for Finance. It was noted that perhaps more proactive upfront engagement of planning/engineering functioning together could facilitate this (2-4 years ahead instead of last-minute changes in CIP). Having cost information for projects readily available would facilitate this communication interface, as would better schedule and planning tools.
Mobile Document Access	Communications	Having the capability to access as-builts, project documents such as specs/drawings/submittals/RFIs remotely would greatly facilitate project delivery. iPads for Board staff were noted as having been tremendously helpful already to admin staff.
Meeting Management - Minutes	Communications	Operations noted a need to see minutes from meetings to facilitate communications when Operations can't be present.
Interface - PM/IT	Communications	It was noted that IT should be routinely brought in on projects for coordinating instrumentation needs.
Interface - PM/Internal Audiences	Communications	Need better overall communication both within and out of Engineering. It was noted that there needs to be more of a culture of communication within Engineering to let others know what is going on, what is coming up, key issues, etc.
Equipment Selection/Deliveries	Construction Process	Equipment selections for Owner-selected equipment can sometimes lead to delays on projects.
Standard Specifications/ Details - Equipment and Installs	Construction Process	Standard details and specifications for District-preferred equipment and installations would be beneficial to inspections staff and Operations staff. It was noted standards would ensure that NTMWD gets a product that meets needs and is cost-effective to operate.
O&M Manuals	Construction Process	It was noted that there is a need for more thorough and timelier O&M manual submittals. Often delayed and not thorough enough to meet the needs of Operations.

TABLE 4-1

Observations Identified

Observation	Category	Comment Summary
Change Orders - Decision Process	Construction Process	Operations needs to be included on the change order process during construction to weigh in on proposed changes to facilities.
Standard Specifications - Compliance Specifications	Construction Process	There was a noted need standard environmental specification and approaches for insertion in contract documents. Including standard safety specification language and requirements in contract documents would encourage a culture of safety and environmental compliance.
Engineering Selection Process	Contract Management	Consultants with poor performance records are sometimes chosen for repeat work or to perform work for which they are ill-suited.
Contract Management	Contract Management	It was noted that PMs and inspectors need to hold contractors to the approved schedule and to the specifications. Not adhering to the approved schedule and specifications creates issues for Operations further down the line.
ESAs and Services During Construction	Contract Management	Several parts of the District organization noted a problem with the level and quality of services during construction (SDC) from design consultants. Complaints typically included lack of responsiveness, inadequacy of SDC budgets, and the difficulty of adequately budgeting for the construction phase before design has even started.
Ad Memo Development Process	Delivery Process	The detailed ad memo development process (Deputy Director to Engineering Manager back and forth/Engineering Manager/PM back and forth) creates elevated workload given the number of ad memos required each month for the Board.
Change Orders - Authorization Process	Delivery Process	There is a noted lack of flexibility surrounding change order management and authorization (what goes to Board for approval, levels of approval).
Scoping	Delivery Process	It was noted that there is a need to get the right people engaged early on in the scoping process. The PM should be included in the scope development as well as Operations, Maintenance, Compliance and IT instrumentation staff to promote engagement and ensure that the scope meets District needs.
Shut-down Process - Approvals	Delivery Process	Noted need to tie approvals to risk levels and streamline the approval process.
Scoping - Scope Development	Delivery Process	At the time scopes are developed, concepts are often not completely defined but no intermediate concept definition step is included in the scoping process. This can create rework, inefficiencies, cost overruns, and project delays.
Scoping - Project Funding	Delivery Process	Funding is set in place before the scope is well-defined.
Standard Project Delivery Processes	Delivery Process	Although there are some processes in place for close out and project delivery, there is an overall lack of standard project delivery processes and the ones in place were noted too often not be best practice or sufficient in scale.

TABLE 4-1

Observations Identified

Observation	Category	Comment Summary
Project Data Management	Delivery Process	There is no central project data management system. Data is scattered throughout multiple systems (Shares folders, finance, LaserFiche). This creates inefficiencies and bottlenecks to getting work done. Inspections and management often have to chase down PMs to get answers. There is a noted need for the ability to track projects financially and track schedules.
Scoping - Project Definition	Delivery Process	There was a noted need to revisit/monitor the District's CIP to ensure projects on the list are still needed if they were added to the list several years back. CIP projects should be selected during study periods based on a full consideration of life-cycle costs and not just capital costs.
Decision Making Process - Documentation	Delivery Process	Decisions are not adequately logged/tracked. Can create confusion, rework, and cost overruns.
Schedule Management	Delivery Process	Projects are not managed by schedule. This is particularly evident during construction. There is a need to have schedule management processes and overall schedule coordination for shut-downs.
Project Funding	Delivery Process	Operations projects are done by purchase order; there is no standard project number so hard to track by Accounting. Funding by multiple different wastewater systems creates difficulties in managing funds and lack of flexibility in funding projects.
Reporting	Delivery Process	There is a need for better reporting capabilities and dashboards to facilitate schedule management/shut-down coordination, understanding of project status and tracking of funding mechanisms.
Project Cost Tracking	Delivery Process	Inspector time is charged to projects; engineer time is not. Tracking engineer time in an organization like the District has distinct pros and cons, and should not be done without considerable planning and discussion.
Maintenance	Delivery Process	It was noted that there is an overall apparent lack of preventive maintenance and that maintenance seems to be more reactive. This can void warranties and create difficulties for Operations.
Inspections	Delivery Process	It was noted that there is a need for more standards on materials inspection processes. Staff noted there have been high rates of failure on piping/equipment at NTMWD as compared to similar utilities and much of this may go back to standard inspection processes and standard specifications.
Purchasing Guidelines	Delivery Process	Purchasing is an issue, consistency in purchasing and tracking insurance requirements and certificates would greatly benefit project delivery. Should consider changing purchasing guidelines to improve efficiencies.
Standard Operating Procedures (SOP) Development	Delivery Process	One issue noted was the need for thorough SOP development by Engineering prior to turn-over of process to Operations/Maintenance.
Ad memo Routing Process	Document Management	Use of manual routing processes for ad memo distribution and recording of each step back to LaserFiche is creating inefficiencies for all staff in District project delivery organization

TABLE 4-1

Observations Identified

Observation	Category	Comment Summary
Paper Routing for Approvals	Document Management	Use of manual routing processes for any document requiring review/approval by multiple parties is cumbersome and creates additional work for administrative staff. Current process of uploading documentation to LaserFiche also is creating additional work.
Shut-down Process	Document Management	Manual routing process for shut-down form creates inefficiencies due to lost paper/slowness of manual process.
File Management	Document Management	Shares files give PMs flexibility, but lack of standardization creates difficulty in finding documents during project execution. Standard naming conventions would also be beneficial. Standard document delivery methodologies/requirements of contractors/consultants would be desirable. Some also noted that it was hard to find documentation in LaserFiche, while others found it easy to navigate.
Standard Forms and Templates	Document Management	Standard templates/forms would be beneficial. Right now, there are minimal standards. There is a form for daily inspection reports.
As-built Distribution	Document Management	PMs need to ensure as-builts are distributed to Operations/Maintenance or at least communicated where they are stored and when they are complete.
Decision Making Process - Authority	Governance	It was noted there is a need to streamline decision-making processes and push responsibility for decisions down within the Engineering department and other areas of the District that affect project delivery. All decisions being made at highest levels of organization can create delays. Staff would like to be trusted to make decisions.
Roles and Responsibilities Definition	Governance	There is a general lack of clarity on roles/responsibilities throughout the delivery organization. Items noted specifically were definitions of roles/responsibilities between Program Manager and Project Managers, and then Project Managers and inspections staff. Outlining clear divisions of authority could increase effectiveness. Examples of suggestions from staff: 1) Planning Division is currently handling a variety of tasks not related to Planning which hampers ability to increase effectiveness in CIP management. 2) It is not necessary to have a PM (professional engineer) to do all project work. Many current aspects of the role could move to an engineering technician/junior engineer position that could lead to upward promotion into PM career path.
Career Progression	Governance	In general within the District, to move upward, you have to be a manager. More career paths leading upward in the organization would benefit organizational functionality and retention.
Culture of Empowerment	Governance	There is a need to get PMs in the mindset that it is acceptable for them to make decisions. One idea raised is to have contingency allowances set aside for PMs to address construction issues more cost-effectively and in a timelier manner. There has been some recent progress in this regard by increasing CO authority. The District is considering developing contingency allowances in the budgets to allow PMs to authorize small contract changes without going to the Board. These authorizations could be informed by consultant evaluations.
PM Performance	Staffing	Staff noted that there is a high level of performance variation amongst PMs with many being high performing, some being low performing and with little in the way of performance guidelines/reviews. This past year was the first performance review to date. Some key performance issues noted were as follows: responsiveness, taking ownership of project, staying on top of action items/prioritization of work, relationship building within organization, understanding role of engineering as support function

TABLE 4-1

Observations Identified

Observation	Category	Comment Summary
		to Operations, a commitment to get best value for NTMWD, and adherence to quality in work products/processes.
PM Succession Planning/Growth	Staffing	There are many PMs with a high level of institutional knowledge. However, translating this knowledge down to younger PMs for succession planning is an issue.
Engineering Staffing Levels	Staffing	The current level of staffing (understaffed) leads to reactionary management. Upper managers cannot focus on strategic items for the department and PMs can't be forward-thinking.
Training	Staffing	There is little to no formal training for PMs currently in place. With PMs aligned to one operating division for project execution, little opportunity for cross training exists within the Engineering Division. Staff noted it would be beneficial to have budgets for training, authorization for engineers to get management training, and budget to attend more trade shows and fund additional trade organization participation.
PM Role	Staffing	PMs are not engaged enough from a technical standpoint on projects and are mostly pushing paper. Feedback from some staff was that they would like to see this changed. Others noted that in-house performance of work in the past had created challenges/inefficiencies.
Job Flexibility	Staffing	The current culture is that the job of Engineering staff is 8 to 5 and there is minimal support of projects being done outside that window. To get the job done, in some instances this is not realistic. This lack of perceived flexibility to “get the job done” does not foster an attitude of ownership/engagement within many Engineering staff. Some staff members perceive that the focus seems to be on micro-managing PM time in the office and less on actual productivity of the PM. More focus on accountability/job effectiveness instead of “time at your desk” would create culture change.
PM Assignment	Staffing	PMs are often staffed on multiple projects that are physically separated across the District service area. This creates difficulties in effectiveness due to time spent travelling between sites.
GIS Department Staffing	Staffing	GIS staffing levels were noted to be a bottleneck. The GIS systems themselves were noted as not being very accurate. Some elements of GIS have not been updated in past few years with as-built information.
Safety Training	Staffing	There was noted to be a need for standard safety training for PMs/staff.
Maintenance	Staffing	There is only one manager so this department appears understaffed for decision-making and participation in meetings and reviews.

4.2 Issues Prioritized

Each of the observations described above are pertinent ones that if addressed, can increase delivery effectiveness at the District. However, implementing change can often be a lengthy process and there are many issues that if addressed, can have a greater impact than others on increasing effectiveness. Therefore, it is necessary to prioritize the issues to identify those that have the greatest opportunity to

improve delivery schedule, quality, and cost or that could address immediate "pain points" within Engineering.

To simplify the prioritization process, the multiple observations above were summarized into key overall issues. The issues were presented to the PDI team for prioritization. Table 4-2 presents the issues as prioritized by the PDI team. Issues were categorized by "Complexity", "Duration", and "Urgency" to facilitate the prioritization contained within the implementation roadmap, with the lower complexity, shorter duration, and most urgent being classified as "1", ranging to the higher complexity, longer duration, and least urgent being classified as "3". In general, those items identified with high urgency, low duration, low complexity should be addressed more readily than those with low urgency, high complexity, and high duration.

TABLE 4-2

Prioritized Issues

Rank	Issue	Complexity	Duration	Urgency	Implementation	Notes
1 QS	Ad Memo Process (Engineering Items)	1	2	3	Implementation Team	Excessive effort and schedule constraints for development and approvals, manual processes.
2 QS	Document Management Systems For Projects	3	2	3	Implementation Team	Inefficient development, sharing, storage, and archiving of documents. Particular issues with engineering plans and specifications.
3 QS	Plant And System Shutdown Processes	2	2	3	Implementation Team	Need efficient scheduling, routing, and consistency in development and approvals.
4	CIP Planning Process	2	1	3	Implementation Team	Needs early Ops/Maintenance involvement and visibility into early scheduling and cost estimates. Need process that doesn't require an executive at every meeting to make progress.
5	PM & PD Support Staffing Levels	1	3	3	Engineering Management	Staffing level benchmarking shows significant understaffing in number of PMs and Admin Techs.
6	Define Project Delivery Roles & Responsibilities	1	2	3	Implementation Team	Clarify roles, responsibilities, and accountability on projects within and beyond Engr Dept.
7	Project Controls & Systems	3	3	2	PDI Consultant or other	Need a strategy for multiple existing and proposed systems to meet requirements, including some level of workflow automation.
8	Defining Guidelines For Funding Sources	1	1	2	Implementation Team	Need to delineate and document guidance/norms for what will be funded via CIP, and what will be funded by operations budgets. Also need something to help PMs differentiate scope creep related to Ops requests from a legitimate CIP effort.

TABLE 4-2

Prioritized Issues

Rank	Issue	Complexity	Duration	Urgency	Implementation	Notes
9	Purchasing Process Standardization and/or Centralization	3	3	2	Executive Management	Primary needs are for consistency, support for PMs in insurance checking and tracking and negotiations of terms.
10	District Standard Details & Specs	3	3	2	Engineering Management	Need standardization of typical District details and specs to provide consistency for appropriate common items, better quality for Ops, and more effective inspection by Engr.
11	Setting Consultant Scope & Fee	2	2	2	PDI Consultant or other	Need less reliance on curves for pricing, typical scope has inadequate SDC budget for rapid responses to construction needs, information on construction schedule duration and timing is uncertain at scoping of design phase. Negotiation tools and training needed.
12	Setting & Training PD Processes & Best Practices	2	2	2	PDI Consultant or other	Needs Include meeting protocol and attendance, meeting agendas, meeting facilitation, meeting summaries focused on decisions & action items, schedule review & management, WBS creation, checklist tools, time prioritization, etc.
13	Performance Reviews For Consultants & Contractors	2	2	2	PDI Consultant or other	Develop templates and guidance for use in consultant and contractor performance reviews.
14	CM Staffing Decision Matrix	2	2	2	Engineering Management	Guidance on when internal v. external CM/inspectors might be used. As schedules change, this can become a challenge to appropriately staff and address changes.
15	Process/System For Engineering Time Sheets & Inspector Comp Time	2	2	2	Engineering Management & Finance	The current time sheet process for engineering is very difficult and time consuming, requiring several days of an engineer's time to compile and refine for the system. Consider needs of engineering time sheets in upcoming time system upgrade.
16	PM Role In Consultant Selection	1	1	2	Engineering Management	Most PMs are not involved in consultant selection, which is not optimal since they are owner and responsible leader of the proposed project.

TABLE 4-2

Prioritized Issues

Rank	Issue	Complexity	Duration	Urgency	Implementation	Notes
17	PM Input To Inspector Assignments	2	1	2	Engineering Management	Ideally assignment of inspectors would consider both PM input and balancing workload of inspection group.
18	Upgraded Hardware For PMs (Computers, Printers)	1	3	3	IT	IT will need to plan for greater potential for electronic dependence in office and field which would affect hardware needs.

The top three issues identified in Table 4-2 were noted by the PDI Team as so important to addressing District "pain points" that immediate improvement efforts were warranted. These issues became the "quick-start" items to be further addressed through this project and by the Quick Start Improvement teams as outlined below. The remaining issues are discussed in the Implementation Roadmap.

4.3 Staffing Level Benchmark Results

The results of the analysis, assuming about 9 projects per PM and the District's size distribution of projects, showed a shortfall in both PMs and Admin Techs (includes project controls specialists, document controls specialists, and other high end technical administrative support).

- 8 PM shortfall (25 FTE positions needed versus 17 currently approved)
- 13 Admin Tech shortfall (17 FTE positions needed versus 4 currently approved)

Note that the results include only Lower Bois d'Arc Program activities that had started and were assigned project numbers by March 2015. The staffing tool was provided to the Department of Engineering for use in staffing analysis as additional projects start or are planned.

FIGURE 4-1
Staffing Level Benchmark Results

Dept	Work Stream	# of projects (Snapshot)	Project Dollar Volume (Snapshot)	Average Project Size	# of PMs (no adjustment for avg. project size) *	# of PMs Needed (adjustment for avg. project size) *	Current PM FTE	Gap
WW	1	38	$251,000,000	$6,605,263	4.22	8	5.5	(2.50)
WTTR	2	27	$348,000,000	$12,888,889	3.00	6	5.5	(0.50)
WTCO	3	42	$733,000,000	$17,452,381	4.67	10	5.5	(4.50)
SW	4	5	$16,000,000	$3,200,000	0.56	1	1	0.00
	5				0.00			
	6				0.00			
	7				0.00			
	8				0.00			
	9				0.00			
	10				0.00			
	11				0.00			
	12				0.00			
		112	$1,348,000,000	$12,035,714	12.44	25	17.50	(7.50)
Target # of Projects per PM =		9		FTE Support Needed Using Industry Avg ratio of 1.5		16.7		

4.4 Information Systems Needs

NTMWD Engineering Project Managers and Executives need an integrated software toolset or "Project Management System" that provides a central repository of key project information for management of contracts, cost, schedule, correspondence, workflow, reporting and documentation.

Project Managers need tools that track performance indicators and alert them to risks and conflicts early on in the project lifecycle when corrections can be made more easily. District executives need tools that can provide status reports and dashboards to indicate program and project health so they can better support project management and report to the Board and public. Both Project Managers and Executives need tools that support the ability to forecast project needs in order to manage change and plan for the future.

The System should contain tools for the following key functions:

- ***Contract Management*** – used to track contractual deliverables and obligations; cost and schedule performance and manage changes and change requests.
- ***Project Document Collaboration*** - used to track collaboration on a wide array of files that can include correspondence, specifications, drawings, maps, models, etc. The system tracks timing, edits, editors, versions and attachments for project submittals, clarifications, requests for information and change orders.
- ***Workflow Management*** - used for control of specific, repetitive or collaborative, time-consuming process (e.g., budget change) within the software so work follows a prescribed and automated path and is tracked throughout.

- ***Cost Management*** – to replace excel spreadsheets by providing task level cost tracking and allows for standardized input of budget, cost, commitment type data and automated tracking of changes to that data.
- ***Schedule Management*** – to not only track project task completion but to support cost, change and risk management with forward-looking project details. Also used to support planning and cross-project resource management.
- ***Report and Dashboard Engine*** – software tools that allow stakeholders to visualize and analyze data stored in the system, and enable informed decision making.
- ***Project Planning*** – used for project prioritization and timing as well as cash flow analysis and tracking of funding across a project portfolio.
- ***Integration Interfaces*** – connectivity enablement such as Application Interfaces (APIs and web services) that enable software to exchange data without manual intervention. Interfaces enable usage of mobile devices and extend selected data to websites in order to provide project information and progress reporting for external stakeholders such as committees, boards or the public.
- ***Mobile Functionality*** – mobile "apps" and compatibility with both apple and android operating systems will become increasingly important as more of the workforce becomes mobile enabled. Consideration should be given to how applications look on various devices and how they perform with varied signal strengths.

4.5 Improvement Teams

The top three issues identified in Section 4.2 were selected for Quick-Start Implementation. Each of these issues was addressed by a Quick-Start Improvement Team, made up of District staff members as presented in Table4-3 and facilitated by CH2M. Each of the Improvement Teams were comprised of a diverse group of individuals whose departments/divisions were identified as having the closest interaction or most experience with the issue to be addressed. The goal of having diverse participation in solution development is holistic buy-in of each affected department, which creates the greatest opportunity for successful process improvement upon implementation.

TABLE 4-3
Improvement Teams

Quick-Start Improvement Item	Team Member and District Role
Shutdown Process	Olin Schiffman Patrick Chadwick Walter Justice Jessie Perkins Corey Anderson Shaya Hamilton
Administrative Memorandum Process	Vicki Haselhoff Erik Felthous Joe Stankiewicz Jeff Mayfield Cesar Baptista
Document Management Process	Kelly O'Brian Mark Christopher Cesar Baptista Billy George Aliza Caraballo

The responsibility of the Quick-Start Improvement Teams is to flesh out the individual issues surrounding improvement of the larger problem and to identify workable solutions that each of the affected departments can mutually agree upon. Solutions identified by the Quick-Start Improvement Teams were then presented to the Executive Steering Committee for vetting and approval. The activities and findings of each of the Quick-Start Improvement Teams are outlined below.

4.5.1 Shutdown Improvement Team

The shut-down approval process was identified as one of the highest priority issues to be addressed for improvement. While system shut-downs primarily impact Operations, the process associated with shut-down requests and approvals is often generated out of Engineering. Project managers, program managers, and Operations staff were noted as spending a disproportionate amount of time shepherding shut-down requests through the District for approval and last-minute coordination of shut-downs creates further difficulties for PM and Operations staff. Specific issues to be addressed by the Shut-down Improvement Team (SDIT) were as follows:

- **Schedule and tracking** – a better, more accessible schedule is needed to allow for improved tracking and planning well in advance of a shut-down request. An improved scheduling system would allow District staff to better manage the shut-down as the date approaches, particularly as the dates can often change. This would allow management to ensure the right people are available to eliminate the “management by crisis” that was noted too often occur during and around shut-downs.
- **Approval process** – the current process is difficult and slow. The manual process currently used for processing shut-down request approvals requires that the form be walked around the District for approval and this is further complicated by the fact that there are too many people involved in the approval process. Because of this, approvals often get completed after the shut-down is underway or over.

To address improvements needed to the Shut-Down process, it was first necessary to understand when shut-down approvals are needed and how they are scheduled, and then to define who needs to approve versus who needs to be informed. Shut-down requests are typically generated and approved as follows:

- CIP/Projects
  - Engineering PM prepares the shut-down form, discusses probable durations for the shut-down with Operations, if it can be done and when. Engineering often leaves the specific details such as order of opening/closing valves, etc. to Operations.
- Maintenance
  - If the shut-down for Maintenance is being done at the request of Operations, then Operations will handle the shut-down request process. Sometimes Maintenance will handle the process if the shut-down is for something technical that Maintenance is more familiar with, such as mechanical or electrical maintenance.
- Operations
  - Operations manages the shut-down process when they are either doing a test shut-down for a project, or taking a major piece of equipment out of service. Therefore, things like pump cleaning would not apply as a shut-down (normal routine maintenance, and have other pumps operating). The biggest shut-downs Operations manages are test shutdowns for projects.
  - Programming changes or operating level changes also require shut-down forms. Operations typically generates these and will email IT to coordinate the form generation. Sometimes just a change form may be needed, not a full shut-down. If a major piece of equipment

needs to go down or out of service for the programming change, a shut-down form would be necessary.

  - Currently, for Wastewater Operations, the shut-down requests are generated at the plant or collection system level, then elevated to Ken Wesson or Randy Barton. Ken or Randy will decide whether the shut-down request needs to be elevated for further approvals. There are currently around 10 shut-down requests per month handled out of Wastewater Operations.
  - For the Water Operations, currently, their level of workload (how busy they are) determines whether the form is routed or not for approvals. Water Operations seldom lets form approvals affect the schedule for shut-downs since they just can't wait on the process completion to complete the work. A typical month would see 20 or 30 forms route through Water Operations for approval.

- IT/Instrumentation/SCADA (emergency short-circuits)
  - IT does generate shut-down forms periodically for software or hardware upgrades, or sometimes related to projects (see CIP above). If a key component of process is taken out of service, for the upgrade, then a shut-down approval is needed. Also, hot reboots require a shutdown form. Operations will ultimately decide whether a shut-down form is needed.

Shut-downs are currently scheduled for CIP projects as follows:

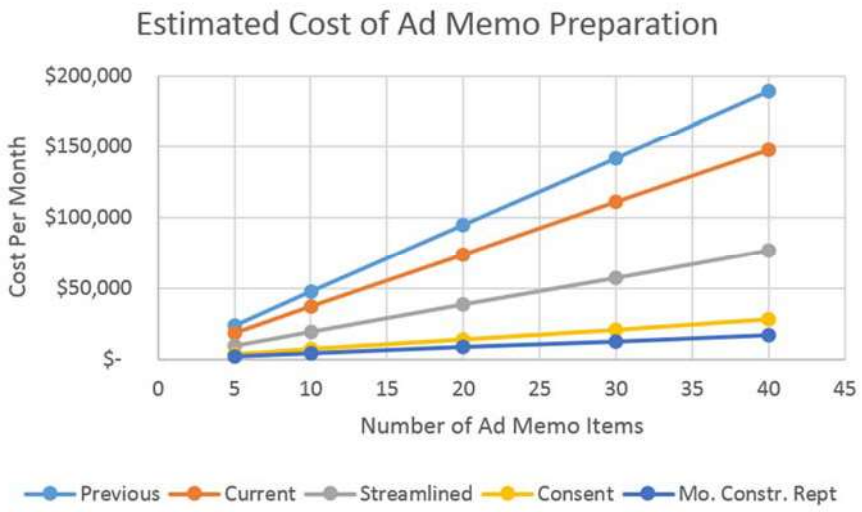
- Scheduling information is typically shared in project meetings. Operations is in the lead to define how to proceed with the shut-downs using input from Engineering and Maintenance. In discussions throughout design, Operations noted that a little more notice might be good before shut-downs to allow them to deal with equipment and manpower issues.
- For CIP projects, shut-downs are often scheduled in advance. Engineering tells Contractors to give 2 weeks' notice prior to the shut-down. There are often issues coordinating with contractor schedule slippage, resulting in little or no notice for shut-downs. Maybe a couple of times a year, there may be an exception on the 2 week notice based on a District request for expediency to avoid contractor claims, etc. These are the approval requests that actually go to the executive level.

Improvement recommendations to streamline the process flow, schedule generation, and approvals were made by the SDIT and further outlined in the Recommendations of this report.

4.5.2 Ad Memo Improvement Team

The administrative memorandum, or ad memo, process was noted through the surveys, interviews, and other general discussions with District Staff to currently be one of the more labor-intensive responsibilities of the Engineering Department. Ad memos are generated prior to each Board meeting for procurement or contracting items that require Board approval prior to execution by District staff. It was discussed during the interviews that some management staff in Engineering can spend up to 40% of their time each month generating ad memos, which represents a significant resource investment. While the District has recently implemented some improvements to the ad memo process, it is estimated that additional improvements can be made to further refine the process.

FIGURE 4-2
Estimated Cost of Ad Memo Preparation



After discussing and defining the existing ad memo process, some of the key issues at hand to be addressed by the Ad Memo Improvement Team (AMIT) were:

- Number of approvals – clarification is needed to determine if actions can be taken to reduce the number of approvals currently required for Board action.
  - If approved in operations budget, do we have to take an item covered in the budget back to the board for approval?
  - If bond is approved by Board, do we need to get each contract under bond approved?
  - Does the Board need to approve all items, or are there just some that they could be informed of, but with actual approvals occurring lower within the District organization?
  - Are there additional items that can go on a consent agenda or monthly construction report for approval to simplify the preparation process?
- Format and templates – are there simplifications that could be made to the existing format to facilitate ad memo preparation or would the use of templates help shift some of the workload off of project managers?
- Automation – is it possible to automate any aspect of the ad memo routing process to facilitate routing/approvals?
- Schedule - currently, the end date to have an ad memo prepared is the week before the Board meeting when the Board packets are issued. Are there benefits to refining the schedule requirements to facilitate ad memo preparation and timing?

The AMIT determined that to address these issues, some discussion on policy and norms of approval approach was needed with both the Executive Director and the Board. The AMIT coordinated with Executive Management to review policy requirements of Administrative Directive No. 10 and District Policy No. 40 to ensure that the process improvements recommended by the team either complied with policy or that a policy change was not warranted for certain recommendations.

The AMIT also coordinated recommendations for ad memo process improvement with a select working group of the Board on May 13, 2015, focused on the examples of various items for Board action. The AMIT evaluated and commented on multiple versions of examples and templates for Ad Memos,

Consent Items, Monthly Construction Report items, and the Ad Memo Guidance Document prepared by CH2M.

Recommendations of the AMIT are summarized in Section 5 of this report.

4.5.3 Document Management Improvement Team

Document management was the third priority identified by the PDI team for improvement. The Document Management Team (DMT) was tasked with analyzing existing document management practices at the District. The overall approach to assessing document management improvement needs was as follows:

1. Review the types of documents managed at the District and the current document management process
2. Discuss possible options for meeting key needs.
3. Develop proposed process revisions and present to Steering Committee.

The document types and existing management systems used to process and house these documents are presented in Table 4-4. A description of these existing systems is as follows:

- Barracuda Archiver – this archival system is provided by IT for email archiving only.
- LaserFiche – LaserFiche is the system of record for the District. It currently serves as both the archiving and storage of final versions of documents of record at the District.
- Shares drive – internal District server drive storage, currently used by Engineering as a working file storage system. Individual PMs can set up folders for individual projects, with no current standard file storage structure protocols, making it difficult for searching.
- SharePoint – the District has licenses for SharePoint, but it is not currently in use at the District.
- Hard Copy – the District receives hard copy deliverables from consultants and contractors and also routes certain internal documents via hard copy. These are stored in various locations throughout the District (PM files, Engineering Admin files, Operations libraries (O&M manuals), etc.).
- Other – the District uses web-based document management systems on certain construction projects if provided by District consultants. The District also uses their FileCloud system for relaying or accepting large electronic files to/from external parties.

TABLE 4-4
Document Types and Existing Management Systems

Docs	Barracuda Archiver	LaserFiche	Shares Drive	FileCloud	Civcast	Hard Copies	Other
E-Mail	X	X					
Drafts/Template			X			X	
Engr Collaboration		X	X	X		X	?
External Docs		X	X	X		X	
Internal Docs		Final Only X	X			X	
Manuals						X	
Bid Docs					X		

Some of the key issues identified with the existing document management systems and questions to be answered by the DMT included:

1. How can the current system of document transfer into/out of the District be simplified? The current method of scanning incoming/outgoing documentation into LaserFiche is cumbersome and time consuming for engineering staff.
2. What improvements can be made to facilitate Engineering document collaboration? Some document collaboration was started in FileCloud, but there are no true workflows or versioning available with this application. Systems are needed to manage:
    - Draft drawings and specs
    - Markups and comments on draft documents
    - Final construction drawings and specs
    - Conformed as-built sets
    - Construction collaboration documents – Pay requests – RFIs – Submittals
    - Photos & Progress documentation
3. Are there standard naming conventions for documents to facilitate searches?
    - Associating project numbers to documents and attaching to filing system as well?
4. Some documents will cross over traditional lines of projects (such as studies, other data needed across multiple projects). Perhaps organization/tagging of documents by facility could be helpful and a need to separate technical information for reference needs versus administrative reference documents.

Records Definition

One of the major questions that had to be answered at the outset of the DMT analysis was "What constitutes a record?"; the definition of a "record" at the District dictates many aspects of the document management system so it was important to clarify this definition up front. Input from the District's attorneys as to the State of Texas records retention requirements was received to confirm the reading of the statute. Per input from District attorneys, the confirmed reading of the statute is that the iterative design and construction documents transferred into or out of the District are indeed all considered "records" and are categorized by the state as requiring permanent retention. There are misdemeanor penalties in place within the state for non-compliance with the statute.

The implications of this definition are that the current high level of document processing and retention will continue at the District and become more burdensome as project loads increase. Therefore, development of a document collaboration system that will allow for a more streamlined receipt, distribution, collaboration, and management of all incoming/outgoing records to the District is of high importance to improving efficiency.

Based on these findings, the DMT moved forward with their analysis with the following set of requirements of any document management system selection:

- Must meet state record requirements
- System must have organized and accessible key design and construction documents
- Document collaboration and review w/ those outside of the District is required
    - Consultants
    - Contractors
    - Members
    - Agencies

- The systems in place should have workflow and routing capabilities
- The system should be structured so as to house as-built drawings and specifications by facility

The various types of document handling capabilities and requirements were discussed as shown in the Information Systems sections of this report. It was noted that GIS linkage capabilities and the ability to coordinate information with Member cities was also an important item to consider

Based upon these requirements, the DMT and the CH2M facilitator developed a set of phased recommendations as presented in Section 5 of this report.

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5.0 Recommendations

The recommendations resulting from the Assessment are summarized in the following broad categories. They have been endorsed by the PDI Team and endorsed for implementation by the Executive Steering Committee.

5.1 Information Systems

The information systems strategy is focused on meeting the comprehensive needs for project delivery, with the systems providing additional benefits to the entire District. Selection of the correct systems or toolset for the District is a critical step but more important is the user adoption strategy. It takes a great deal of organizational commitment to successfully move from manual self-directed processes to standardized controls. Standards and organizational controls are the framework around which a project delivery system is built. It enforces common practices like workflow for approvals and standards such as funding/budget/ change order structure. If common practices are not currently well defined, software implementation will require management support and agreement as to how the software should be configured and training for how users will perform their duties under the new structure. Without full buy-in from users and support from their management, the implementation may fail due to lack of adoption, i.e. users work around the system and continue to follow their own guidelines.

A phased implementation of software packages/modules is recommended as follows:

- Phase 1. SharePoint for District-wide collaboration, and workflows,
- Phase 2. Project Management software critical for increasing the capacity of PMs and quality of work,
- Phase 3. Development of a mature schedule management system, integrations of systems to streamline dataflow between departments, and creation of enterprise dashboards showing project portfolio status and rollups. The phased implementation recommended for the District allows better work-load balance as the new processes and tools are established while staff continues to run existing projects.

5.1.1 Phase 1

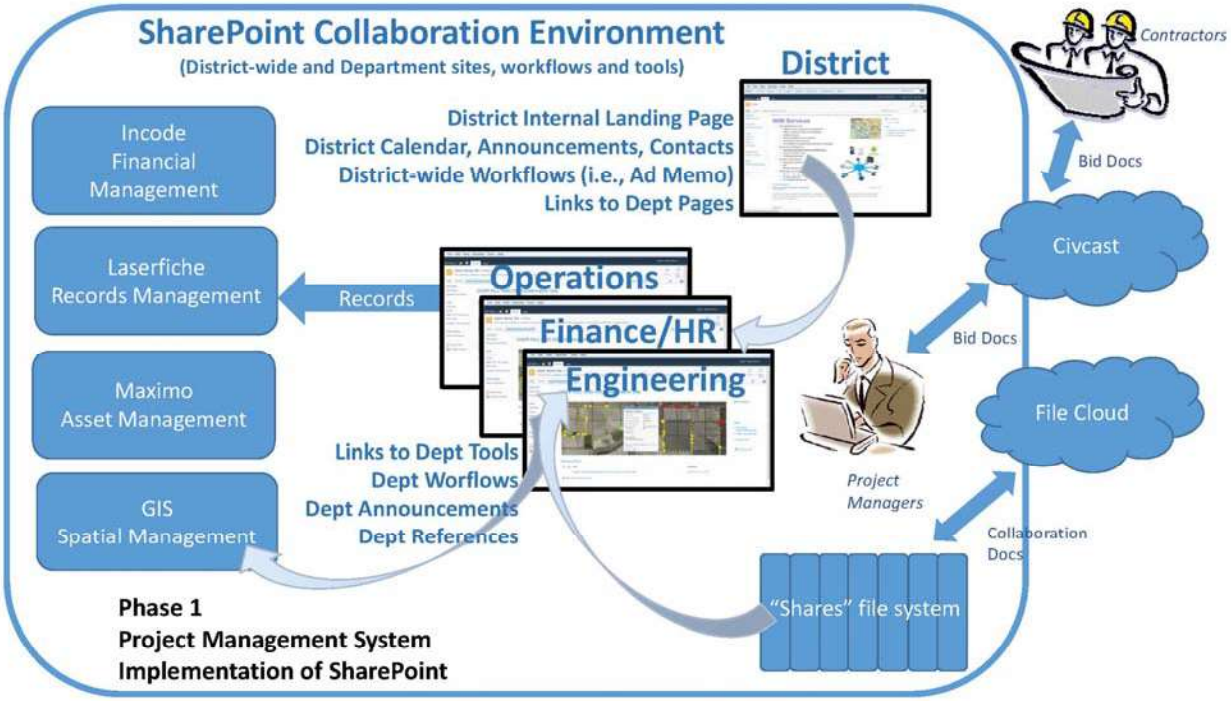
Implementation of SharePoint is suggested as an initial systems support step to provide a common platform for District-wide internal collaboration, standardization of documents, filing structure, naming conventions and workflow. SharePoint software has been purchased by the District, and server capacity is available to support the initial roll-out. The District's IT team has limited training on SharePoint so contract support for the implementation is recommended.

Web-page mock-ups and workflows for the Ad Memo and Shutdown processes have been designed and are provided with this document. Those materials should jump-start the implementation however proper security and site architecture are critical so experienced consulting is essential to successful setup of SharePoint.

In conceptual Phase 1 SharePoint is used for internal collaboration only. A District landing page will provide a central jumping off point for all District Employees. Each Department can then establish a web page (site collection) for their documents, calendar, announcements, hyperlinks, etc. Communication with contractors outside the District will not be established through SharePoint since all external communication is considered a Record and needs to be managed with an automated Project Management System (Phase 2).

Use of SharePoint will require ongoing support and maintenance. It's recommended that the District hire or train a SharePoint System Architect/Programmer and assign a SharePoint Administrator (subject matter expert) for each department with a homepage (site collection).

FIGURE 5-1.
Phase 1 Conceptual Design – SharePoint Collaboration Environment



5.1.2 Phase 2

Selection and implementation of an off-the-shelf Project Management System is recommended as a top priority. A Project Management System is required to support more efficient management of the full lifecycle of CIP projects as well as provide a programmatic view across the District's projects. The Project Management System will ultimately be the "System of Record" for all correspondence with construction contractors which will address a number of document management issues identified in this study by providing a secure repository for delivery and markup of contract documents and drawings. Email with contractors can be documented in the system as well to create a complete project record in one centralized system. Funding for the Project Management software is budgeted in FY 2016 so the District can immediately start the selection process and hit the ground running on Oct. 1.

FIGURE 5-2
Phase 2 Conceptual Design – Web-Based Project Management System

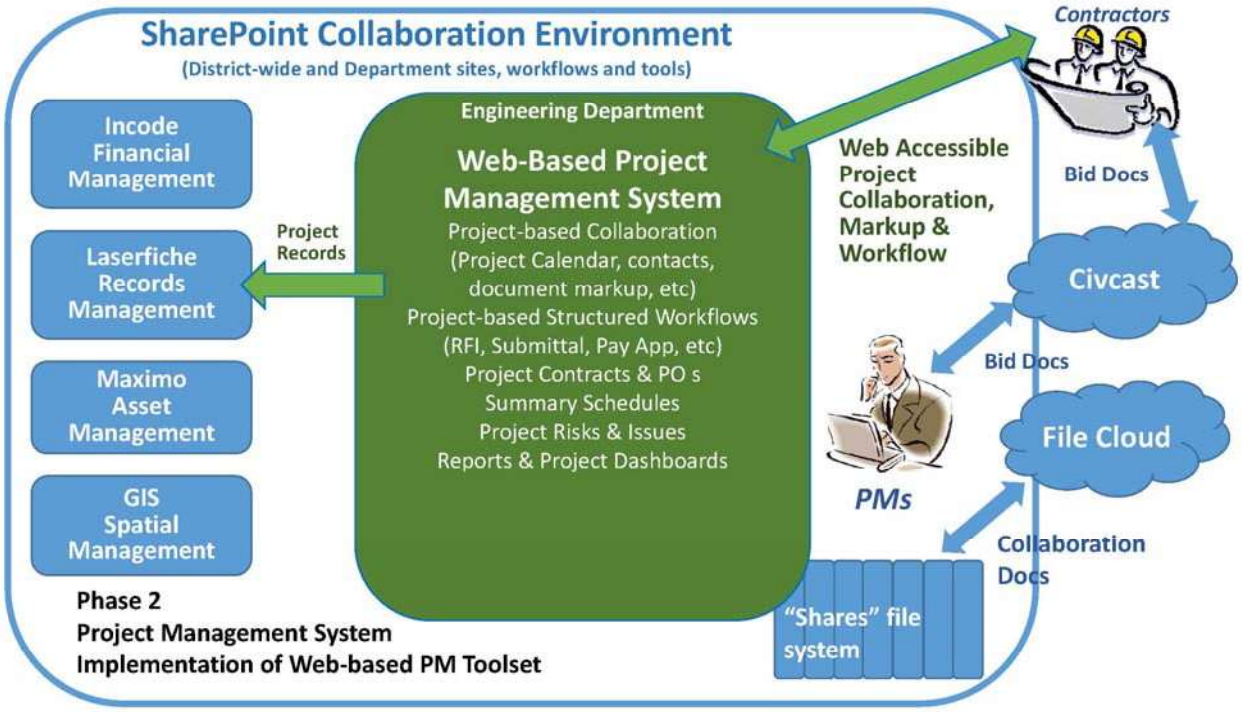


Figure Notes: Project Records can be transferred to LaserFiche in regularly scheduled batch transfers or as an archive at the conclusion of the project.

Program Management Systems Market. There are currently over 200 Program/Project Management systems on the market, each with inherit strengths and weaknesses. Those designed to meet the needs of Construction Managers include robust functionality to manage cost and schedule of detailed tasks by Schedule of Values (SOV) or Work Breakdown Structure (WBS). Others are designed more with project owners in mind and focus less on the hands-on details and more on a broad-level overview of the project portfolio. Many are designed around a specific functional strength such as Document, Contract or Schedule Management and provide some level of supplemental modules supporting extension of that functionality.

Pricing and provisioning options of these systems vary widely; from the fully outsourced software as a service (SaaS) model to owner installed and configured. Most support agreements include some services for setup, configuration and training as the tools are not effective if not implemented correctly. Software licensing is typically by named users on a per/user basis either monthly or yearly or they can be purchased outright followed by payment of a yearly maintenance fee that is typically 1/3 of the initial purchase price to buy support and rights to all future upgrades. A few packages have a premium offering of one price for the enterprise but they are typically only cost effective for enterprises with Capital budgets over $500M. Table 5-1 summarizes the general attributes of different provisioning models and Table 5-2 lists the typical costs associated.

TABLE 5-1
Project Management System Models

Deployment/Support Model Type	Description	Attributes
Software as a Service (SaaS)	Web-based solution package (software, infrastructure and support), accessible only online through the system provider. Typically billed annually or monthly as a set fee per user. Data is stored at the provider's data center and is available as backup or download only. True SaaS models are "multi-tenant" meaning: • all client data is managed by the provider • all clients are on the same version of the software (i.e. upgrading is not optional) upgrades and patches of the software are managed by the provider and are applied seamlessly for clients	Software of this type is typically user friendly and easier to setup and begin use of. The subscription type pricing model provides consistent, predictable billings and can be extended to client contractors. Client IT does not need to staff high-paid programmers or administrators or send IT staff to extensive training. The system is typically customizable but with limitations. Enhancements or fixes are driven by user requests and are not allowed for one client only. Direct integration with a client's other systems or software is typically supported although batch transfer of data can be achieved at additional cost. This model requires little IT support from the client and is most cost-effective when IT has limited resources or is focused on other priorities.
Web-based Software Services	Web-based software has many of the same characteristics as SaaS. These service providers offer managed software and professional services on an annual or monthly fee basis with professional services offered as quoted fees per service.	Installation and basic configuration services are typically packaged in a setup fee. Thereafter upgrades and customizations to the software are performed at client request and on a fee per service basis.
Hosted Software	Hybrid model of off-the-shelf software and a data center "hosting" service provider. The data center typically provides the hardware (servers and network connectivity), security, backups and monitoring services required but do not include application expertise (they keep the servers & databases running but if there is a problem with the software or it's configuration, clients have to work with their software vendor or a consultant to resolve)	Clients can "rent" space in a high availability data center (expensive hardware) with 24/7 monitoring and administration more cost-effectively than building that infrastructure themselves. Hosting is less restrictive as to the versions of software and customizations allowing more flexibility. Clients' with extensive experience deploying and configuring the software themselves will find this model less expensive than full SaaS. Allows client IT to focus their support on desktop services and application expertise.
Self-Hosted Software	Client purchases or builds software and manages their own environment. Client is responsible for full design and deployment of solution including hardware (servers and network connectivity) backups and security.	Clients able to best support this model have mature, robust IT resources with strong governance practices. Allows the most control over security, configuration, and business rules and data management. Is most cost-effective when there is an existing data center with capacity and resources capable of managing both infrastructure and application support.

TABLE 5-2
Cost Considerations for Project Management Systems

Typical Upfront Costs	
One-time license fees1	Traditional “off-the-shelf" software is purchased with a one-time license fee (i.e. a "perpetual license").
Installation fees[1]	A software vendor may charge professional service fees to install the software and ensure a client’s infrastructure is properly configured for optimal performance.
Configuration services	Software vendors charge professional service fees to configure the system to the client’s needs or to make changes to the software.
Training fees	Most software vendors will charge for on-site training, some others provide free or lower cost web-based training. It’s important to note if the training is “navigational” or “role-based”
New end-user computer hardware costs	If the new software requires upgraded desktop/laptop or mobile computing devices, budget for purchase of these devices needs to be included. Hardware upgrades should be considered if greater than three years old.
Typical Recurring Annual Costs	
Annual subscription fees[2]	SaaS and web-based systems are often sold on an annual subscription fee, so yearly renewal of the licenses needs to be budged for.
Annual support & maintenance fees	Software vendors that sell perpetual or term l licenses typically charge ~20% of the purchase amount annually for support.

1 Associated with Hosted models only, not with the SaaS or Web-based Service models

2 Associated with SaaS or Web-based Service models only

Based on CH2M experience and the scope of this study, the following systems are recommended for consideration by the District (in alphabetical order).

Aurigo MasterWorks

- Strengths: Masterworks is a complete Program management System offering full functionality for program Cost, Contract, Schedule, and Document Management as well as robust mapping, dashboards and reports. MasterWorks offers flexible deployment schemes including a fully outsourced web-based service model or installed on premise. As a Microsoft based product, Masterworks has a familiar look and feel that significantly improves the user experience, aiding user adoption and training. The open architected platform provides the greatest flexibility by allowing separate databases to be established for each project or program. The Microsoft base platform allows tight coupling with other Microsoft tools frequently used on large programs, namely SharePoint, MSProject, Excel and Outlook. MasterWorks has mobile capabilities for both the iPad and Android. Out of the box integration with ESRI GIS is a unique feature of this system.
- Weaknesses: There are few local clients similar to the District running MasterWorks that can be interviewed in person. While financially stable, the company is fairly young (est. 2003), privately owned and is a likely acquisition target.

e-Builder

- Strengths: e-Builder is a full Project Management solution. A number of District staff have been exposed to e-Builder through their work with Freese & Nichols and other contractors and like the system. e-Builder is targeted at owner needs specifically and provides high-level support for project contracts, schedule, document and workflow management. e-Builder has mobile capabilities for both the iPad and Android.

- Weaknesses: e-Builder is only offered as a SaaS model. e-Builder scheduling capability is somewhat limited and will likely need to be supplemented with Primavera P6 or MSProject Server to meet the District's desire for a Master Schedule and executive dashboards.

ProCore

- Strengths: ProCore offers a full program management suite of modules including; contract, document, workflow, bidding, schedule and timesheet management. Its clean, simple interface is user friendly. It has robust mobile functionality that allows users to use the tool offline and sync when connection is restored. ProCore has strong interface capabilities with full schedule integration to both MSProject and Primavera. ProCore is an established company with a large installed base of customers.
- Weaknesses: ProCore is only offered as SaaS. The unlimited user licensing model is based on value of construction contracts managed and number of modules needed which may result in a more expensive complete solution.

Prolog/Converge

- Strengths: Prolog and Converge are complementary software packages that work together to provide a robust cost, contract, document and workflow management system. Prolog has extensive contract and cost management functionality. Converge is the web-enabled toolset that handles document and workflow management via the web. Converge licenses can be shared by a large pool of users, ultimately reducing the overall cost of the solution. Prolog is owned by Meridian Systems, has a long track-record of customer service and a large installed base of customers.
- Weaknesses: Prolog and Converge are separate software packages that require expertise to setup properly. Prolog Mobile is an additional module for document and workflow functions on iPad. Prolog does not have schedule functions so it must be integrated with Primavera P6 or MS Project Server for full program level support

ProjectMates

- Strengths: The District is familiar with ProjectMates software. It has been developed by a local company based in Richardson and is used by Trinity River Authority (TRA). It is a full program management solution with cost, contract, funding, document and workflow management. ProjectMates also includes support for bidding, dashboards, reports and has a mobile enabled interface. ProjectMates has the ability to create HTML versions of transactional data and can deliver that project archive in a single downloadable zip file for permanent retention by the client.
- Weaknesses: ProjectMates is offered as SaaS only. It doesn't provide full scheduling functions and will likely need to be supplemented with Primavera P6 or MS Project Server to meet the District's desire for a Master Schedule and executive dashboards.

A systems functionality comparison of these five recommended systems is described in Table 5-3 below.

TABLE 5-3
Functional Capabilities of Recommended Systems

	Functions

System	Model	Users	Employees	Funding	Bidding	Budget & Cost	Contract & Change	Schedule	Document	Red Line	Workflow	Mobile	Interfaces
Aurigo MasterWorks	SaaS or Installed	50k+	+/- 100	X	X	X	X	X	X	X	X	X	X
e-Builder	SaaS	42k	+/- 100	X	X	X	X	\	X	X	X	X	
ProCore	SaaS	500k	+/- 100	X	X	X	X	X	X	X	X	X	X
Prolog/ Converge	SaaS or Installed	500k+	+/- 100	X	X	X	X	\	X	X	X	X	\
ProjectMates	SaaS	50k	<50	X	X	X	X	\	X	X	X	X	\

(X indicates capability, \ indicates partial capability)

5.1.3 Phase 3

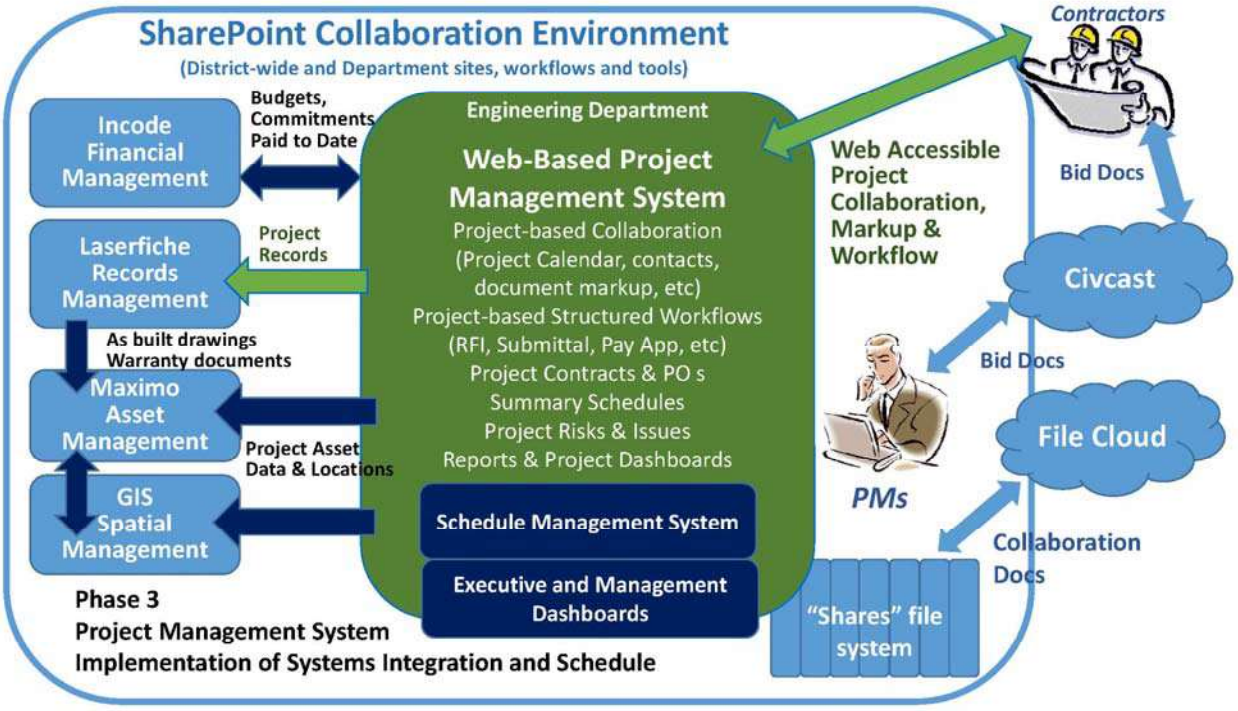
The full scope of this phase will depend on the Project Management System selected and modules implemented up to this point. Full program management support is seldom provided by one software package so ultimately integration between a couple software packages is required. Integration between software packages will also be driven by the need to streamline data entry (enter once) and the need for cross-system reconciliation.

A software's ability to integrate is driven by the number and quality of its interfaces. Application Programming Interfaces or APIs are the means by which third parties can write code to exchange data with the system. Web-enabled interfaces or web services are a typical method of exchanging data over a network between computer systems. The presence and quality of web services is an indicator of how easily the software can be integrated.

Based on the current understanding of the District's dashboard requirements, a detailed master schedule of all District projects will be required. Design and implementation of the Master Schedule will be the first step in this phase, once a comprehensive schedule has been created, other data (cost, performance, changes, etc.) can be tied to the project phases and/or tasks to feed a District-wide dashboard view.

Figure 5-3 summarizes the resulting recommended system following implementation of all three phases.

FIGURE 5-3
Phase 3 - Summary



5.2 Improvement Teams

Each Improvement Team included six to eight District staff selected by the PDI Team and approved by the Executive Steering Committee. The Improvement Teams' efforts were facilitated by CH2M, who developed agendas, led meetings, and created the deliverables.

5.2.1 Administrative Memo Process

The team's recommendations are summarized below.

- Simplifying and streamlining the Administrative Memo content and format.
  - Detailed Examples created for reference
  - Templates with instructions created for use
- Clarifying new District Policy and Administrative Directives regarding Administrative memos and consent agenda items (these examples were reviewed and discussed for feedback with a select committee of the Board of Directors)
  - Ad Memo Guidance Document created for staff clarifying what action does not need an Ad Memo, what action does need an Ad Memo, what action needs to be included on the Monthly Construction Report
- Streamlining the approval process
  - Ad Memo Guidance Document created for staff included, for each category of Ad Memo, guidance for what positions needed to be involved in collaboration to develop the document, what positions needed to approve the document, and what positions needed to be notified
- Workflow to improve collaborative development, approval, notification, and tracking of board items through the creation and approval process

- SharePoint workflow mapped out for implementation in Phase 1 of the Information Systems implementation

5.2.2 Shut-down Plant/System Process

The team's recommendations are summarized below.

- More structured coordination and communication is needed.
  - Assign "Shut-down Coordinator" as point of contact for each of the following groups:
    - Operations (3) (Primary owner of shut-downs: Water Conveyance, Water Treatment, Wastewater)
    - Engineering (1) (Primary owner of schedule, shut-down Plan development)
    - Technical Services (1) (Staffing support during shut-down)
    - IT/SCADA (1) (Staffing support during shut-down)
- Definition of "who approves" versus "who is informed"
  - Table with guidance for collaboration, approval, and notification by position
- Scheduling process (initially a SharePoint calendar, evolving to a 3-month look-ahead milestone calendar based on detailed schedules statused monthly)
- Shut-down Plan collaboration for creation and review (collaboration/feedback workflow in SharePoint)
- Workflow and routing capabilities to speed approvals and reduce staff effort (approval workflow in SharePoint)

5.2.3 Document Management

The Document Management Improvement Team recommendations are summarized below. The requirements and needs included:

- Meeting State and District record requirements
- Organized and accessible key design and construction documents
- Document collaboration and review with those outside of the District
  - Consultants
  - Contractors
  - Members
  - Agencies
- Document collaboration and review w/ those inside of the District
- Workflow and routing capabilities
- As-built drawings and specifications by facility

The solutions to these needs are largely associated with information systems, so they were considered in developing the Information System recommendations in 1.3.1. Additional recommendations beyond Information System recommendations included:

- Standard file naming protocol for key document types
- Assigned Document Management staff, including Record Liaison, in Engineering Department with training to:

  - Identify and store records on LaserFiche,
  - Manage other Engineering document management functions, and
  - Facilitate SharePoint workflows.
- Designate that all design/construction document transfer will be electronic only (official record):
  - Quality review forms will be required for review comments, and
  - Use of a service to create courtesy hard copies as requested.
- Training on guidelines for use of LaserFiche, SharePoint, FileCloud, and Shares drive in near term.

5.3 General

5.3.1 Staffing

The staffing benchmarking used data from twelve public organizations nationally that included water and/or wastewater utilities. The purpose of the tool is estimating staffing levels of client project managers and delivery staff whose focus is primarily on the successful delivery of capital projects with respect to schedule, manage budgets, and manage consultant and contractor performance. District staffing levels, number of projects, and total dollar volume of projects were used in the benchmarking tool. The results of the analysis, assuming about 9 projects per PM and the District's size distribution of projects, showed a shortfall of 8 project managers and 13 admin technicians (including project controls specialists, document controls specialists, and other high end technical administrative support).

With the impending hire by the District of the Lower Bois d'Arc Project Manager position, it is recommended that the successful applicant assess the program and District and consultant resources. It is anticipated that additional staffing will be needed to successfully deliver that program, and this new role will need to help balance what support will be provided internally and what will be provided by consultants.

5.3.2 Priorities in Project Delivery

The priority for a project delivery organization like the Department of Engineering is to deliver projects. Therefore project management, and the staffing and activities associated with timely and cost-effective delivery of projects, must be its highest priority. All delivery organizations must strike a balance between the practice of project management and the supporting technical or engineering efforts that complement the project management. Many client project delivery organizations staffed by technical personnel such as engineers have a tendency to elevate the importance of technical work over the project delivery work. While both elements are valuable and necessary, the primary benefit to the district is in the continued improvement of project delivery in the organization. It is incumbent for management in the Department of Engineering to set the priority of the organization on project delivery rather than engineering. While engineering and technical assistance can be obtained from many sources (e.g., design consultants, a few designated technical specialists internally, engineering staff embedded in operations, etc.) the owner-focused project management function is the highest and best use of this internal project delivery group.

Given the chronic shortfall in project delivery staffing and the District's project delivery needs, it is recommended that the existing staff prioritize project delivery as their primary focus. Additional technical accountability should be placed on the District Operations staff, consultants, and contractors to help the Department of Engineering balance the demands for delivery services with technical/engineering services and focus their technical efforts.

5.3.3 Approaches for Structuring Engineering Services Agreements

CH2M heard a good deal of frustration within the District about the level of service provided by design consultants during the construction phase of projects. Recommendations to help improve this performance include creation and implementation of a consultant performance evaluation that includes the construction phase. The evaluation should be performed with a consistent form, and at multiple points during the design and construction of the project.

An equally important recommendation is to revise how services during construction (SDC) are scoped and contracted. In most cases, ESAs are scoped to include both the design and construction services at the beginning of the project using relatively simple percentage approaches and little information about the duration and nature of the services needed following the design phase. Therefore the scope and fee often do not adequately address the two primary drivers in the cost for SDCs, namely the level of engagement needed for RFIs and responding to other requests, and the actual duration of construction. When funds are not adequate for the design phase, consultant performance will suffer and frequently not meet Engineering or Operation needs. This can be accomplished in any of several ways. One approach is to budget a conservatively larger SDC allowance when the ESA is developed, and revisit and define how much of that allowance will be used prior to starting SDCs. Another approach is simply to wait and approve the ESA for SDCs near the end of the design phase when additional information is available about the specific scope and duration of the desired services.

5.3.4 Implementation Leveraging Lower Bois d'Arc Program

It is common for organizations to leverage some or all of the needed project delivery implementation using a large program or project. These large efforts require additional staffing, processes, and systems for successful and efficient delivery. If these needs are designed with the District's ongoing needs in mind, the District can benefit from these improvements on all projects. The approach for this should be coordinated between the District's Lower Bois d'Arc Project Manager, the broader Department of Engineering, and a subset of the consultants working on the program based on their respective skill sets.

5.3.5 Remaining Issues

The Engineering Department should continue progress toward addressing the remaining issues as part of their ongoing project delivery improvement efforts, and track progress quarterly on the eighteen issues. An appropriate owner of this process is the Assistant Deputy Director of Engineering.

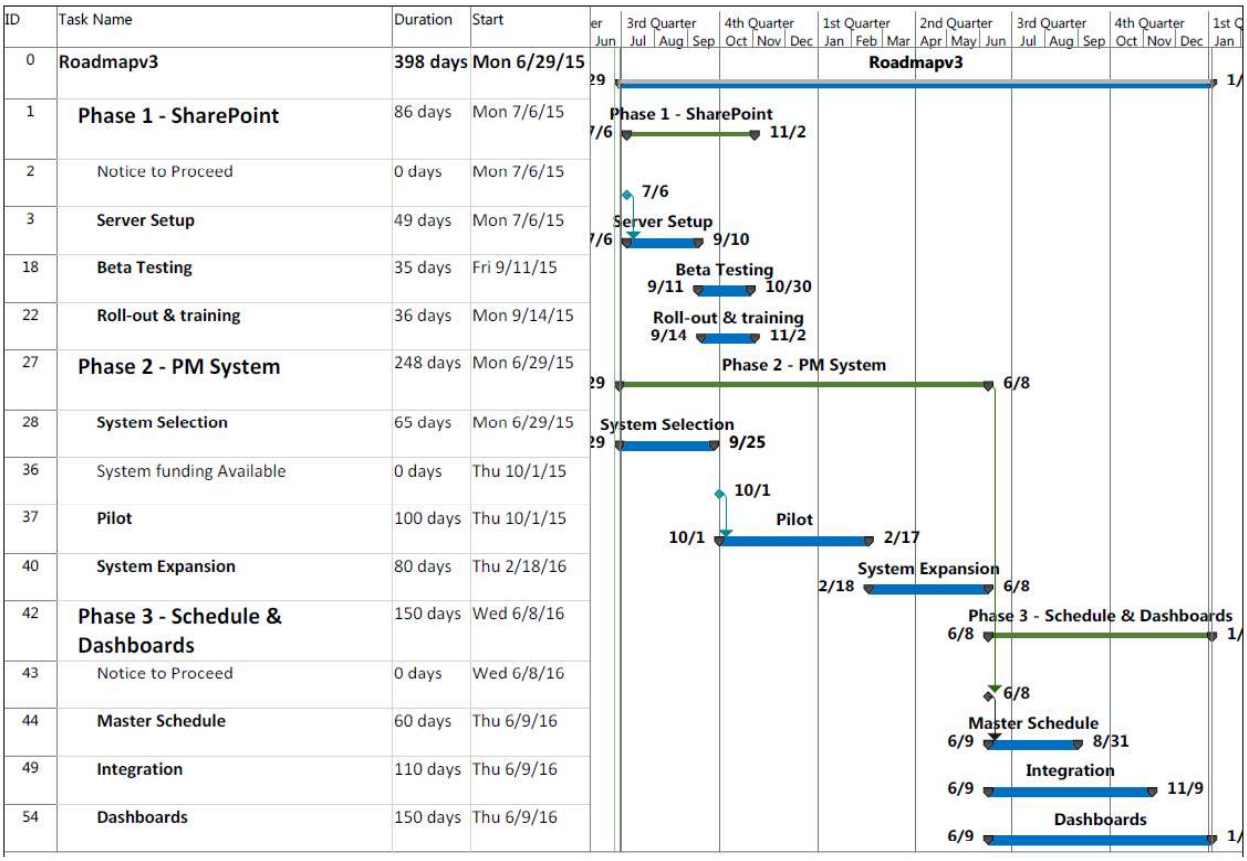
5.4 Implementation Roadmap

The Implementation Roadmap provides a conceptual approach for implementing the recommendations summarized in this report.

5.4.1 Information Systems Implementation Schedule

Timing of the phases is dependent on a number of factors including funding for consulting and software and availability of staff to review processes, designs and software releases. Figure 5-4 is a conceptual best case project plan for the 3 phases based on known funding constraints.

FIGURE 5-4
Information Systems Implementation Schedule



5.4.2 Information Systems Implementation Estimate

Total cost of Systems implementation varies widely based on an organization's process maturity and standardization; available staff to self-perform; and IT system policies. The price of software can include implementation services and staff augmentation but may result in a less efficient roll-out. Given that vendors have different pricing and support models, total cost of complete systems can be hard to compare.

Typically new system costs are heavily front-loaded due to hardware and software purchases and professional services needed to roll-out the system. There are however, some new pricing models that spread these costs more evenly on a per-user, per-month or yearly basis. Break even between these models and traditional procurement methods is somewhere around 5 years.

TABLE 5-4
Phase Estimates
Cost Estimates for the 3 proposed phases

Phase	Phase Description	Annual Hosting/ License Fees	Standup Development Testing	Business Processes Workflows	Launch Support	Training Support	Total
1	Standup of SharePoint 2013 Enterprise Edition, SQL database, 50 cals - 2-3 workflows, training	$50,000 - $100,000	$50,000 - $100,000	$50,000 - $150,000	$20,000 - $40,000	$20,000 - $40,000	$190,000 - $430,000
2	Project Management System	$40,000 - $80,000	$100,000 - $150,000	$20,000 - $40,000	$20,000 - $40,000	$20,000 - $40,000	$220,000 - $340,000
3	System Extension - Integration		$250,000 - $500,000		$20,000 - $40,000	$20,000 - $40,000	$290,000 - $580,000
	Systems Implementation Estimates						$700,000 - $1,350,000

Note that the cost estimates and ranges presented focus only on the system implementations and workflows and functions associated with those systems. They do not include additional outside consultant help in moving recommendations for other issues not addressed by these systems, such as CIP Planning Process, Project Delivery Roles and Responsibilities, etc.

5.4.3 Conclusion

The Department of Engineering is a service organization, delivering projects that will be owned and operated by the District Operations staff. In general, staff at the District believe that project delivery staff in Engineering are technically sound, work hard, and are committed to the District's success.

In the interest of continuous improvement, the District should assign a responsible staff member, preferably in the Department of Engineering, to oversee and track a methodical implementation of the recommendations in this roadmap using an appropriate combination of District staff, consultants, and vendors. The designee should report progress quarterly to the executives.

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Appendix A1
Survey Results

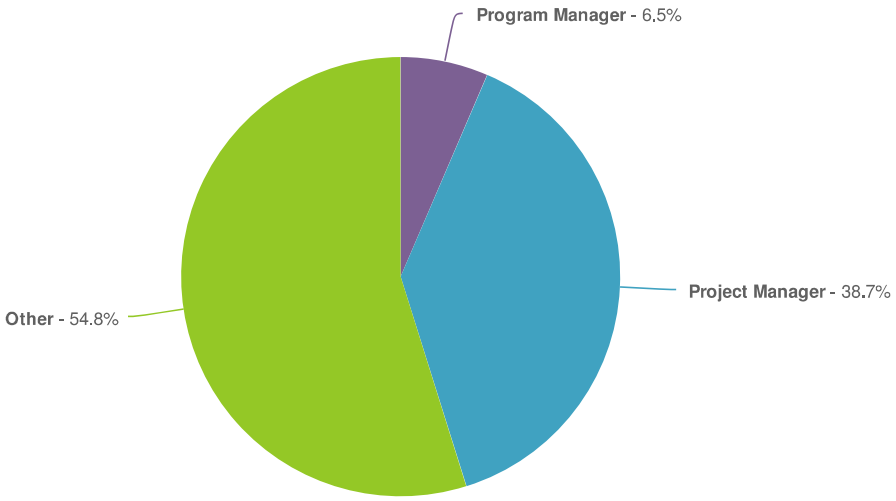
New Summary Report - 17 March 2015

1. Which of the following best describes your job role?

Program Manager	6.5%		2
Project Manager	38.7%		12
Other	54.8%		17
		Total	31

Statistics

Total Responses	31

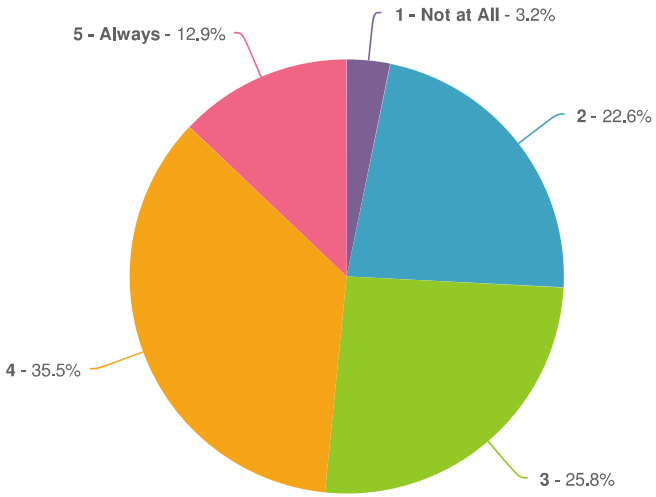


2. Project Managers actively involve customers and other stakeholders in the planning of their projects.

1 - Not at All	3.2%		1
2	22.6%		7
3	25.8%		8
4	35.5%		11
5 - Always	12.9%		4
		Total	31

Statistics

Total Responses	31
Sum	103.0
Average	3.3
StdDev	1.1
Max	5.0



Comments

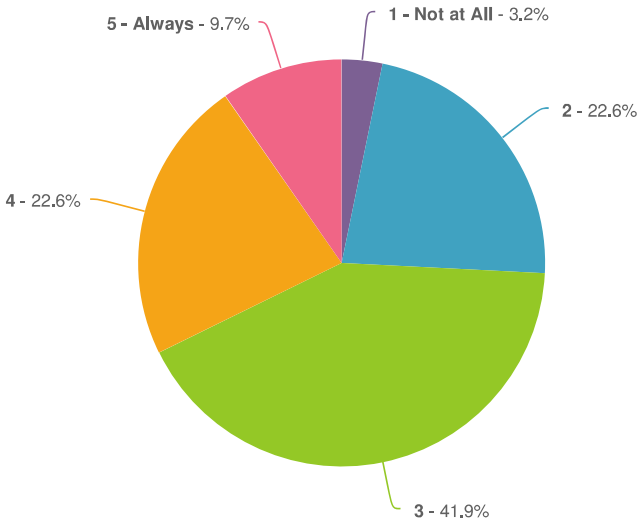
Count	Response
1	5 - assuming stakeholders would be operations dept, tech services, maintenance, etc.
1	Make sure that Operations is involved
1	To involve others does not count if info (for current month) changes after the involvement.
1	Unknown
1	The construction inspection team could often be included earlier in the process. Sometimes an inspector is not known at the time of project design.
1	Project Managers in the conveyance group do a good job inviting all stakeholders if they know who the stakeholders are.
1	Not sure if you are requesting feedback from member cities, but their response to this question would be helpful.
1	There is inadequate involvement of customers/end users during the planning process by some project managers. Some do a pretty good job of involvement of stakeholders.
1	The Project Managers will work with the Consulting Engineer, the Operations Staff, and the Engineering Department. These are the only "customers and stakeholders" that Project Managers work with, and they are actively involved in the planning.
1	Customer and Stackholders do not understand their rolls and take little interest in the initial stages

3. Project managers ensure their own vision and objectives of the project are compatible with the customer's.

1 - Not at All	3.2%		1
2	22.6%		7
3	41.9%		13
4	22.6%		7
		Total	31

Statistics	
Total Responses	31
Sum	97.0
Average	3.1
StdDev	1.0
Max	5.0

5 - Always	9.7%		3
		Total	31



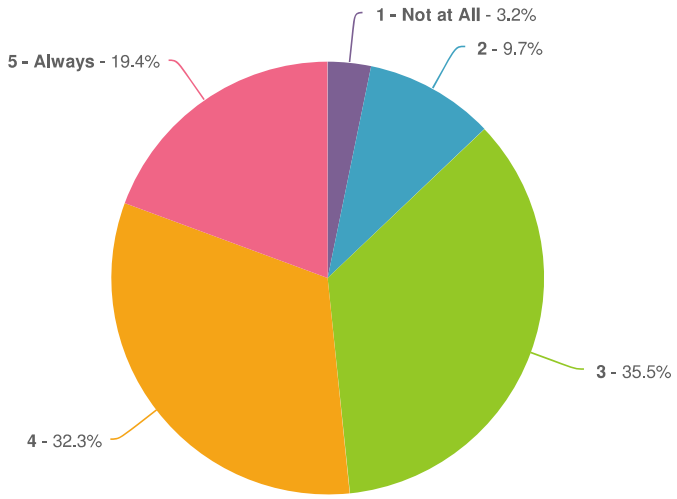
Comments

Count	Response
1	Internal customers - Maybe on the first go around.
1	Unknown
1	Normally, the project managers' project vision are built totally around the customer's objectives
1	3 - i selected the mid-way choice b/c this is project specific. depending on the specifics of the project this could be a 1 or 5.
1	Not always. I would like to see Project Managers have a little more independence in running their projects, since there seems to be too much micromanagement by certain Program Managers.
1	Some project managers seem to care less about the end users and do not listen nor adequately solicit input.

4. Project Managers keep customers and other stakeholders involved throughout the execution of the project.

1 - Not at All	3.2%		1
2	9.7%		3
3	35.5%		11
4	32.3%		10
5 - Always	19.4%		6
		Total	31

Statistics	
Total Responses	31
Sum	110.0
Average	3.5
StdDev	1.0
Max	5.0



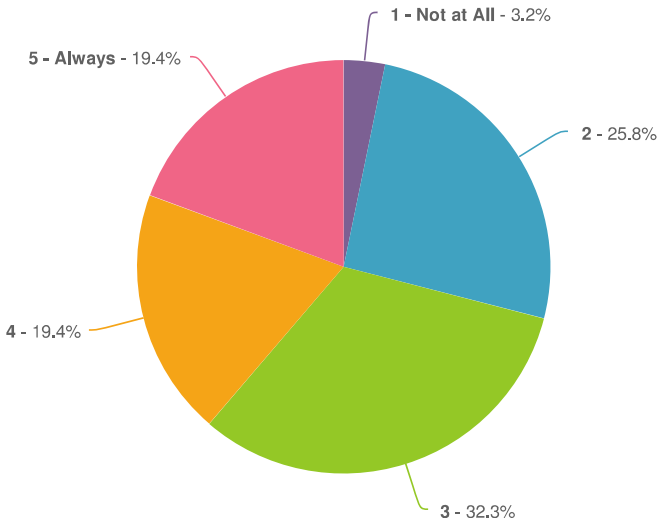
Comments

Count	Response
1	It would not be so bad if the info did not change so quickly/ much.
1	No formal comunication or stackholder managment plans
1	Unknown
1	The Project Managers will work with the Consulting Engineer, the Operations Staff, and the Engineering Department. These are the only "customers and stakeholders" that Project Managers work with, and they are actively involved in the execution.
1	Some project managers do a very good job of keeping end users informed/updated. Some project managers rarely communicate to end users nor listen to end user input.

5. Customer and Stakeholder feedback is gathered during delivery of the project.

1 - Not at All	3.2%		1
2	25.8%		8
3	32.3%		10
4	19.4%		6
5 - Always	19.4%		6
		Total	31

Statistics	
Total Responses	31
Sum	101.0
Average	3.3
StdDev	1.1
Max	5.0



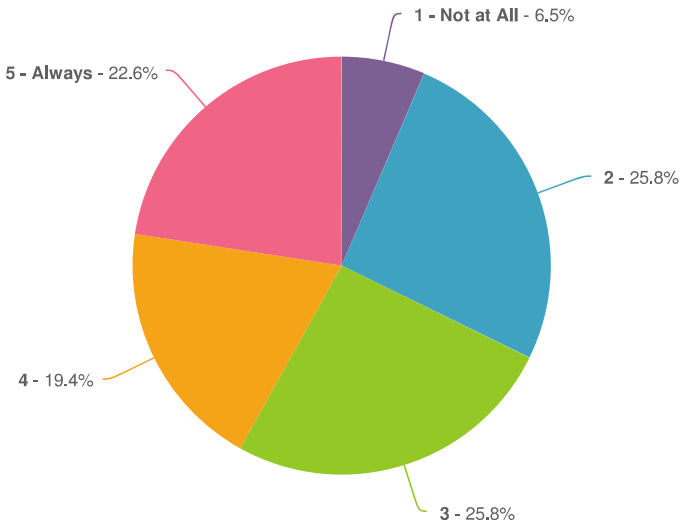
Comments

Count	Response
1	If this was done adequately, the CIP would better reflect the next board packet.
1	It is hard to get any feed back from stackholders
1	Some project managers regularly seek feedback. Many do not.
1	Unknown
1	i always request feedback, but often getting feedback from certain depts can be like pulling teeth
1	The Project Managers will work with the Consulting Engineer, the Operations Staff, and the Engineering Department. These are the only "customers and stakeholders" that Project Managers work with, and they gather feedback through design reviews at 30%, 60%, 90%, and 100%. It is imperative that Operations and Engineering get their comments together in a timely manner, in order to avoid change orders, lengthy addendums, and make sure that plans and specifications are properly issued.

6. Customers and Stakeholders are clearly defined for each project.

1 - Not at All	6.5%		2
2	25.8%		8
3	25.8%		8
4	19.4%		6
5 - Always	22.6%		7
		Total	31

Statistics	
Total Responses	31
Sum	101.0
Average	3.3
StdDev	1.2
Max	5.0



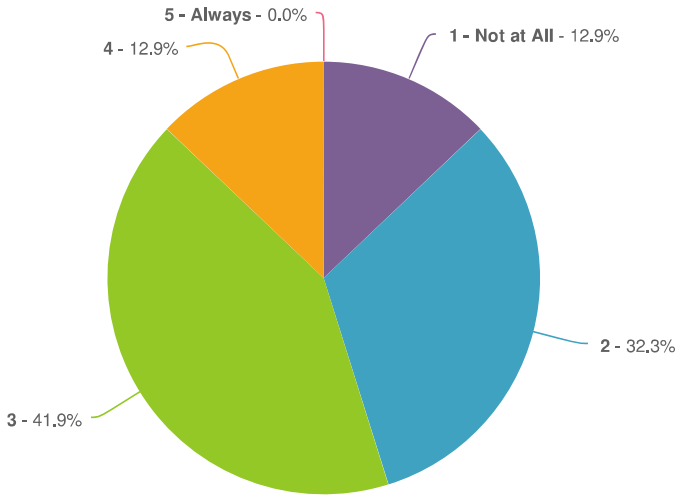
Comments

Count	Response
1	I'm sure some would say yes, however, it does not feel like it.
1	Only in general terms.
1	Stackholder relationshipd are ill defined
1	The definition of all of the stakeholders is usually not well defined.
1	Unknown
1	not really, i think we discussed this during the interviews so no add'l comments
1	The "customers and stakeholders" for Project Managers should be defined as the following: the Consulting Engineer, the NTMWD Engineering Staff, and NTMWD Operations.

7. We have an established Project Management Process that is used for the execution of our projects.

1 - Not at All	12.9%		4
2	32.3%		10
3	41.9%		13
4	12.9%		4
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	79.0
Average	2.5
StdDev	0.9
Max	4.0



Comments

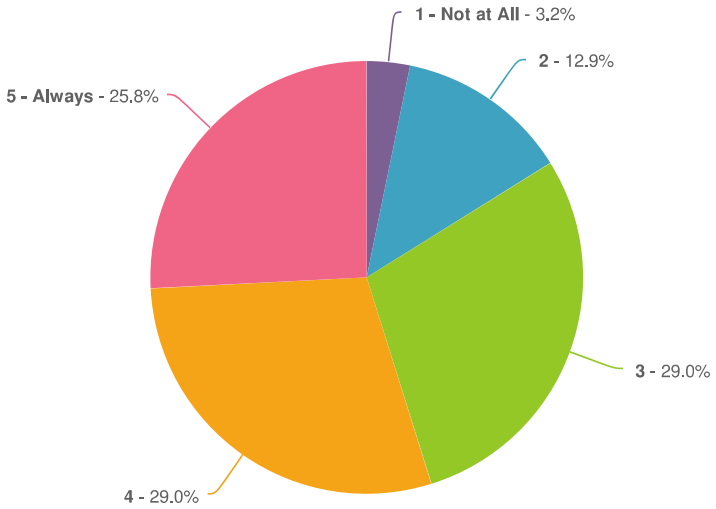
Count	Response
1	There is a process, but it needs some work.
1	Unknown
1	Work in progress
1	again we discussed in interview, but this needs better defined.
1	as a customer I am unaware of the process
1	no defined procedures
1	I think we do, however I don't think we have a flexible process nor use of various options - think we limit ourselves.
1	We are using the same project management process that was started in the 1970's. The project management process is poorly defined.
1	Limited. Consultants seem to be selected in a vacuum by a limited number of engineering personnel with little or no input from end users.
1	A Project Checklist has been developed for use by Project Managers. The current Engineering Manager enforces this use. It is a good way to make sure tasks get done, and nothing is left out.

8. Project team members and other key parties are engaged in a chartering or kickoff session at the start of important projects.

1 - Not at All	3.2%		1
2	12.9%		4
3	29.0%		9
4	29.0%		9
		Total	31

Statistics	
Total Responses	31
Sum	112.0
Average	3.6
StdDev	1.1
Max	5.0

5 - Always	25.8%		8
		Total	31



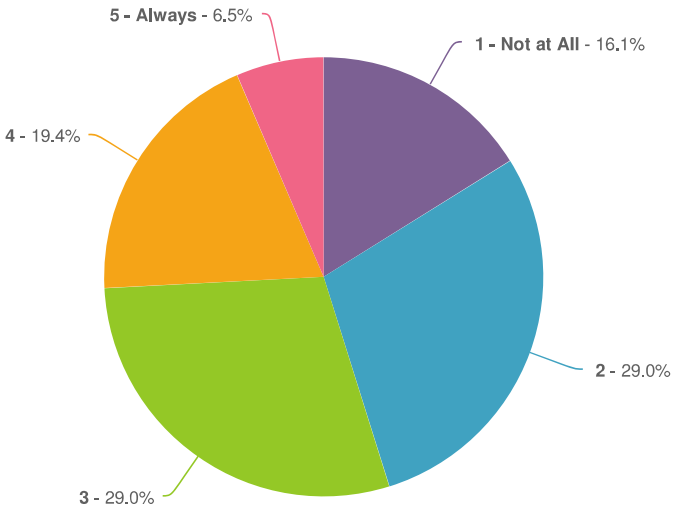
Comments

Count	Response
1	Loosely defined project kickoffs. No "parternering" involved.
1	Not sure
1	This area is much improved.
1	varies from project to project, no set way to this.
1	Kickoff Meetings are always scheduled after the Engineering Services Agreement (ESA) is awarded by the Board of Directors and after the Consulting Engineer signs the ESA.

9. Agreement on a work-plan is secured from all project team members before proceeding to execute the project.

1 - Not at All	16.1%		5
2	29.0%		9
3	29.0%		9
4	19.4%		6
5 - Always	6.5%		2
		Total	31

Statistics	
Total Responses	31
Sum	84.0
Average	2.7
StdDev	1.1
Max	5.0



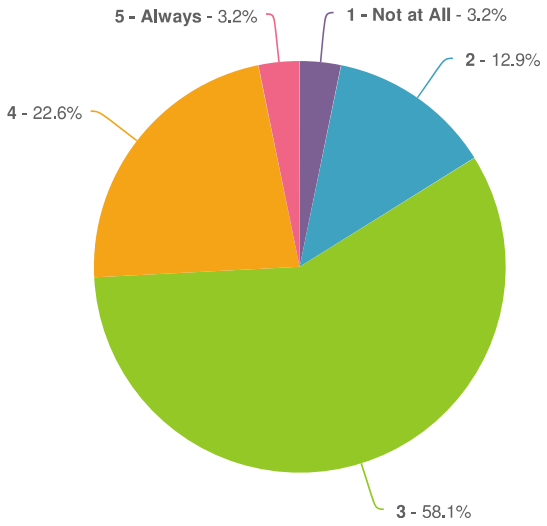
Comments

Count	Response
1	Sometimes items are added after a project is started
1	Technically I believe this happens, however, it is a very LIQUID plan.
1	Unknown
1	What is a work plan?
1	define team members as project managers don't have teams
1	Sometimes, the Consulting Engineer comes up with a schedule. However, oftentimes, the schedule will slip due to changes in scope, re-prioritization of other projects, scheduling outside meetings, or securing property. My recollection is there is really "no official agreement" on a work plan.
1	Engineering cannot be counted upon to fulfill agreed to plans. Frequently plans are changed without knowledge of end users.

10. Changes to the project are effectively managed.

1 - Not at All	3.2%		1
2	12.9%		4
3	58.1%		18
4	22.6%		7
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	96.0
Average	3.1
StdDev	0.8
Max	5.0



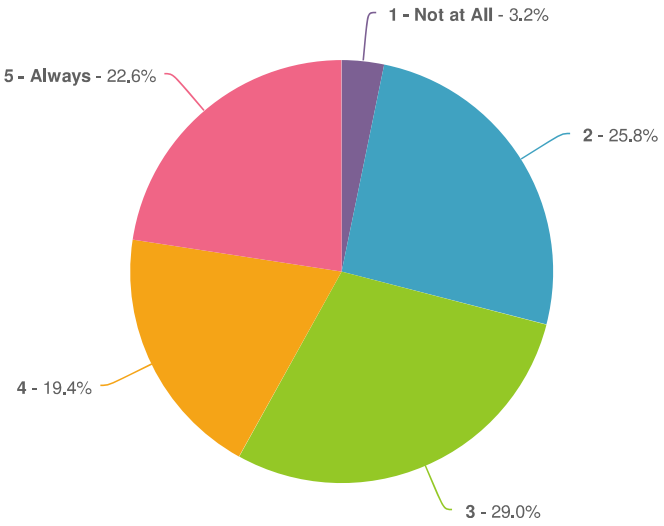
Comments

Count	Response
1	This is improving. Last year I would have marked this as a 1.
1	Unknown
1	No. There are way too many change orders and they frequently are not adequately communicated to end users.
1	we have issues with scoping projects b/c various depts all have wants, scope can grow expontentially and it's always a fight.
1	Not always. Sometimes, meetings are needed to discuss change orders, which may take weeks to discuss. It is more efficient to catch changes before the project goes out for bid. However, progress meetings are often held monthly, which are helpful in communication and bringing up issues. Construction inspectors are often involved with changes, and these inspectors are helpful being the "eyes and ears" of the job site, and providing their expertise and advice.

11. The project is closed out in accordance with defined procedures.

1 - Not at All	3.2%		1
2	25.8%		8
3	29.0%		9
4	19.4%		6
5 - Always	22.6%		7
		Total	31

Statistics	
Total Responses	31
Sum	103.0
Average	3.3
StdDev	1.2
Max	5.0



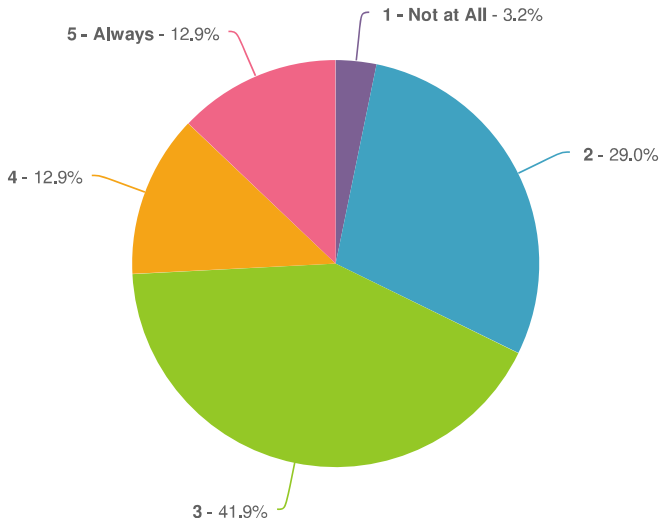
Comments

Count	Response
1	,again there is no standard process
1	Lake Tawakoni WTP was in svc in 2011, and the project is still open.
1	Projects often remain open a considerable amount of time (years)after they are placed in service.
1	as a customer I am unaware of the procedure
1	no defined procedures
1	We need to look closely at our procedures for project close out; would think we can identify areas to improve.
1	Projects tend to linger. At times projects are closed out with lingering issues which then have to be addressed by user departments and require operating funds to correct / complete.
1	A Project Closeout Checklist was developed years ago. Before a construction project is closed out, a typed list must go up front with the final pay estimate showing the Administrative Memorandum for Final Authorization, the Waiver of Lien, the Affidavit of All Bills Paid, and a Consent of Surety to Final Payment.

12. Personnel who manage projects are responsible for the technical and financial results of the project.

1 - Not at All	3.2%		1
2	29.0%		9
3	41.9%		13
4	12.9%		4
5 - Always	12.9%		4
		Total	31

Statistics	
Total Responses	31
Sum	94.0
Average	3.0
StdDev	1.0
Max	5.0



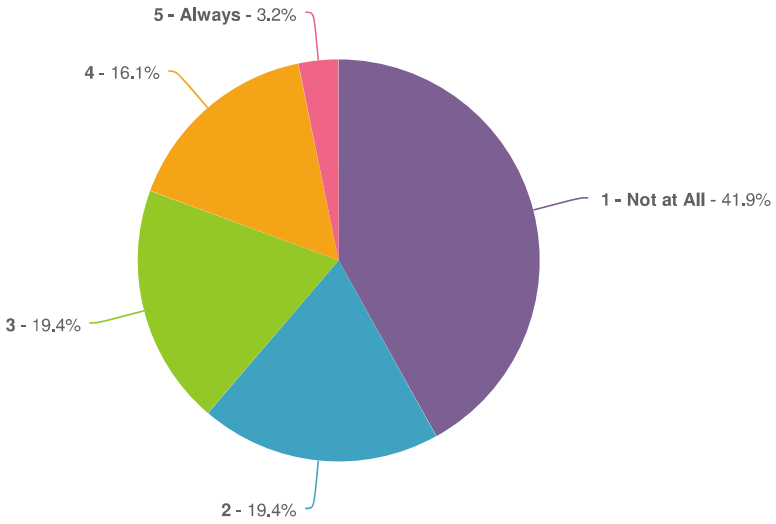
Comments

Count	Response
1	Unknown
1	seems to vary based on pm
1	I think we are hit or miss, as we clearl have the technical expertise for some projects but often rely solely on in-house PM for even those prjects where we don't have the necessary in-house skills.
1	Some project managers have more technical experience than others. Some bring this experience to the table, while others just let the Consultant do the technical work. I would like to see more Project Managers take an interest in the technical aspects. The financial results aren't often addressed, but a good design is one where change orders are at a minimum. If the project is at 25% over the original, the project must be re-bid. Project Managers are often asked now to get cost estimates at 30%, 60%, 90%, and 100%. This is to help NTMWD manage the costs of the project.
1	PMs do not have the authority to make decisions, minor decisions that have no financial impact or scope impact then yes, nearly any decision of substance has to be routed up for approval with some type of memo to get signed off on.
1	Some project managers do not take responsibility to assure expected outcome. This may be from lack of interest, inadequate inspection, inadequate oversight of contractors, etc.

13. There is a specific career path in the organization for personnel who manage projects.

1 - Not at All	41.9%		13
2	19.4%		6
3	19.4%		6
4	16.1%		5
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	68.0
Average	2.2
StdDev	1.2
Max	5.0



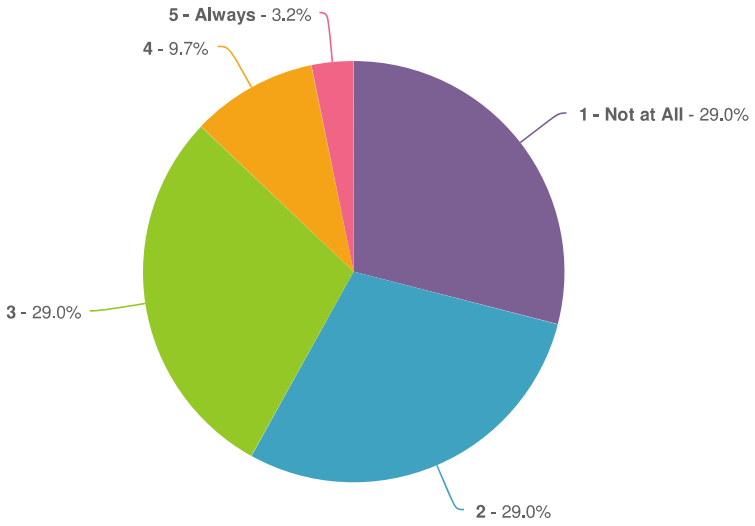
Comments

Count	Response
1	No obvious career path.
1	Unknown
1	There isn't any training or assistance offered to help improve as a project manager. There doesn't appear to be opportunity to advance in the organization. It really appears the preference is to hire outside personnel who have experience with similar organizations, however, in doing so the hires are typically nearing retirement and won't be around longer than a few years, about the same time it will take them to catch up the systems/plants and be even a slightly helpful manager
1	There are Project Managers who have been in the same position and the same pay grade for years. There needs to be some more emphasis on "promotion from within" based on merit. Moving up should not be based on "who are you friends with".

14. Project team members are recognized for their individual achievements on successful projects.

1 - Not at All	29.0%		9
2	29.0%		9
3	29.0%		9
4	9.7%		3
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	71.0
Average	2.3
StdDev	1.1
Max	5.0



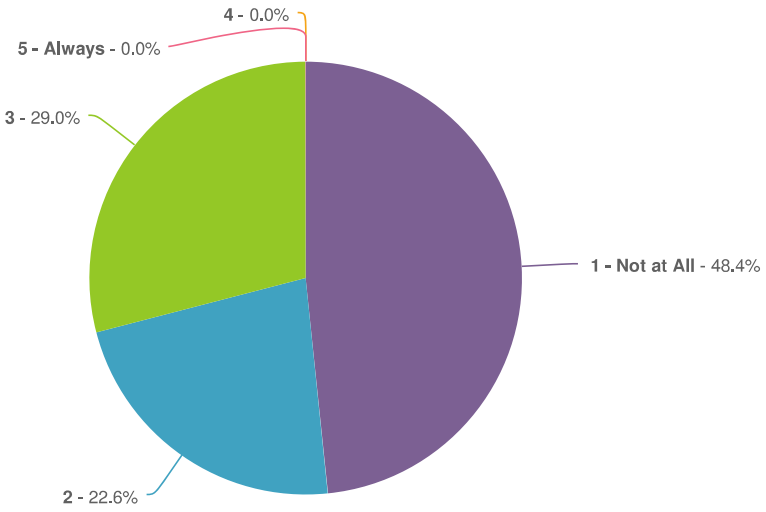
Comments

Count	Response
1	Some have been
1	this has begun to happen recently for large or very visible projects
1	Most people here just go from project to project. However, a few people in the past year have been recognized by the Board for their involvement as Project Managers on certain projects, and for their success.
1	there are a few recent recognitions, only driven by an award from an outside society. You get more attention for a failed project or a project that had a difficulty getting finished than a successful project.
1	Good and responsible project managers seem to get "rewarded" by getting extra work piled on them while less effective project managers get to slide on projects or simply get moved around.

15. Project personnel's compensation is linked to the performance of their projects.

1 - Not at All	48.4%		15
2	22.6%		7
3	29.0%		9
4	0.0%		0
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	56.0
Average	1.8
StdDev	0.9
Max	3.0



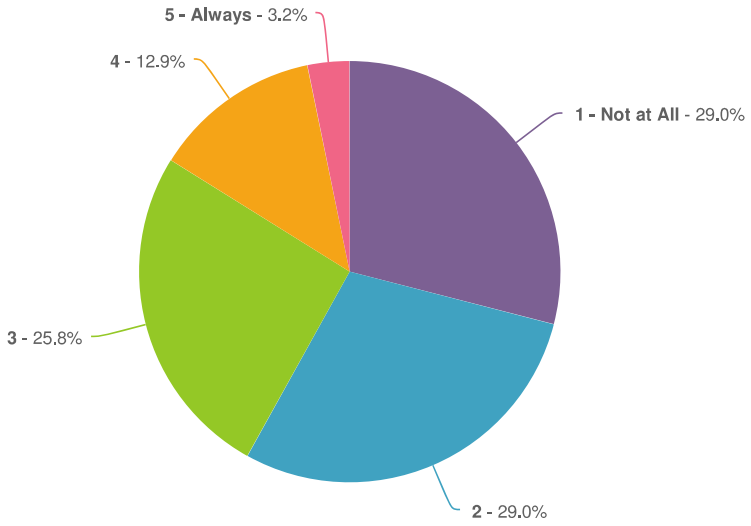
Comments

Count	Response
1	Unknown
1	I am not aware of any compensation link to performance. Recently, a new evaluation process was implemented at the District which could included a limited link to performance. However, there is no mechanism to give extra award to high performers.
1	For those at the top of their step grade, bonuses are sometimes given (I have received a few), but as far as completing a large project on time and on budget, there's really no financial incentive. However, for those who are not at the top of their step, a good performance review may mean moving up a step, but not a grade.
1	personnel compensation is based on a new evalution done by thier immediate supervisors. This evaluation has created very low morale based on HR limiting the number of employees who can receive the max raise (ie even if one supervisor gave all 10 employees a 91/100 score, he was told thats too high and to change them so they are lesser scores). Contrary to managments belief this absolutly accounted for several employees quitting/retiring soon after the evaluations. They don't want to admit and tried like to convince the employees that the reason others quit/retired was not related to the evals.

16. Mentoring is practiced as a means to promote ongoing development of project personnel.

1 - Not at All	29.0%		9
2	29.0%		9
3	25.8%		8
4	12.9%		4
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	72.0
Average	2.3
StdDev	1.1
Max	5.0



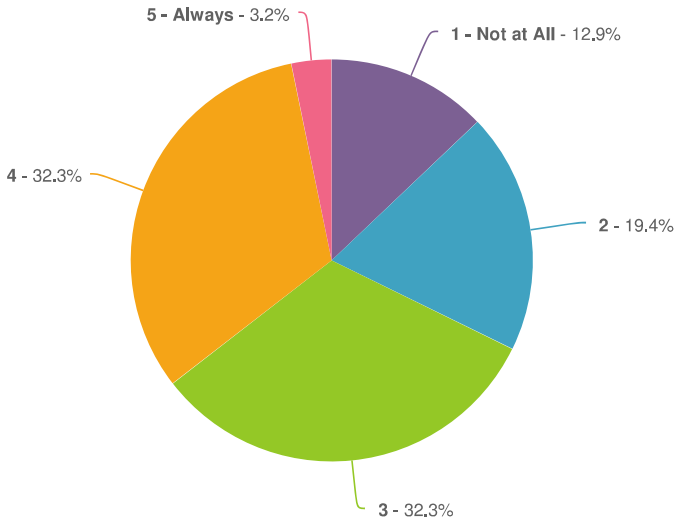
Comments

Count	Response
1	Not observed in any planned or obvious way. There may be some individual mentoring?
1	Unknown
1	absolutly not done in any way shape or form
1	as a customer I am not aware of mentoring. doesn't mean that it doesn't exist just that I am unaware
1	Mentoring has gotten better over the last 8 years. However, when I arrived, it was "sink or swim". I voluntarily give help to others on their projects, with things to look out for in design. This is to help promote education, facilitate teamwork, and aide in communication.
1	We would mentor the PM's much more if we had time. Investment in our people is one of the top five priorities, but we have no tools to achieve this priority.

17. We have a clearly defined set of procurement practices for developing agreements and contracts.

1 - Not at All	12.9%		4
2	19.4%		6
3	32.3%		10
4	32.3%		10
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	91.0
Average	2.9
StdDev	1.1
Max	5.0



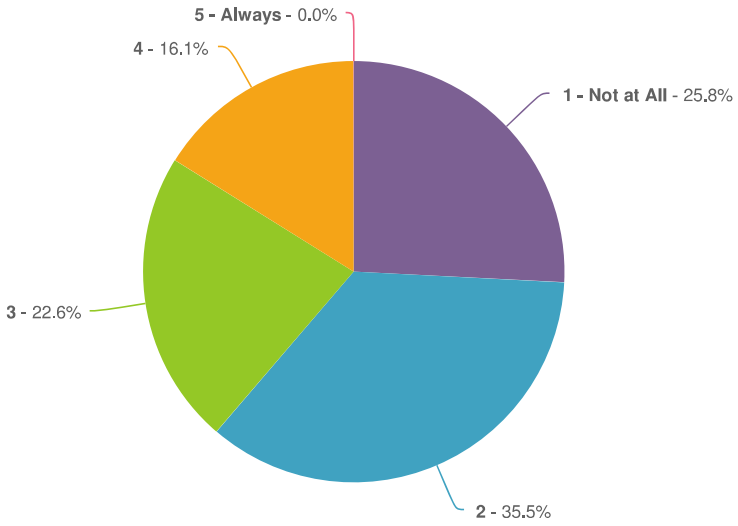
Comments

Count	Response
1	We have standard front end documents
1	if we do its not shared or readily available
1	no, the only standard practice is negociate consultants cost down as low as possible and expect them to bend over backwards when we change scope, increase the number of meetings, length of meetings, etc., all after the fact.
1	There are standards for Engineering Services Agreements concerning payment to Consultants, scoping, etc.
1	Poorly defined process for consultant selection. Basically, it has been whoever Engineering Dept. wants for a project with limited input from those for whom the project is intended.

18. We have a clearly defined set of work planning tools and procedures that are consistently used on our projects.

1 - Not at All	25.8%		8
2	35.5%		11
3	22.6%		7
4	16.1%		5
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	71.0
Average	2.3
StdDev	1.0
Max	4.0



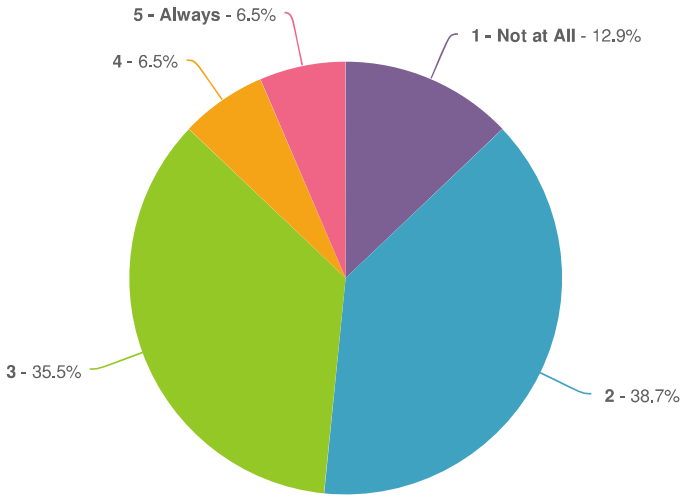
Comments

Count	Response
1	Unknown
1	Years ago, I helped develop some checklists. However, it wasn't until a few years ago it became more "standard' to use these.
1	Poorly defined process for consultant selection. Basically, it has been whoever Engineering Dept. wants for a project with limited input from those for whom the project is intended.

19. A clearly defined set of project financial controls is consistently used on our projects.

1 - Not at All	12.9%		4
2	38.7%		12
3	35.5%		11
4	6.5%		2
5 - Always	6.5%		2
		Total	31

Statistics	
Total Responses	31
Sum	79.0
Average	2.5
StdDev	1.0
Max	5.0



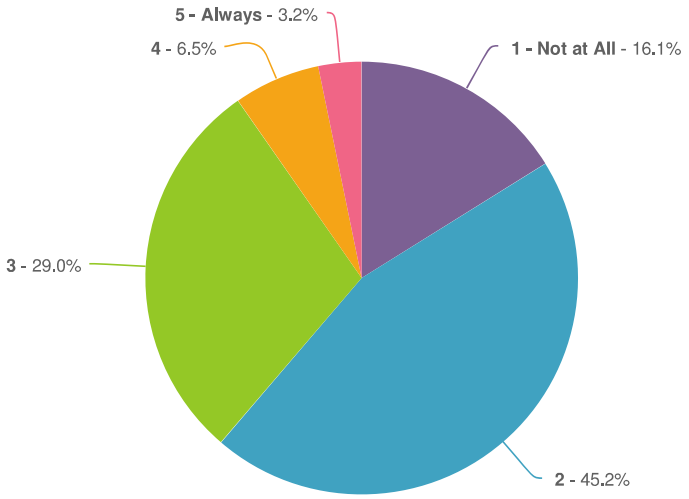
Comments

Count	Response
1	Accounting uses Incode for this.
1	Financial controls are well defined and consistently followed.
1	If we are awarding bonds for a contract in April, the contract should not go to the board in March (before we have the funding).
1	Cost estimates are to be received throughout the design of the project. This way, Finance and Accounting can be notified of cost increases and decreases. Funding for projects often relies on money from bond sales and from capital improvements.
1	Doubtful. Projects seem to have an unusually high number of change orders. Perhaps this relates to poorly defined expectations or poor oversight of projects.

20. Specific measures of project status, schedule and progress are used to take necessary actions on the project.

1 - Not at All	16.1%		5
2	45.2%		14
3	29.0%		9
4	6.5%		2
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	73.0
Average	2.4
StdDev	0.9
Max	5.0



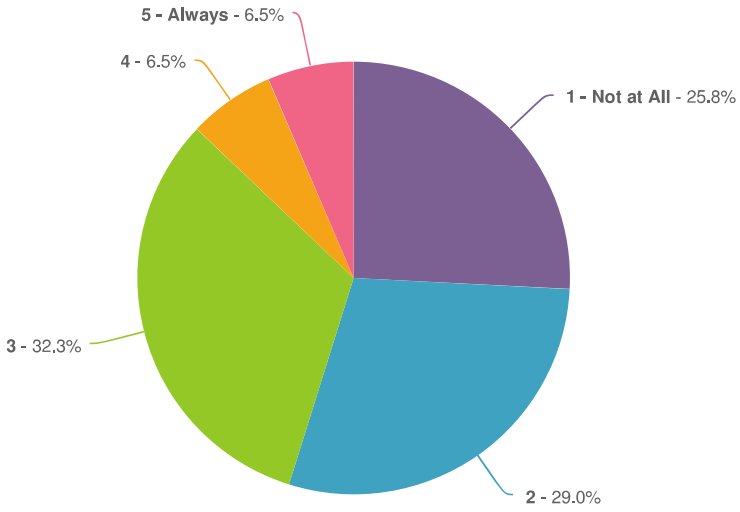
Comments

Count	Response
1	Unknown
1	as a customer this is not apparent
1	im not sure how to answer this so i picked a 3, id need a more specific question
1	I think this depends on the individual Project Manager. However, monthly progress meetings are strongly encouraged, and design meetings are often held at 30%, 60%, and 90%. The Engineering Department has been working more towards a goal in the past year of adherence to a timeline.
1	If there is any organized project tracking process, it is not obvious and not shared with those for whom the project is intended. Input/feedback is not sought by Engineering from those for whom a project was intended. There is no "report card" of a project's status.
1	This may be happening but we need to develop reporting procedures to keep executive leadership informed.

21. We routinely take lessons learned from our projects and share them with other project personnel to apply to subsequent projects.

1 - Not at All	25.8%		8
2	29.0%		9
3	32.3%		10
4	6.5%		2
5 - Always	6.5%		2
		Total	31

Statistics	
Total Responses	31
Sum	74.0
Average	2.4
StdDev	1.1
Max	5.0



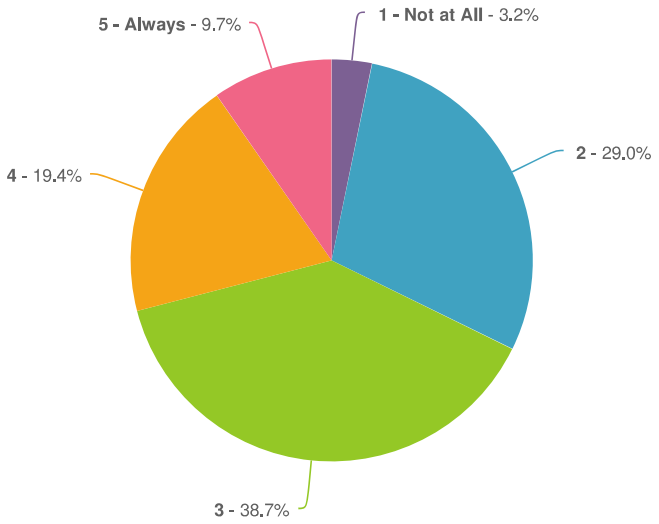
Comments

Count	Response
1	Unknown
1	We need a close look at this task and set procedures so we do this well routinely.
1	not able to comment on this
1	Since I have been here, this has been done on an informal basis. Some Project Managers will share with others (and look out for others), but others just look out for themselves.
1	Not observed at all. Projects continue to be awarded to contractors with quality control problems.
1	i'll give another PM a heads up on something that caused me an issue if i know they have something similar in the works, but beyond that not done

22. The necessary coordination between different functional groups occurs to ensure successful project execution.

1 - Not at All	3.2%		1
2	29.0%		9
3	38.7%		12
4	19.4%		6
5 - Always	9.7%		3
		Total	31

Statistics	
Total Responses	31
Sum	94.0
Average	3.0
StdDev	1.0
Max	5.0



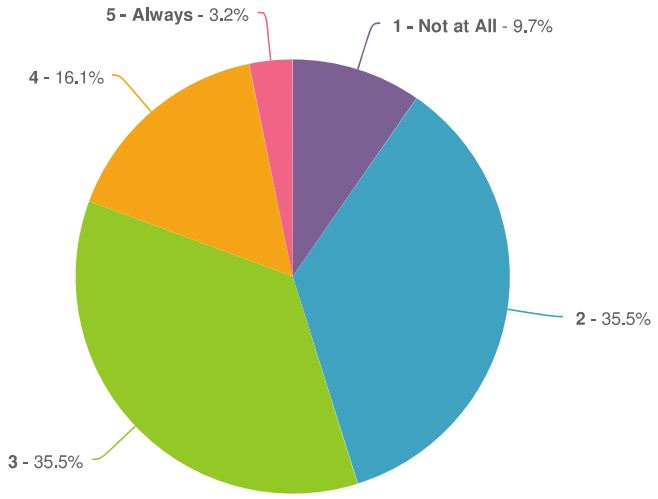
Comments

Count	Response
1	Unknown
1	not always
1	we try
1	This is the theory. However, if Operations does not communicate effectively with Engineering, the coordination doesn't always work properly.
1	Extremely limited. User departments are frequently not adequately updated on projects. Coordination needs improvement.

23. Decision-making on resource issues for projects is handled effectively by the different functional groups involved with the project.

1 - Not at All	9.7%		3
2	35.5%		11
3	35.5%		11
4	16.1%		5
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	83.0
Average	2.7
StdDev	1.0
Max	5.0



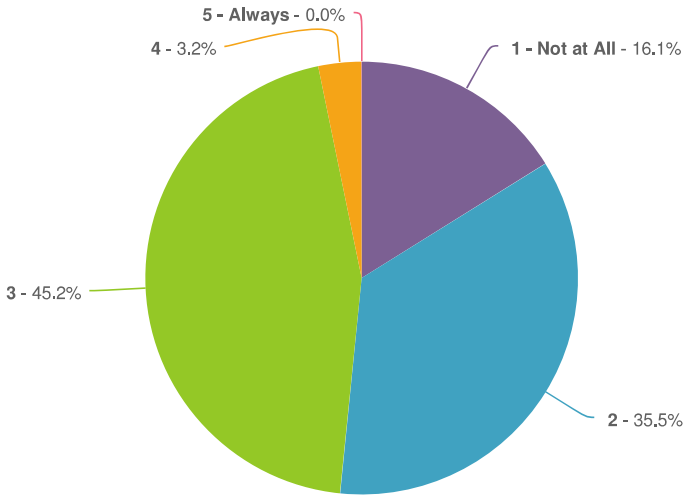
Comments

Count	Response
1	Unknown
1	no, there is no clearly defined decision maker for each dept/functional group
1	Too often Engineering makes decisions in a vacuum without seeking/accepting input from the user department.
1	"Decision-Making" is handled by Project Managers, Consulting Engineers, Program Managers, Operations Managers, and the Executives. Sometimes, this is effective. However, other times (particularly at the Executive Level) decisions are made based on money. The Executive Level needs to understand that in many cases, decisions based on money may just mean a second project will have to be done a few years later (which may be more costly), or a financial decision may mean more work for the Operations Staff (in that case, is any money being saved?)

24. The structure of our organization promotes effective project delivery performance.

1 - Not at All	16.1%		5
2	35.5%		11
3	45.2%		14
4	3.2%		1
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	73.0
Average	2.4
StdDev	0.8
Max	4.0



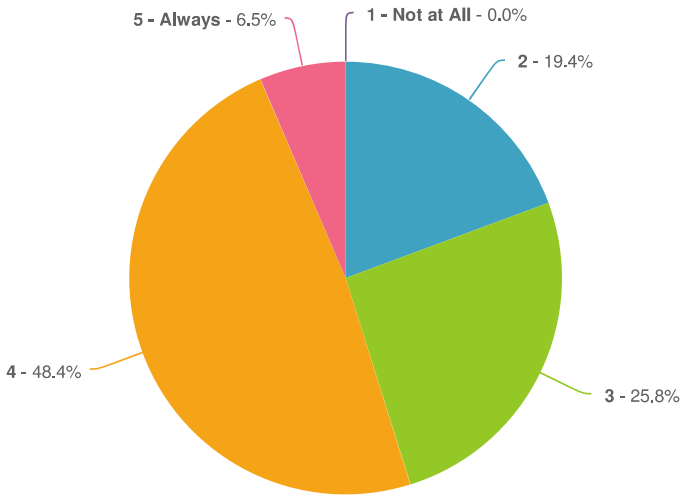
Comments

Count	Response
1	I believe this has recently changed for the better and am optimistic that it will continue to improve.
1	Response based on inability to close projects that have been in service for a considerable amount of time.
1	It does work, but I would like to see "less micromanagement". This would be a way for Project Managers to "take ownership" in their projects. It would also be an incentive for Project Managers to do a better job.
1	No. Too often the project managers are just interested in completing a project without regard to quality or the long term effect.
1	Turnaround for project changes is very slow, whether it is in the design process or construction process

25. Project Managers work effectively with other support services on the project.

1 - Not at All	0.0%		0
2	19.4%		6
3	25.8%		8
4	48.4%		15
5 - Always	6.5%		2
		Total	31

Statistics	
Total Responses	31
Sum	106.0
Average	3.4
StdDev	0.9
Max	5.0



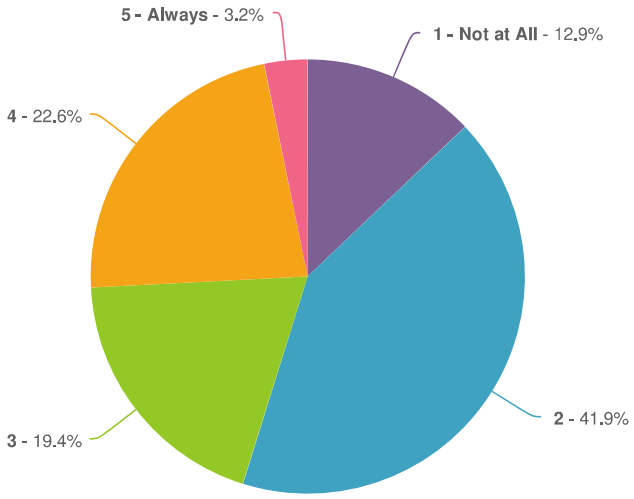
Comments

Count	Response
1	Many of them do an excellent job with the other support services (i.e. Water, Wastewater, Solid Waste), but there are a few who could do better.
1	Some project managers are very effective in working with user departments. Other project managers do not keep user departments informed, do not solicit or accept input, and some project managers do not even regularly attend meetings related to their projects.
1	project managers coordinate as best as we can to ensure project success, we take ownership in the project which ensures success on our side
1	Some pms are great and others less so with coordinating with other support functions. Lab work is usually an after thought often requiring the lab to quickly respond to a project that had been planned for months but the lab is given only a couple of days to develop work flows and obtain necessary supplies often resulting in over time and increased costs. Safety and regulatory compliance are also coordinated at last minute.
1	Accounting is not included in discussions regarding special handling of items such as participation due to errors and omissions.

26. The team assigned to the project is well-defined with roles and responsibilities clearly defined.

1 - Not at All	12.9%		4
2	41.9%		13
3	19.4%		6
4	22.6%		7
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	81.0
Average	2.6
StdDev	1.1
Max	5.0



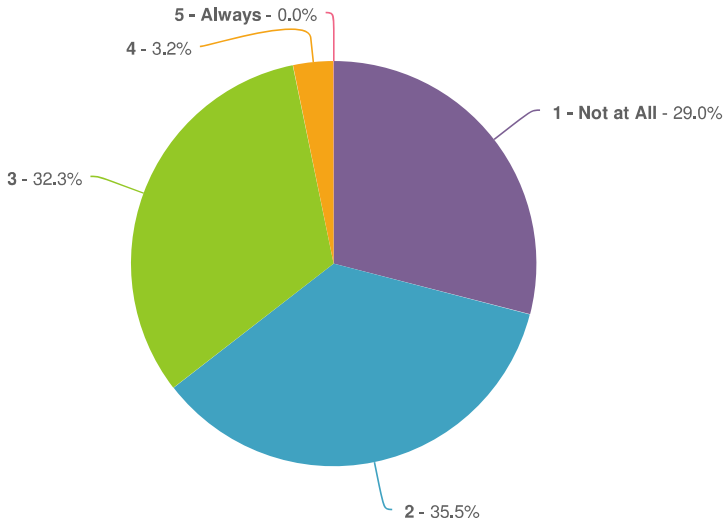
Comments

Count	Response
1	No formal teams are established.
1	Unknown
1	there is no team, its the project manager who coordinates, collects and implements
1	unable to comment on this
1	Team composition poorly communicated. Need to publish names of inspectors, etc. assigned to projects.
1	This is part of the problem. A Project Managers Job Description is very "vague". As a Project Manager, sometimes a Project Manager is involved in Operations, Inspections, Design, and Construction. It is multiple roles, not just one or two.

27. Our organization has an integrated set of processes and tools for accomplishing well-defined projects.

1 - Not at All	29.0%		9
2	35.5%		11
3	32.3%		10
4	3.2%		1
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	65.0
Average	2.1
StdDev	0.9
Max	4.0



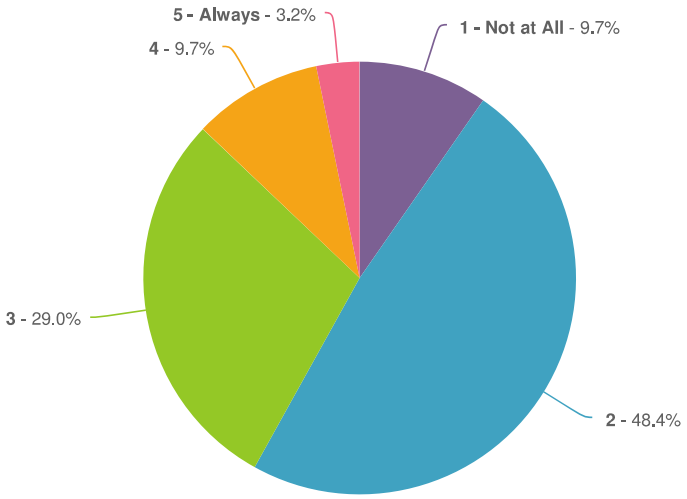
Comments

Count	Response
1	Eng needs better tools for the job.
1	To my knowledge, this has never been done.
1	Unknown
1	nothing is written

28. Consistent and defined methods are used to prioritize and select projects that will be executed each year.

1 - Not at All	9.7%		3
2	48.4%		15
3	29.0%		9
4	9.7%		3
5 - Always	3.2%		1
		Total	31

Statistics	
Total Responses	31
Sum	77.0
Average	2.5
StdDev	0.9
Max	5.0



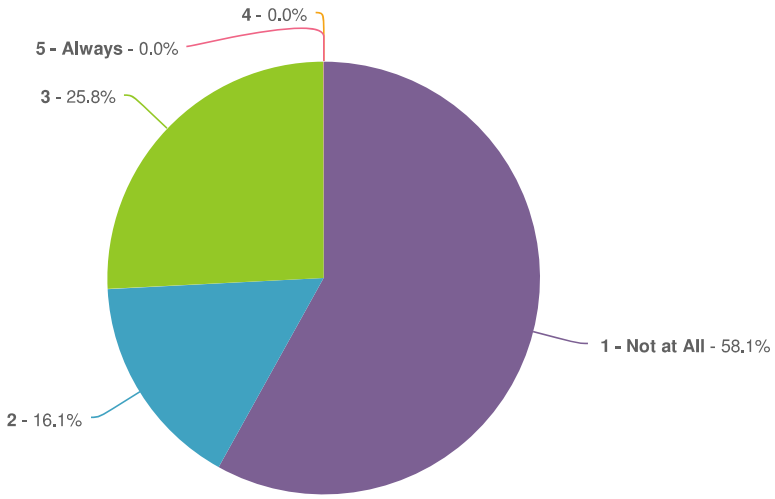
Comments

Count	Response
1	Certain individuals in Sr Management utilize power to realign priorities unexpectedly
1	N/A to my work.
1	The monthly CIP process was recently changed. It is very ineffective in prioritizing projects.
1	Unknown
1	not involved
1	this is outside the responsiblity of the project manager
1	we're not involved in the CIP process so from my perspective this not defined, i may know of an upcoming project im going to be assigned to by name, thats about the extent of my look ahead knowledge
1	The Capital Improvements Plan process has been in effect over the last four years. It has been helpful with prioritizing projects, and involves Operations, Project Managers, Program Managers, Executives, Finance, and Accounting. This is much better than it was ten to twelve years ago.

29. Training curricula have been offered that target improvement in Project Performance.

1 - Not at All	58.1%		18
2	16.1%		5
3	25.8%		8
4	0.0%		0
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	52.0
Average	1.7
StdDev	0.9
Max	3.0



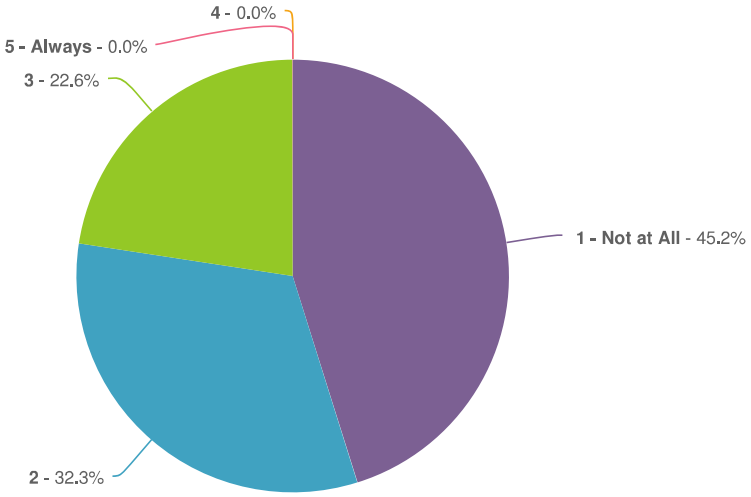
Comments

Count	Response
1	No training program or continuing education goals or programs appear to be established.
1	Not that I am aware of?
1	Unknown
1	all that has been learned is due the persitence of the project manager
1	While mentoring has improved over the last eight or nine years, official "training" in project management is non-existent. With the exception of a two day seminar I attended about three years ago, I would like to go to some more training.

30. Measures are in place which look at the overall effectiveness of our project execution as an organization.

1 - Not at All	45.2%		14
2	32.3%		10
3	22.6%		7
4	0.0%		0
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	55.0
Average	1.8
StdDev	0.8
Max	3.0



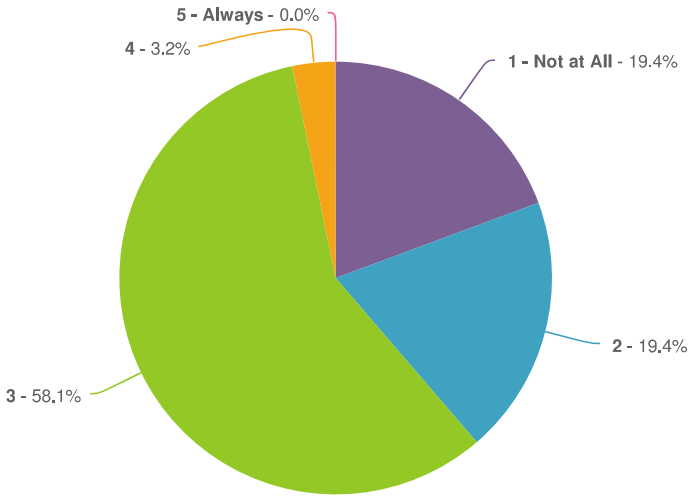
Comments

Count	Response
1	N/A to me (unknown).
1	Not other than this effort
1	There has been improvement in the last year.
1	To my knowledge, this has never been done.
1	Unknown
1	Many project managers appear to simply want to "check the box" on projects and have no apparent concern for the outcome and ultimate success of the projectd.
1	again supposedly there are end of project reviews for consultants, inspection, consultants, etc but ive never been asked to do one

31. Our project performance has continually improved over the past three years, in terms of financial results, quality, and customer satisfaction.

1 - Not at All	19.4%		6
2	19.4%		6
3	58.1%		18
4	3.2%		1
5 - Always	0.0%		0
		Total	31

Statistics	
Total Responses	31
Sum	76.0
Average	2.5
StdDev	0.8
Max	4.0



Comments

Count	Response
1	N/A to me (unknown).
1	Not observed.
1	There has been much improvement over the last eight or nine years, but it could be better.
1	There has been some improvement in the last year.
1	no, in previous years under different management the performance was vastly superior
1	unable to comment
1	since no feedback is generated or shared its hard to tell if we are effective. if the project works and operations is pleased we can assume we did a good job.

Appendix A2
Interview Summary

	PDI Interview Summary Issue	March 2015 Category	Comment Summary	Other notes
1	Decision making process - authority	Governance	Need to streamline decision making process and push responsibility for decisions down within the organization. All decisions being made at highest levels of organization can create delays. Noted that need to empower and then trust staff to make decisions.	Noted by PMs, execs, planning as efficiency issue. Includes numerous types of approvals such as permits, change orders, amendments, shut-downs, etc.
2	Ad memo development process	Delivery Process	Detailed development process (Deputy Director to Engineering Manager back and forth/Engineering Manager/PM back and forth) creates elevated workload given number of ad memos required each month for the Board.	In question is what should require submission to the Board as part of Ad Memo process (if this can be streamlined) and what information should be required in the ad memo (opportunity for improvement). Note real-estate requires some specific language in ad memo for legal reasons.
3	Change orders - authorization process	Delivery Process	Lack of flexibility surrounding change order management and authorization (what goes to Board for approval, levels of approval)	Several groups noted that allowing PMs/PgMs flexibility in funding set-asides that would allow for authorization of small COs without having to go to Board for approval will improve efficiency - pushing decisions down and trusting staff to make good decisions.
4	Meeting management	Communications	Too many meetings right now with right people often not engaged/invited and wrong people in attendance.	
5	Emails	Communications	Too many communications happen via mass email instead of face-to-face discussions	
6	Meeting management	Communications	PMs often do not coordinate within their own group when inviting Operations to meetings; often triple-booked on Ops side.	PMs should include agendas with every meeting invitation to help Ops prioritize their time/attendance. PMs should also coordinate via Outlook or other method to schedule Ops attendance at meetings.

7	Scoping	Delivery Process	Need to get right people engaged early on in scoping process. Need to include PM in scope development as well as Operations, Maintenance, Compliance and IT for instrumentation needs to promote engagement and that scope meets needs.	
8	Ad memo routing process	Document Management	Use of manual routing processes for ad memo distribution and recording of each step back to LaserFiche is creating inefficiences for all staff in PD organization	
9	Paper routing for approvals	Document Management	Use of manual routing processes for any document requiring review/approval of multiple parties is cumbersome and creates additional work for admin staff. Current process of uploading to LaserFiche also creating additional work.	
10	Shut-down process	Communications	PMs need to communicate more proactively with operations on shut-downs upcoming for their projects. Also PMs need to improve communication with inspections staff regarding upcoming shut-downs to allow for better coordination of field activities on jobs.	Several groups noted that institution of a document management system/dashboard system for monitoring schedules could facilitate this.
11	Shut-down process	Document Management	Manual routing process for shut-down form creates inefficiencies due to lost paper/slowness of manual process.	
12	Shut-down process - approvals	Delivery Process	Need to tie approvals to risk levels and streamline the approval process.	
13	Engineering selection process	Contract Management	Consultants with poor performance records sometimes chosen for repeat work or to perform work for which they are ill-suited	Consultant performance evaluations could assist with feedback to consultants. Engineering selection process standardization/improvements.
14	Scoping - scope development	Delivery Process	Scopes not well-defined and based on studies, but sometimes concepts not completely defined. Can create rework, inefficiencies, cost overruns, project delays.	Scope definition process improvements - inclusion of conceptual design prior to development of design scope. Also need to examine cost development/contingency practices.

15	Scoping - project funding	Delivery Process	Funding set in place before scope well-defined.	Scope definition process improvements - inclusion of conceptual design prior to development of design scope. Also need to examine cost development/contingency practices.
16	Roles and Responsibilities Definition	Governance	There is a general lack of clarity on roles/responsibilities throughout the delivery organization. Items noted specifically were definitions of roles/responsibilties between PrgM and PM, PM and inspections staff. Inspectors sometimes view they are doing PM's job during construction. Effectiveness could be increased by clearer divisions of authority and less micromanagement of decisions. Another example - planning currently handling variety of tasks not related to Planning which hampers ability to increase effectiveness in Planning areas. Not necessary to have a PM/PE to do all project work. Should explore having much of role move to an engineering tech/junior engineer position that could lead to upward promotion into PM path.	
17	PM performance	Staffing	There is a high level of performance variation amongst PMs. Many high performing, many low performing and little in the way of performance guidelines/reviews. This past year was first. Key performance issues noted were responsiveness, taking ownership of project, staying on top of action items/prioritization of work, relationship building within organization, understanding role of engineering as support function to Ops, commitment to get best value for NTMWD, adherence to quality in work products/processes.	Performance metrics needed (KPIs desired by management)
18	PM succession planning/growth	Staffing	Many PMs with high level of institutional knowledge; translating this down to younger PMs for succession planning is an issue.	Succession planning/mentoring and knowledge capture

19	Standard project delivery processes	Delivery Process	There is a lack of standard project delivery processes and ones in place may not be best practice. Some noted processes appear inefficient. Have processes in place for close-out, running a project.	Feedback includes a desire for improvement recommendations for repeatable processes.
20	Project data management	Delivery Process	There is no central project data management system. Data is scattered throughout multiple systems (Shares folders, finance, accounting, laserfiche); creates inefficiencies and bottleneck to getting work done. Have to chase down PMs to get answers. Need ability to track project financially and track schedules.	
21	Interface - PM/Inspector	Communications	PMs do not often respond quickly to inspectors on field issues, which can have cost/schedule impacts in the field. Getting answers from consultants can also be slow. PMs should get out in field more to improve understanding/engagement on projects. PMs should copy inspectors on communications with contractors as well and ensure inspectors get submittal information in a timely fashion.	Staff suggested weekly meeting with PMs/Inspectors for addressing issues and PMs getting out into field more.
22	Engineering staffing levels	Staffing	Understaffing leads to reactionary management. Upper managers can't focus on strategic items for department and PMs can't be forward-thinking.	PM and support staffing benchmarking tool provided to Engineering for use. Indicates additional PM and Admin/Tech support needed.
23	Scoping - project definition	Delivery Process	Need to revisit/monitor CIP to ensure projects are still needed that made it on the list several years back. Need to consider life-cycle costs and not just capital costs in studies.	
24	Equipment selection/deliveries	Construction Process	Equipment selections for Owner-selected equipment can sometimes lead to delays on projects.	
25	Standard specifications/details - equipment and installs	Construction Process	Standard details/specs would be beneficial to inspections staff/operations staff to ensure NTMWD gets product that meets needs and is cost-effective to operate. Caution that creating standard details/specs for too many items can constrain designs and vendor competition, therefore defining what will be included is an important joint decision by Engineering, Ops, and Maintenace.	Development of standard details/specs could be spun off as a distinct project.

26	Training	Staffing	Little to no training for PMs in place. With PMs aligned to one operating division for project execution, little opportunity for cross training exists. Would be beneficial to have budgets for training, authorization for engineers to get management training, attend more trade shows, trade organization participation, etc.	
27	Interface - PM/Finance	Communications	Need PMs to get monthly reports back to finance in a more timely manner and have more training on how to update the report. Need PMs to follow-through on checking insurability and timeframes of certificates. Need closures to happen more quickly. Noted need for electronic routing of finance report vs. manual markup.	Standard process/training need. Upgrade of Incode, planned later this year, will allow export of reports into Excel in more useful form for sorting and manipulation. Purchasing support needed either at Dept. or District level to track items like contracts and insurance.
28	Decision making process - documentation	Delivery Process	Decisions are not adequately logged/tracked. Can create confusion, rework, cost overruns.	Project decision logs
29	Schedule management	Delivery Process	Projects are not managed by schedule. Particularly evident during construction. Need to have schedule management processes and overall schedule coordination for shut-downs.	
30	PM role	Staffing	PMs are not engaged enough from a technical standpoint on projects and are mostly pushing paper. Feedback from some was that they would like to see this changed. Others noted that in-house performance of work in the past had created challenges/inefficiencies.	Both inefficient processes and staffing shortfall are contributing to many issues of prioritization for PM's time.
31	Job flexibility	Staffing	The current culture is that the job is 8 to 5 and that's it - minimal support of projects outside that window within engineering. This lack of flexibility to get the job done does not foster attitude of ownership/engagement. Currently, focus seems to be on micro-managing PM time in the office and less on actual productivity of the PM. More focus on accountability/job effectiveness instead of time at your desk would create culture change.	

32	File management	Document Management	Shares files give PMs flexibility, but lack of standardization creates difficulty in finding documents during project. Standard naming conventions would also be beneficial. Standard document delivery methodologies/requirements of contractors/consultants would be desirable. Also noted hard to find documentation in LaserFiche.	
33	Standard forms and templates	Document Management	Standard templates/forms would be beneficial. Right now, minimal standards. Have form for daily inspection reports.	
34	Interface - Engineering/Ops	Communications	Need better interdepartmental coordination and communication. Maintenance should be included in meetings and Ops should be more involved in construction, startup, and commissioning. Need Ops engaged in plan reviews.	
35	Contract management	Contract Management	PMs and inspectors need to hold contractors to the original contract schedule and to the specifications. There appears to be a general lack of understanding amongst PMs for the pressures Ops is under to perform once equipment is in place and not adhering to the contract creates issues for Ops.	Contract admin training could be beneficial
36	Career progression	Governance	In the organization, to move upward, you have to be a manager. More career paths leading upward in the organization would benefit organizational functionality and retention.	Can also be achieved by valuing PMs and PrgMs differently, since they are the most significantly externally leveraged (consultants and contractors) in the organization.
37	Project funding	Delivery Process	Ops projects are done by PO; no project number so hard to track by accounting. Funding by multiple different WW systems creates difficulties in managing funds and lack of flexibility in funding projects.	Standards for Ops project tracking; future consideration of funding structure if contract structures revisited.
38	PM assignment	Staffing	Would be good to look at what projects PMs are assigned to from location/technical standpoint. PMs often staffed on multiple projects physically separated across service area.	

39	Interface - Planning/Finance	Communications	Process needed to reduce quick changes in CIP for large dollar amounts that create issues for finance. Noted that perhaps more proactive upfront engagement of planning/engineering functioning together could facilitate this (2-4 years ahead instead of last-minute changes in CIP). Having cost information for projects readily available would facilitate this communication interface.	Additional norms for allowing these changes could also help.
40	Reporting	Delivery Process	Need better reporting capabilities and dashboards to facilitate schedule management/shut-down coordination, understanding of project status and tracking of funding mechanisms.	
41	Mobile document access	Communications	Field staff moving towards mobile devices for document access for inspections staff but not there yet. Having this capability (to access as-builts, project documents such as specs/drawings/submittals/RFIs remotely) would facilitate delivery. iPads for Board staff has been tremendous help to admin staff.	
42	Meeting management - minutes	Communications	Ops needs to see minutes from meetings to facilitate communications when Ops can't be present.	Minutes should also be easily found and accessed.
43	Change orders - decision process	Delivery Process	Ops needs to be included on change order process during construction to weigh in on proposed changes to faciltiies.	
44	O&M manuals	Construction Process	Noted need for more thorough and more timely O&M manual submittals. Often delayed and not thorough enough to meet Ops needs.	
45	GIS department staffing	Staffing	GIS staffing seems to be a bottleneck. Some aspects of the GIS systems themselves were noted as not being very accurate, partly due to requests for mapping that resulted in GIS data being revised to match aerial photography that was less accurate. Some elements of GIS have not been updated in past few years with as-built information. Need to develop vision and support to allow GIS to become the valuable tool it can be.	

46	Interface - PM/IT	Communications	IT should be centralized way to purchase software and manage warranties. Some PM and other complaints with quality and performance of hardware, particularly printers.
47	Project cost tracking	Delivery Process	Inspector time charged to projects; engineer time is not. Engineer time should be tracked to projects to have better accountability of project cost. Others said that PM time sheets were a waste of time.
48	Standard Specifications - Compliance Specifications	Construction Process	Need standard environmental spec and approaches for insertion in contract docs. Need standard safety spec for inclusion in contract docs that encourages a culture of safety and environmental compliance.
49	Safety training	Staffing	Need standard safety training for PMs/staff
50	Interface - PM/Internal audiences	Communications	Need better communication within and out of engineering. Need to create a culture of communication within engineering - let others know what's going on, what's coming up, key issues, etc.
51	Culture of Empowerment	Governance	Need to get PMs in mind set that it's OK to make decisions. Could be more efficient if have pots of money to address construction issues more cost-effectively/timely. Current progress in this regard by increasing CO authority. Looking at developing contingency allowances in budget to allow PMs to authorize consultant/construction contracts/changes without going to Board. These could be informed by consultant evaluations.
52	Maintenance	Staffing	Only one manager so understaffed for decision making/participation in meetings and reviews.
53	Maintenance	Delivery Process	Lack of preventive maintenance, more reactive maintenance. This can void warranties and create difficulties for Operations.
54	Inspections	Delivery Process	Would like to see more standards on materials inspection processes. Have high rates of failure on piping/equipment at NTMWD and much of this may go back to standard inspection processes and standard specifications.

55	Purchasing guidelines	Delivery Process	Purchasing is an issue, right now have to create a PO for any purchase and anything over $1000 necessitates getting 3 bids. Should consider changing purchasing guidelines to improve efficiencies.
56	As-built distribution	Document Management	PMs need to make sure as-builts are distributed to Ops/Maintenance or at least communicated where they are stored and when complete.
57	Standard operating procedures (SOP) development	Delivery Process	Engineering should ensure good SOPs developed before turn-over of process to Ops/Maintenance.

Appendix A3
Issue Prioritization

NTMWD PDI Assessment Issues List 1 - Low

Last Updated: 3/26/15 3 - High/Long

QS - Quick Start

		Solution				
Rank	**Issue**	**Complexity**	**Duration**	**Urgency**	**Implementation**	**Notes**
1 QS	Ad Memo Process (Engineering items)	1	2	3	Impl. Team	Include Ad Memo development process, templates, approvals both inside and after Engr creation and review. Implementation Team recommendation (Vicki Haselhoff, Erik Felthous, Joe Stankiewicz, Jeff Mayfield, Cesar Baptista).
2 QS	Document management systems for projects	3	2	3	Impl. Team	How project related documents can be efficiently developed, received, handled, shared, used, stored, and archived. Implementation Team recommendation (Kelly O'Brian, Cesar Baptista, Mark Christopher, Billy George, Aliza Caraballo)
3 QS	Plant and system shutdown processes	2	2	3	Impl. Team	Focus on early identification & tracking, delineating between approval and information in routing, decision authority. Different process/approvals for plant vs. system. Implementation Team recommendation (Olin Schiffman, Pat Chadwick, Walter Justice, Jesse Perkins, Corey Anderson).
4	CIP Planning Process	2	1	3	Impl. Team	Focus on early process and Ops/Maintenance involvement. Define both process and level of organization needed for advisement and decisions. In past needed an executive at that meeting, or else we couldn't progress.
5	PM & PD Support Staffing Levels	1	3	3	Engr. Mgmt	Per 3/20 Steering Cmte mtg, Ray to prepare staffing level for next 6 mos. for review by Execs. Staffing analysis benchmarking spreadsheet tool was populated with data and provided to Ray for use.
6	Define project delivery roles & responsibilities	1	2	3	Impl. Team	Clarify roles, responsibilities, and accountability on projects within and beyond Engr Dept.
7	Project Controls & systems	3	3	2	PDI Consultant or other	Develop strategy for multiple existing and proposed systems to meet requirements, including some level of workflow automation. Describe the effort needed to implement and maintain/operate in the long-term. Initial strategy provided as part of PDI Assessment effort.

NTMWD PDI Assessment Issues List 1 - Low

Last Updated: 3/26/15 3 - High/Long

QS - Quick Start

		Solution				
Rank	**Issue**	**Complexity**	**Duration**	**Urgency**	**Implementation**	**Notes**
8	Defining guidelines for funding sources	1	1	2	Impl. Team	Delineate and document guidance/norms for what will be funded via CIP, and what will be funded by operations budgets. Also modification process when things change, and how that works. Is this already sufficiently defined? Something to help PMs differentiate scope creep related to Ops from a legitimate CIP effort.
9	Purchasing process standardization and/or centralization	3	3	2	Exec. Mgmt	For executive management to discuss and address options of centralized v. dispersed purchasing function.
10	District standard details & specs	3	3	2	Engr. Mgmt	Recommend separate consultant agreement, facilitated by Engr. w/ input from Ops and Maint.
11	Setting consultant scope & fee	2	2	2	PDI Consultant or other	Reduce reliance on curves for pricing, scope adequate SDC budget for rapid responses, review for adequacy (careful not to remove scope and fee that will likely be needed).
12	Setting & Training PD processes & best practices	2	2	2	PDI Consultant or other	Includes meeting protocol and attendance, meeting agendas, meeting facilitation, meeting summaries focused on decisions & action items, schedule review & management, WBS, checklist tools, etc.
13	Performance reviews for consultants & contractors	2	2	2	PDI Consultant or other	Develop templates and guidance for use in performance reviews.
14	CM staffing decision matrix	2	2	2	Engr. Mgmt and/or PDI Consultant	Guidance on when internal v. external CM/inspectors might be used. As schedules change, this can become a challenge to appropriately staff and address changes.
15	Process/system for Engineering time sheets & Inspector Comp Time	2	2	2	Engr. Mgmt & Finance	Consider needs of engineering time sheets in upcoming time system upgrade. Consider removal of comp time for inspectors - limited value for complexity it adds to time sheet and management process.
16	PM role in consultant selection	1	1	2	Engr. Mgmt	Consideration of PM participation in consultant selection as owner and responsible leader of the proposed project.

NTMWD PDI Assessment Issues List 1 - Low

Last Updated: 3/26/15 3 - High/Long

QS - Quick Start

		Solution				
Rank	**Issue**	**Complexity**	**Duration**	**Urgency**	**Implementation**	**Notes**
17	PM input to inspector assignments	2	1	2	Engr. Mgmt.	Consideration of PM input and preferences in assigning inspectors.
18	Upgraded hardware for PMs (computers, printers)	1	3	3	IT	IT may need to plan for greater potential for electronic dependence in office and field which would affect hardware needs.

Appendix A4
Information systems Needs and Preferences

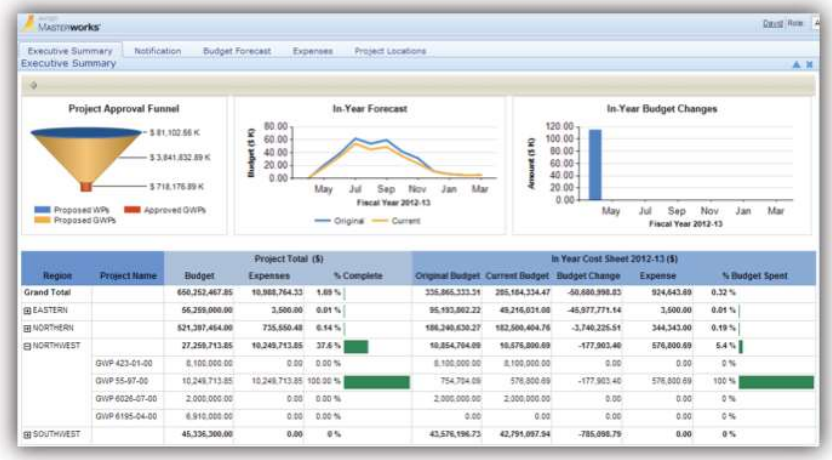
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Effective Enterprise-Scale Planning and Forecasting for Organizations With Large Annual Construction Project Costs

Aurigo Masterworks planning module (MPM) is a flexible and powerful analytical engine that resides in the cloud and enables enterprise-scale financial planning and forecasting, and automatically integrates actual project data as it's produced. And, MPM is interoperable with industry-standard planning tools like Microsoft's Project Server and Oracle's Primavera P6.



Aurigo Masterworks features dashboards and realtime reporting of key project indicators, like forecasts compared to actual costs.

MPM supports planning activities like scheduling, funding, and carryover forecasting, and provides a foundation for project progress reporting and expense tracking. It is intended for medium-to-large organizations that track hundreds of construction projects across multiple regions or departments, and over long, multi-year timelines.

MPM allows users to create and manage annual and multi-year monetary plans, create budget forecasts that are automatically updated by user-defined data such as amortization and interest capitalization curves. MPM can also be used to track and project funding sources and fund allocations, adjust spending plans based on fund availability and timing, track commitments, compare forecasted and actual expenditures, improve visibility of project financial data… in short, the Masterworks planning module gives project and department managers all the tools they need to use organization funds effectively when planning and executing construction and infrastructure projects. Specific tools include:

- centralized capital project financial planning
- project scoring and budget forecasts

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Tim Pratt, CEIS manager of Lincoln, Nebraska

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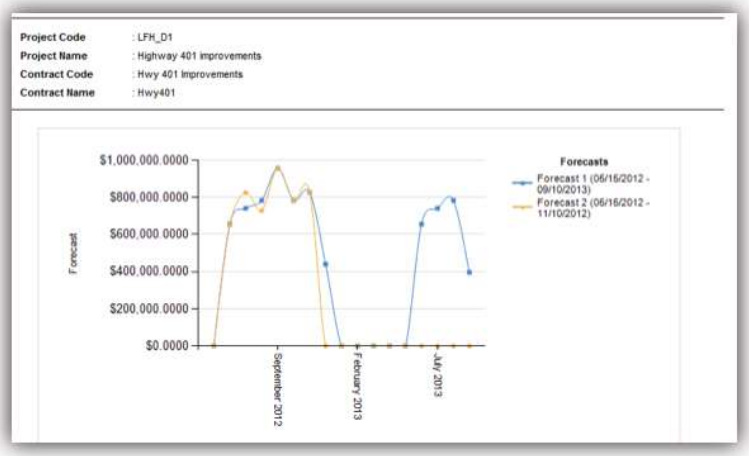
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- accurate cash flow prediction
- amortization scheduling
- track fund availability as part of project prioritization
- track actual project expenditures and compare to forecasts
- generate earned value, and track cost and schedule variances
- realtime visibility of key financial indicators
- increased budget control
- enterprise dashboards with visual indicators and drill-down capacity

The Aurigo Forecasting Engine

The forecasting engine in Masterworks provides predefined installation curves to quickly determine spends over the life of any given project. It also supports managing and updating the installation curves to keep forecasts accurate and up-to-date as known conditions change. The basic Masterworks software engine also produces easily configured forms, reports, and workflows that adapt to your existing procedures and reporting.



Graphs created in realtime compare forecasts to actual budgets.

- predefined and user-defined forecast curves
- library of forecast curves organized by project type
- quickly generate projected cash flows based on your curve parameters
- quickly generate the forms, reports, and workflows (routing and approval guidelines) required in your system

Project Budgets & Schedules

MPM allows users to create and track project budgets and schedules. Project budgets can be built on high-level estimates, or on known costs and budget details (or on a mix of both). MMPM generates forecasts based on installation curves that determine the spend pattern and project calendar for the project schedule—cash flows can be calculated on a month-by-month or annual basis. The planning module is designed to track detailed budget forecasts, with provision to create baselines and revisions requiring multi-level approvals. MMPM also supports detailed comparison between various revisions and forecast versions, for comparison and increased data visibility.

- quickly create budgets and schedules, and update as more data is available
- create budget baselines
- track budget and schedule revisions and enforce approvals as needed
- create project cash flows, with dashboards for transparent data access

Fund Allocation & Tracking

MPM enables convenient management of funding sources and tracks fund allocations. MPM allows you to track fund allocations across projects, and automatically apply fund adjustments to forecasts and budgets. MPM also tracks fund encumbrances, fund transfers, fund additions and tracks fund usage at a very detailed level. Configurable reports easily produce needed documentation of fund allocations.

- manage funding sources and track fund allocations and encumbrances
- track fund transfers and additions
- automatically apply fund surpluses/deficits to project forecasting and budgets

Multi-Year & Annual Plans

MPM has extensive multi-year planning capabilities that enable users to create plans and forecasts spanning multiple years, all of which can be reviewed and revised prior to plan execution. Enterprise level

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plans can be created by adding multiple projects based on various pre-defined and user defined criteria. MPM provides a strong search and recommendation engine that lists projects to be included in a plan based on project priorities, requirement year, budgets, and other critical parameters. This lets planners quickly generate plans that include detailed forecasts, including amortization schedules and interest capitalization projections.

MPM allows creation of multiple plans for different years, and the grouping of projects based on user-designated criteria. For example, users can create different plans organized by geographic region or organizational department.

MPM supports what-if analysis in planning phases by allowing users to compare multiple plans for proposed budgets, types of projects, work nature, and other criteria that enables planners to create accurate plans that are relevant in their existing systems. MPM allows users to copy plans, so that historical data can be applied to new plans and projects to create accurate and useful what-if scenarios.

MPM supports the amalgamation of multiple plans into a larger master plan that includes all details from each of the plans and allows users to view the combined plan. Users can work on the merged plan as they would on a normal plan, and drill down as needed to individual plan data.

Plans can be reviewed and revised, and MPM tracks revisions to the plan for future reporting and comparison. Plans, when approved, automatically update the project schedule, proposed start dates, budgets, and associated forecasts. All key reporting in MPM is available in both tabular and graphical formats, allowing users to quickly review and track plans as they change based on new data.

Approved multi-year plans provide annual plans that can be tracked and managed for the current fiscal year's projects. MPM provides comparison between planned and actual cash-flows for the current fiscal year, and for individual projects. Users can closely monitor and track their organization's month-by-month fiscal health using the various reports and alerts in the system. At year end, the system supports automatic roll-over of ongoing and deferred projects without data reentry.

- easily assemble multi-year plans
- track planning on year-by-year and month-by-month basis
- create amortization schedules based on asset categories and asset lifecycle
- evaluate projects for plan inclusion based on user-defined criteria
- track reviews and revisions to plans, enforce approval workflows as needed
- easily apply historical data from previous plans to new plans
- assemble multiple plans into a master plan
- what-if analysis
- graphic and tabular reporting
- automatic updating of planned schedules and budgets based on new data

Track Projected & Actual Project Costs

MPM allows you to track project expenses closely, and compare actual expenses to forecasts. Users can monitor project progress, schedule, and expenditures in near realtime. MPM enables users to adjust forecasts based on actual completions over the project lifecycle. MPM computes the earned value, schedule variance, and cost variance for the project. This lets users closely monitor fiscal health by project and by organization.

- monitor project expenses and schedules
- track budget revisions
- create cash flow reports
- create predictive schedules and budgets, modify based on actual events
- generate earned value, schedule variance, and cost variance reports
- track project health based on schedule and cost variance

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e-Builder is the only organization delivering a construction program management solution that combines cost, schedule, workflow and document management with built-in reporting and 3rd party integration tools. e-Builder Enterprise is a complete solution designed at its core from the owner's point of view.

Project costs and schedules are always interrelated. Following a natural progression, e-Builder Enterprise helps you manage your construction projects throughout their entire lifecycle – from planning and design all the way through construction and operations.



Planning

Whether your budget is in the billions or just one million, the goal is the same – make informed decisions about which projects to include in your capital plan, when to execute them and how to do so cost effectively. Thanks to e-Builder Enterprise, the process is no longer cumbersome and full of risks.

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- Consolidate the cost, schedule, scope and other assumptions for analysis and future reference
- Easily define and prioritize potential projects based on strategic, financial or other criteria
- Align project budgets and milestone schedules to funding sources and cash flow requirements
- Ensure compliance with capital authorization approval processes

Back to top

Design

The project design phase requires lots of document sharing, revisions, reviews, approvals and more sharing. Without proper tools, project design can be time-consuming and result in costly errors and oversights.

Improve design quality with e-Builder Enterprise...

- Give your entire project team real-time access to the latest design drawings, documents and BIM data

Industries Served (/industries-served)
Healthcare (/healthcare)
Higher Education (/higher-education)
Government (/government)
K-12 (/k-12)
Other (/other)

- Automatically track and archive all design revisions, mark-ups, notes and approvals
- Expedite approvals using electronic notifications and automated business processes

Back to top

Procurement

Traditional construction bid preparation, distribution and evaluation is difficult and expensive. Printing costs are skyrocketing. Information requests get lost. Organizing the different bidder responses is time-consuming and bid comparisons often challenging.

Save money and time with e-Builder Enterprise...

- Eliminate printing by giving all your bidders safe, secure online access to the latest bid packages and project documents
- Provide all bidders online bid invitations and collect all responses electronically
- Easily compare all bids side-by-side making evaluations and award decisions faster

Back to top

Construction

Once in the construction phase, your world becomes all about the schedule, costs, change orders, issues and a myriad of other details. Surprises can be a daily occurrence.

Eliminate cost overruns, mitigate claims and shorten projects with e-Builder Enterprise...

- Gain visibility into all project costs, eliminate overruns and reduce your contingency funds
- Streamline your construction administration with consistent business processes, up-to-date project documentation and real-time reporting
- Eliminate surprises by electronically managing change orders, budget changes, purchase orders, contracts, change orders, invoices and other approvals
- Keep everyone accountable with automated task notifications and tracking from project start through to occupancy

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Operations

Keep your building's history at hand to eliminate operation and maintenance issues such as missed permits, misplaced manuals and unchecked warranties.

Reduce operational costs with e-Builder Enterprise...

- Efficiently operate and maintain your building using historical project information

- Eliminate contract or permit compliance issues with simple to use, yet sophisticated business process automation
- Streamline the warranty and maintenance process including requests, follow up steps and reporting

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PRODUCTS (/PRODUCTS)

SERVICES (/SERVICES)

INDUSTRIES SERVED (/INDUSTRIES-SERVED)

COMPANY (/WHO-WE-ARE)

RESOURCES (/RESOURCES)

LET'S TALK (/REQUEST-ONLINE-DEMO-E-BUILDER)

Contact (/contact-us) Support (/services/support) Careers (/who-we-are/work-for-ebuilder)

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(https://www.youtube.com/user/eBuilderSof



WHAT IS PROCORE?

Procore provides cloud-based construction management software to over half of a million registered users. Procore offers a secure management platform for all types of construction projects including industrial plants, office buildings, apartment buildings, university facilities, retail centers and more.

Procore offers world-class training, implementation and a superior customer support experience. Built for general contractors, owners, architects, construction management firms, specialty contractors, engineering firms and subcontractors, Procore improves project communication and collaboration.

BENEFITS

- Intuitive and easy to use interface
- Unlimited users, data storage, training, and support
- Accessible from any web browser, tablet, or smartphone
- Secure, automatic real-time backups of project data
- Standardize processes and streamline communication
- Enhance project team collaboration with a single platform
- All product updates are included at no additional cost

Inc. 5000

Proud to be recognized by Inc. Magazine as one of the fastest growing private companies in America, Procore focuses on improving collaboration across project teams. Offering customizable tools to automate project management, Procore is available on any web browser or Internet connected device.

PROCORE™
CLOUD-BASED CONSTRUCTION SOFTWARE

WWW.PROCORE.COM
866.477.6267

DOCUMENT CONTROL TOOLS

RFIs: Create, distribute, and monitor RFIs to ensure that projects run smoothly and stay on task. Architects and engineers can respond by email without logging in.

SUBMITTALS: Track all steps in your submittal register and approval process. Request and collect online approval from the architect and design team, and send overdue email notifications.

DOCUMENT MANAGEMENT: Manage, track, and share all project documents and file types. Procore offers unlimited storage capacity and version control, and anyone on your project team can upload files.

TRANSMITTALS: Manage the transmittal process and send attachments by email. Easily track and export as PDFs.

DRAWING MANAGEMENT: Ensure that project team members always work off the current set of drawings with real-time access. Manage, share, and revise project drawings, and automatically save all revisions.

MEETING MINUTES: Manage meetings by emailing agendas, creating and distributing detailed minutes, and scheduling follow-ups to address open tasks.

FIELD TOOLS

PUNCH LIST: Create and manage punch list items from smartphones, tablets and computers. Assign items, filter by status, and send overdue notifications via email. Capture and annotate pictures from the field.

PHOTOS: Upload, mark up, and caption unlimited photos by email or smartphone. Store photos by category with automatic back ups, and grant access to all project team members.

SCHEDULE: Procore's Schedule tool integrates with P6, P3, SureTrack, and MS Project. View Gantt charts, access project schedules in real-time, and distribute weekly schedules to your project team.

DAILY LOGS: Record daily jobsite activities that can be seen by the team in real-time. Give your field team a simple platform to log and share information.

CONTRACT MANAGEMENT TOOLS

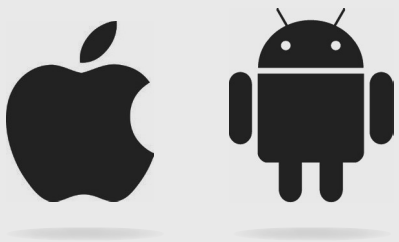
CONTRACTS, COMMITMENTS AND CHANGE ORDERS: Generate subcontracts, purchase orders, and change order documents. Streamline the change order approval process electronically.

BIDDING TOOLS

BIDDING TOOL: Send project bid invitations to vendors. Distribute bidding documents, track intent to bid, and collect bid responses. Vendors can access bid information and select their intent through email. View vendor bids on a side-by-side comparison by cost code.

MOBILE

Access Procore remotely with **Procore for iPad**, **Procore for iPhone**, **Procore for Android**, and all **web browsers**.



- Create Punch Lists, RFIs and Daily Log entries
- View current Drawings, Documents, and Submittals
- Upload and markup photos
- Access the Directory
- Enter Time Card data
- Work in offline mode and sync when connected

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Projectmates

Construction Program Management Software

Document Management

The traditional document management system is fraught with potential issues. The very nature of managing the many different details and personnel on a project lends itself to challenges, especially when it comes to storing, managing, and tracking all the related documents.

Projectmates changes that with a Document Management system that was designed to anticipate the needs of project managers and address the shortcomings inherent in the process.

Anytime, Anywhere Access
The ability to access and reference documents whenever and wherever the necessity arises is critical to effective project management. With Projectmates, clients can securely login using any desktop, mobile device, or tablet to view documents, make redlines, accept changes, email approvals, and more.

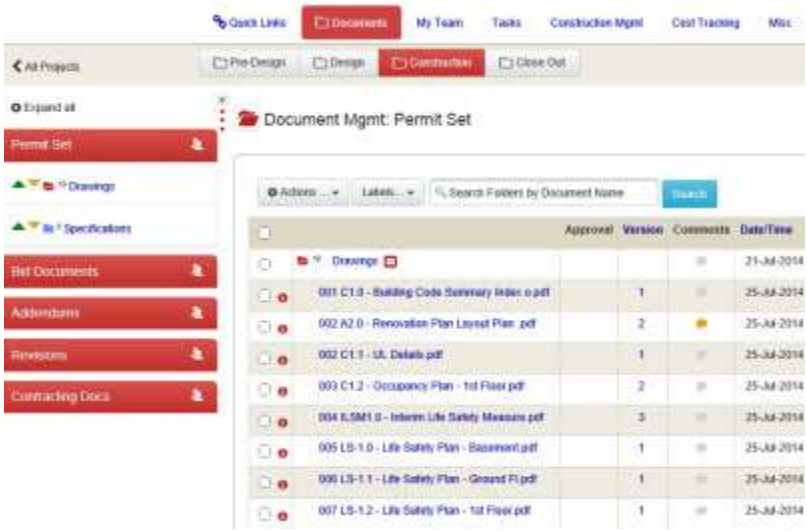
Additional benefits of the document management system available through Projectmates include:

- Drag and drop file upload on any browser
- Customizable tabs and menu structure
- Customizable role-based access privileges
- Explorer-like folder structure
- File access tracking and audit log
- Email directly into Projectmates

- Automatic document format detection
- Supports X-Refs for drawings
- Email Notifications & Reminders
- Version Control
- Instant email notification
- Watch folders for critical email notifications

- 

- Mobile Access
- Construction drawings are accessible right from the field on tablets and smartphones.

- 

- File Sharing
- Manage, organize, and share all your project files within the document manager, including AEC documents, drawings, and specifications.

Workflow Management

The effective management of any project can easily require oversight of dozens or more facets at any one time. Projectmates' workflow management features provide an intelligent system that automates the entire process, making tasks such as tracking requests and receiving approvals virtually effortless. Clients will find a simple and easy-to-use web interface where requests are submitted and tracked. Email notifications are immediately sent to parties responsible for handling the requests, and actions are monitored in real-time. All guesswork as to where requests should be sent is eliminated, saving time and a lot of effort

RFI
Built on collective industry knowledge and best practices, Projectmates' construction management tools are an integrated part of our solution. Clients can tailor the RFI workflow within Projectmates specifically to meet the needs of the organization. Depending on the rights of a project participant, a user can create, view, route, respond, close, and resubmit an RFI all within Projectmates.

When an RFI is created in the system the responsible party will be notified via email. The RFI will appear in the responsible party's Ball in Court. If the RFI becomes overdue, Projectmates will send an automatic email reminder. A log of all RFIs is kept in Projectmates with the ability to drill down and view all the details of any RFI.

Submittals
Submittal is a process by which design and construction details are reviewed and approved. Contractors or other authorized team members can attach cut sheets, drawings, material safety data sheets, and other electronic files. A significant amount of money can be saved by using the electronic submittal process to review and approve shop drawings.

When a submittal is created in the system the responsible party will be notified via email. The submittal will appear in the responsible party's Ball in Court. If the Submittal becomes overdue, Projectmates will send an automatic email reminder. When a submittal is opened, the user will have the information about the origination of the submittal, the routing of submittal and the final action taken. Projectmates also allows reports to be run, printed, or emailed from within a single workflow item.

Field Reports
Project Managers, design professionals, and construction site crew can report and track the work and progress of the project using Field Reports. For field personnel, the report is broken down into 6 sections: Work Description, Weather, Manpower, Equipment, Events, and Attachments. The report may be saved for quality assurance and review before making it available for other users. Daily Field Reports can be copied from day to day and modified as needed. This is a huge time saver for the construction manager or superintendent. Reports can include digital photos, sketches, or other attachments.

Punch List
In addition to project schedules, the Action List module efficiently serves as a reminder to project participants regarding their tasks and task completion dates for tracking and completing the requirements for the punch list. Punch lists, ongoing action items, and closeout checklists can all be created and tracked separately in Projectmates. The tool allows you to keep track of incomplete issues, deadlines, and responsibilities. The tool also allows users with appropriate rights to verify issues marked as complete. Users assigned an action list item will receive an automatic email triggered by the system. When logging into Projectmates, the user will also see the action list item in Ball in Court. Additional communications can be triggered by the user at any point.

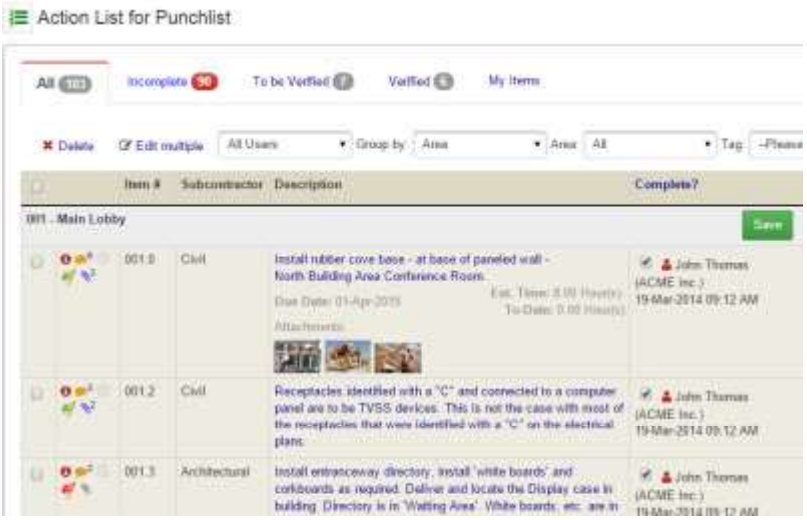
Meeting Minutes
Projectmates' Meeting Minutes allows you to record minutes and to assign action items. You can track due dates, status, and completed dates, as well as distribute minutes to attendees and others via automated email.

Even before a meeting occurs, Projectmates facilitates the meeting process by allowing coordinators to create meeting agendas for any scheduled meeting so that team members can see what topics are planned for the next meeting. After a meeting, if an agenda was prepared before the meeting, it can be converted into meeting minutes with the click of a button.

Discussion Forum
Discussion forums are one of the simplest, most effective ways of enabling team members to trade ideas at a distance. You can use the Projectmates discussion forum to conduct topic-based discussions among team members. Multiple discussion "threads" can be created and designated specifically for various projects or departments within a property with appropriate access rights configured.

Photo Management
Every workflow process within Projectmates supports photo attachments, including RFIs, punch lists, discussion forums, and field reports. In addition, Photo Albums are designed specifically for viewing and sharing image files. Getting pictures into Projectmates is a cinch and can be done at the jobsite on a tablet or smartphone. You can browse photos with small thumbnails to see a few at a time, create a slide show, print or email a printer-friendly album, or download originals to a local drive. Along with image viewing, Photo Albums have many more functions for image management, including changing orientation and adding titles.

Individualized Solutions
Don’t see what you need? Projectmates also offers the ability to customize your modules using our proprietary business process creation tool. The possibilities are endless!



Project Closeout

Collaborate with contractors via the punch list to get the job done right and on time. The punch list is just one of several features to manage project closeout.

Contract Management

Built on collective industry knowledge and best practices, Projectmates provides construction accounting based on AIA standards. The contract modules provide ability to create budgets, bid packages, analyze and compare supplier bids, and convert bids to contracts. Contracts, proposal requests, and change orders can be tracked, purchase orders can be issued, and invoices and pay applications can be created. The built-in logic and approval process makes it easy to keep contracts, purchase orders and invoices synchronized. The budget becomes the capture all for all financial details within a project.

Budget
Projectmates provides the ability to link your estimated, committed, anticipated, and actual costs to your project's scheduled work breakdown structure, allowing you to track your costs throughout the project's lifecycle. Projectmates cost management tool is flexible, allowing you to track your costs by a specified group/category, cost accounts, funding sources, or WBS, and calculate subtotals automatically. Projectmates will red flag commitments that are over budget.

The budget is the capture all for all financial aspects of the project. Costs are automatically updated as contracts, change orders, purchase orders, and invoices are created in Projectmates, and are tracked as separate columns in the budget. Cost and invoice totals are also automatically calculated. Key Performance Indicators are displayed if any potential problems arise such as commitments that are exceeding your original budget.

Bid Buyout Package
Line items in your budget group can be selected, packaged together, and sent out for bids to various contractors. If you do not wish to create a package using line items in the budget, there is also the option of creating a package by entering items manually or importing them. Multiple bid packages can be prepared and associated with a single bid.

After bids have been received through the Bids and Plan Room, the procurement manager can compare the bids side by side. The bid analysis grid highlights the lowest bidder for each division or section of the buyout package.

Contract & Change Order
Within the Projectmates contracts module multiple contracts can be created within a single project. From beginning to end, Projectmates can automate the entire lifecycle of your subcontracts. Contract data can be exported into Microsoft Word format using the pre-formatted Word templates. With Microsoft Word's mail merge feature, contract data can be populated from Projectmates into your custom contract.

Projectmates provides modules for RFIs, work directives, proposal requests, and change orders to document changes that happen during a project that affect time and cost. Proposed change orders and change orders can be created if changes are needed to the original scope of a contract. Clients can configure and track the reason codes for all change orders.

Once a contract has been approved, external contractors can create Change Order Requests and Change Orders in Projectmates. With one click, the vendor starts the approval process. Responsible parties will be automatically notified. Internal and external project participants can attach or upload supporting files.

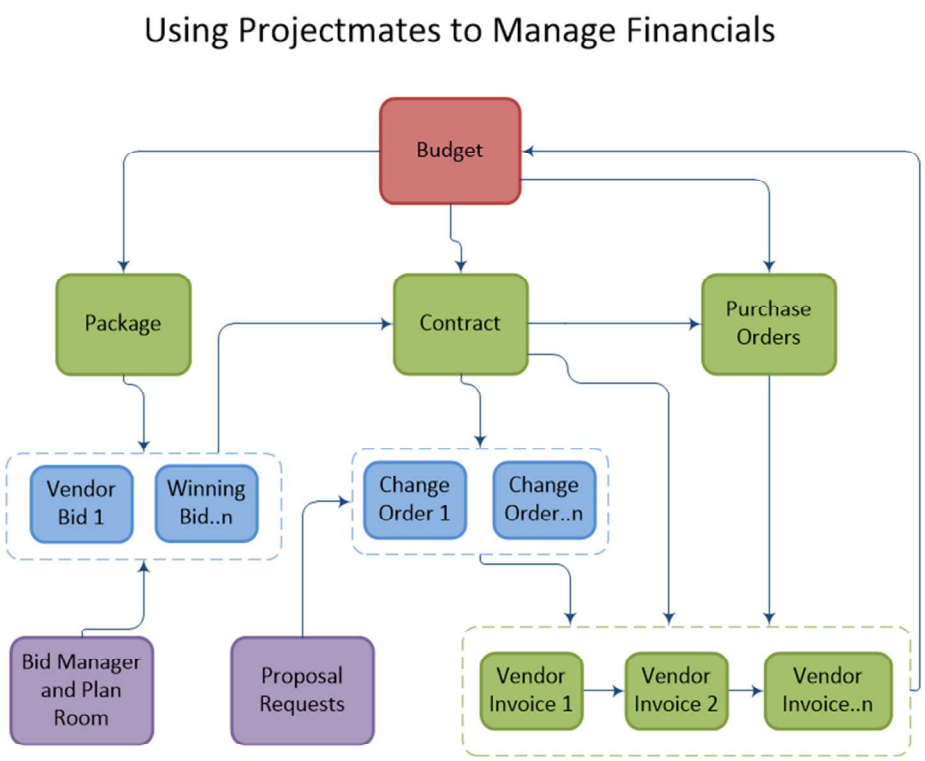
Purchase Orders
Purchase orders can be created for contract or non-contract purchases and then linked to and tracked in the budget as committed costs. Purchase orders may contain items, information about the vendor, shipping arrangements, and attachments. Once a purchase order is created, it can be routed through an approval process.

Projectmates gives you better oversight because it allows the field to receive and record items delivered at the jobsite so you know the vendor has fulfilled the PO obligation. Once the job is complete, buyers can also track materials returned to a vendor. Later, an invoice can be created against the purchase order.

Invoice & Pay Application
Projectmates automates the entire invoicing process. Invoices can be created electronically in alignment with a contractor's or vendor's contract structure or task level billing detail. The schedule of values is pulled from the approved contract or purchase order automatically and prohibits payment in excess of contract or purchase order amounts. When there are approved change orders associated with a contract, they will automatically be added to the schedule of values. Retainage is calculated automatically.

Documents like affidavits and lien releases can be uploaded to the invoice before it's routed through an approval process. Retainage information is calculated, and invoice information links back to the budget automatically, avoiding double entry at multiple steps.

In addition, Systemates has the capability to integrate with almost any existing ERP solution, including PeopleSoft, SAP and Oracle. Once pay applications and invoices are approved in Projectmates, data is transferred to your AP software. Then, once checks are cut, payment information can be sent back into Projectmates. The process works seamlessly, reduces data entry mistakes, and can eliminate costly late payment fees



Financial Tracking with Ease

The budget captures all project financials and is updated in real time to track current commitments, change orders, and pay apps.

Schedule

Risk management. Doing it effectively and efficiently is one of the leading factors contributing to growth, according to respondents of KPMG's 2013 Global Construction Survey. Delays, however, pose a significant and costly risk to the success of any construction process, an all too common problem. In fact, as the survey results reveal:
Although the engineering and construction industry has made great strides in managing risk, 77 percent of respondents report underperforming projects due primarily to delays, poor estimating and failed processes.

Projectmates has the solution. With our Schedule tool, you have access to every milestone, every contingency, every contractor, and every meeting under your purview. Create timelines in minutes while setting up tasks, targets, deadlines, and reminders. Then, team members can access their schedules from anywhere they use Projectmates, so accountability and reminders are just a click away.

Multiple Schedules
Project managers can create different schedules for the different aspects of their projects, such as a

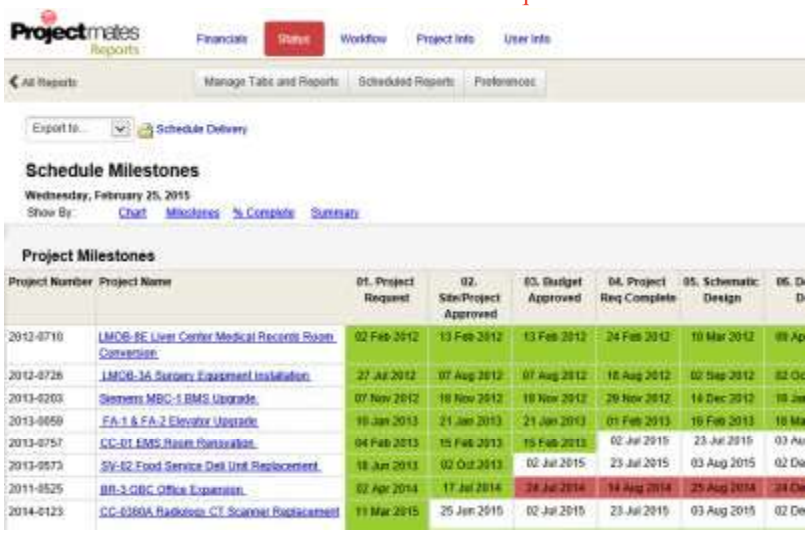
design and construction. Schedules can even be kept private when they are under development, wherein access is only given to the team when the project manager is ready.

Controlled Access
Project managers easily control project schedules by determining which team members have the rights to view, change, or delete information.

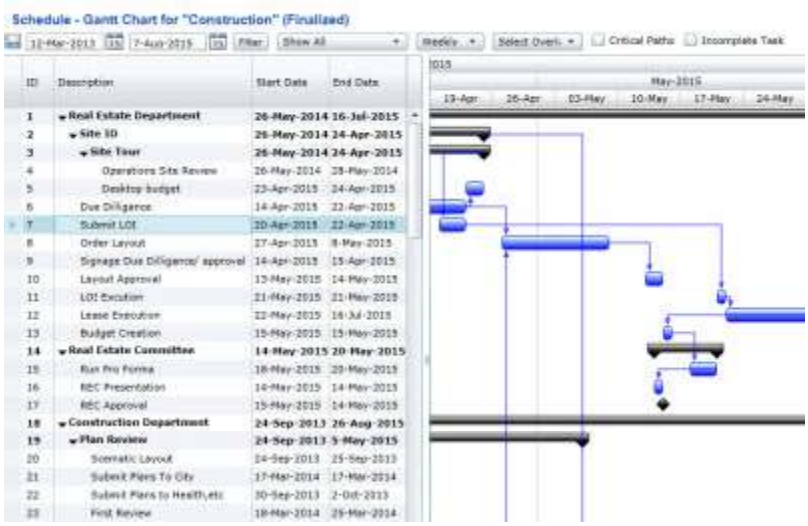
Task Management
Project managers establish either one-time or recurring tasks for their team members. As the schedule changes, tasks automatically adjust themselves. Individual team members can easily track the tasks for which they are responsible by checking their "My Tasks" list.

Benefits of Using Schedule:

- Create timelines based on information you enter about project tasks
- Assign tasks to individuals and keep them on target
- Alert team members of scheduling conflicts with built-in red flags
- Allow schedules to be viewed either as calendars or Gantt charts
- Keep distributed teams informed with online, rights-managed access
- Import schedules from Microsoft Project, Microsoft Excel, Primavera, & more
- Easily exchange information with Microsoft Outlook and Excel
    - Request Live Demo



- Schedule Reporting
- Program reports display schedule milestones across all projects, red flagging overdue tasks so executives can focus on problem projects.

- 

- Gantt Chart
- View planned versus actual dates and tasks by day, week, month, or year with this attractive Gantt chart.

Bids and Plan Room

The ability to handle all your bid preparation and planning online is yet another way Projectmates is helping clients transition to an all-digital process. There's no longer a need to prepare bids on paper that are submitted to contractors by hand or mail. It's all electronic, effortless, and highly efficient.
Here's how it works:

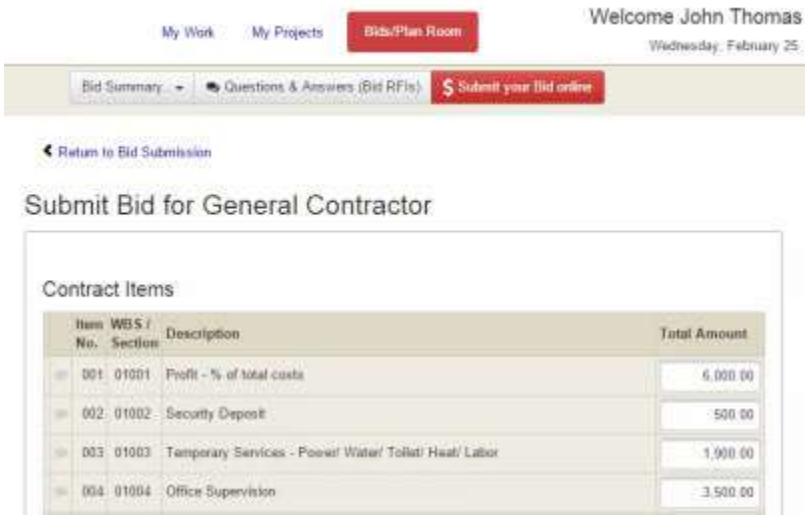
Through Projectmates' fully collaborative 2-way bidding system, your project team members create bid solicitation requests and publish information to the virtual plan room. Contractors register to view bids through a separate registration process that then subscribes them to those specific bids. Bid subscribers are able to view and download a wide range of bid documents, and automatically receive addendum notifications. Subscribers can also participate in the Q & A area and submit bids through Projectmates.

Key Features for Bid Managers

- Simple, 4-step process to publish bids
- Invite bidders and manage subscribers
- Option for bidder self-registration
- Post bid documents for online download
- Sophisticated, role-based security
- Create and publish multiple bids simultaneously
- Publish addendum instantly
- Manage Q & A process effortlessly
- Archive bids, including addendum and Q & A
- View and download options for bid submissions
- Convert awarded bid to contract with single click

Key Features for Bidders

- Self-register to view bids
- Subscribe to bid solicitations
- Submit your electronic bid securely
- Download plans and specifications online
- Submit line item costs
- View addendum and Q & A
- Submit questions to bid managers
- Instant notification of addendum and Q & A



- Collaborative Plan Room
- Bidders submit bids directly in Projectmates, eliminating the need to manually consolidate all bids for comparison.

Number	Description	Original Estimate Amount	Lowest Bids by Category Vendor	Lowest Bids by Category Amount	ABC Contracting Amount	JLS Industries, Inc. Amount	Schmid Construction Amount
Item							
001	Supervision	$ 57,626.70	ABC Contracting	$ 55,000.00	$ 55,000.00	$ 61,500.00	$ 56,000.00
002	Project Travel	$ 15,510.00	ABC Contracting	$ 14,750.00	$ 14,750.00	$ 15,000.00	$ 16,000.00
003	Job Site Utilities	$ 1,645.00	ABC Contracting	$ 1,500.00	$ 1,500.00	$ 2,567.00	$ 1,700.00
004	General Requirements	$ 10,105.00	ABC Contracting	$ 9,900.00	$ 9,900.00	$ 10,000.00	$ 11,000.00
005	Overhead & Profit	$ 45,120.00	ABC Contracting	$ 46,720.00	$ 46,720.00	$ 48,000.00	$ 46,790.00
006	GC liability Insurance	$ 4,230.00	ABC Contracting	$ 4,300.00	$ 4,300.00	$ 4,500.00	$ 4,500.00
007	Performance Bond	$ 875.00	JLS Industries, In	$ 900.00	$ 4,100.00	$ 900.00	$ 2,300.00
008	Interior Flatwork	$ 1,200.00	ABC Contracting	$ 970.00	$ 970.00	$ 1,500.00	$ 1,670.00
009	Footings	$ 9,165.00	ABC Contracting	$ 8,500.00	$ 8,500.00	$ 9,000.00	$ 10,500.00
010	Columns	$ 1,490.00	ABC Contracting	$ 1,450.00	$ 1,450.00	$ 1,500.00	$ 1,780.00
011	Walls - CIP	$ 2,040.00	ABC Contracting	$ 1,950.00	$ 1,950.00	$ 2,000.00	$ 2,800.00
012	Building Curbs	$ 1,600.00	ABC Contracting	$ 1,700.00	$ 1,700.00	$ 1,775.00	$ 2,800.00
013	Structural Steel and Misc	$ 5,550.00	ABC Contracting	$ 5,500.00	$ 5,500.00	$ 6,010.00	$ 6,500.00
014	Steel Stairs, Handrails	$ 3,750.00	ABC Contracting	$ 3,800.00	$ 3,800.00	$ 4,259.00	$ 4,000.00
015	Galvanized Brackets	$ 9,500.00	JLS Industries, In	$ 9,000.00	$ 10,000.00	$ 9,000.00	$ 11,000.00
016	Steel Structure	$ 3,500.00	ABC Contracting	$ 3,200.00	$ 3,200.00	$ 4,000.00	$ 4,000.00
017	Metal Corner Guards	$ 1,020.00	ABC Contracting	$ 875.00	$ 875.00	$ 1,000.00	$ 1,050.00
018	Casework & Finish Carpentry	$ 30,080.00	ABC Contracting	$ 28,900.00	$ 28,900.00	$ 35,000.00	$ 29,000.00
019	Rough Carpentry	$ 8,058.00	ABC Contracting	$ 8,000.00	$ 8,000.00	$ 8,050.00	$ 10,000.00
020	Wood Handrails Stair Treads	$ 6,500.00	JLS Industries, In	$ 3,600.00	$ 7,000.00	$ 3,600.00	$ 7,450.00
021	Storefront Glulams	$ 3,550.00	ABC Contracting	$ 3,500.00	$ 3,500.00	$ 4,000.00	$ 4,329.00
022	Exterior Trellis Wood Structure	$ 21,721.00	ABC Contracting	$ 20,000.00	$ 20,000.00	$ 27,000.00	$ 20,500.00
023	Wainscot / FRP Panels	$ 940.00	JLS Industries, In	$ 1,050.00	$ 1,750.00	$ 1,050.00	$ 2,000.00
024	Acoustical Ceiling Tiles	$ 3,055.00	JLS Industries, In	$ 2,500.00	$ 3,000.00	$ 2,500.00	$ 3,450.00
025	Interior GWB walls	$ 94,000.00	ABC Contracting	$ 93,500.00	$ 93,500.00	$ 105,000.00	$ 95,000.00
Contract Items TOTAL		$ 341,830.70	ABC Contractin	$ 339,765.00	$ 339,765.00	$ 370,211.00	$ 356,119.00
GRAND TOTAL		$ 341,830.70	ABC Contractin	$ 339,765.00	$ 339,765.00	$ 370,211.00	$ 356,119.00

- Automatic Bid Analysis
- Cut time and reduce confusion by letting Projectmates generate the bid analysis.

Program Reporting

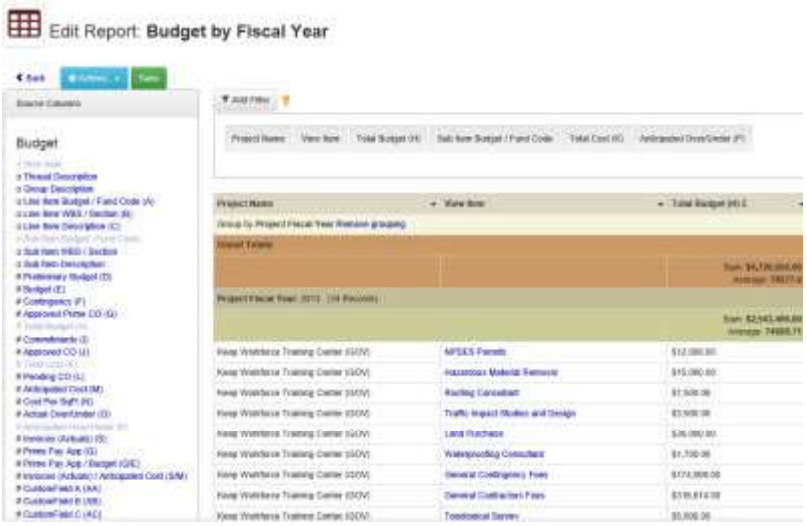
Projectmates ad hoc reports provide unprecedented control over project data and have never been easier to use. Unleash project analytics through reports that give you critical insight to make smart decisions. Highly configurable, ad hoc reports feature drag and drop functionality, support grouping and summarizing of data, provide advanced filter logic, and let you control what information you want in your reports.
The practical applications of Projectmates reporting are limitless. For example, a program director can build a budget report by fiscal year and then view the average cost of architectural services by region. Track budgets, compare actual costs versus anticipated costs, and track project expenses by department. This data can be used for trending and forecasting of future projects.

In addition to ad hoc reports, Projectmates provides over 100 enterprise reports out-of-the-box. Pre-built reports capture vital information, such as project status, total project cost, and change orders to date. With Projectmates automatic report delivery, reports can be scheduled for automatic delivery to department directors on a quarterly basis or as needed.

Benefits of Projectmates Reporting:

- Real-time reports with up-to-the-minute accuracy
- Drag and drop functionality that requires little to no training to learn
- Sort, summarize, filter, and group data as needed
- Robust drill-down capability
- Schedule reports for automatic delivery to anyone, anytime via email
- Export to PDF, Microsoft Excel, HTML, XML, and other formats
- Evaluate program status and quickly identify at-risk and under-performing projects

Projectmates consultants can help you configure an existing enterprise report from a template or create an entirely new report from scratch.



Your Reports, Your Way

Ad hoc reporting gives you control over project analytics and critical insight to make smart decisions. Reporting has never been easier.

Global Dashboards

Effective construction program management demands accurate, real-time information. It's what gives executives the ability to track progress and make well-informed decisions regarding their construction projects. Projectmates Construction Project Management Dashboards equip project managers and executives with all the tools needed to meet and exceed these expectations.

Global Dashboards depict large amounts of data graphically, providing real-time snapshots that are quick and easy to comprehend. Capture mission-critical information from multiple construction projects using bar graphs, pie charts, tables, and many more. The possibilities are endless.

The obvious benefit Dashboards deliver is their ability to provide executives with easy insight and business intelligence so they can ensure projects align with core business goals. Traditionally, this is accomplished with quarterly or annual reports, posing the challenge of significant time delays, which can negatively impact the business. With Dashboards, everything is in real-time, making it easy to spot trends early and adjust accordingly.

How It Works

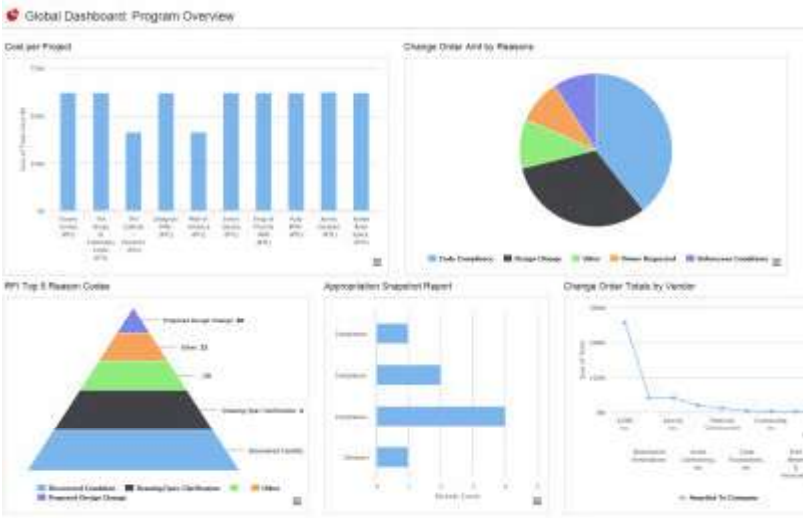
With state-of-the-art technology, Projectmates offers a powerful tool that lets you build dashboards through simple drag and drop functionality. Building dashboards is easy to learn and flexible.

Benefits of Global Dashboards

- Create an executive snapshot of live data
- Summarize large amounts of information in easy-to-read charts and graphs
- Create dashboards based on user-defined reporting criteria
- Export charts to PDF, JPEG, and other formats

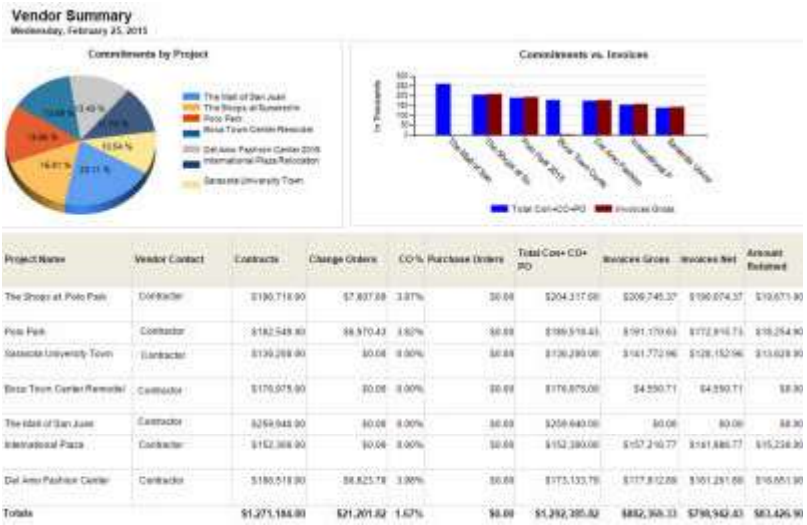
- Evaluate program statuses and quickly identify at-risk and under-performing projects
- Create dashboards through drag and drop functionality; easy to use!

Projectmates consultants can help you customize existing enterprise reports from a template or develop entirely new dashboards from scratch.



Configurable Dashboard

Graphs and charts speak a 1,000 words when it comes to construction program management.



Vendor Oversight

The vendor summary displays all financials for each vendor. Key Performance Indicators flag excess change orders by vendor and project.

Projectmates for Mobile Workforce

With today's mobile workforce, it is important to get a mobile solution to convert downtime into productive time, streamline complex construction processes and increase efficiency. Projectmates Mobile provides a one-stop solution for all the challenges of construction management at your fingertips. Simple and convenient, our project management tools for your mobile device will be something you won't go without.

Using Projectmates Online Project Management Software on your Mobile Device

With our online construction project management software, mobile professionals can increase productivity by using Projectmates Mobile to access information when away from their office environment. The software works across all popular phone, tablet, and desktop platforms. Built with accessibility and universal access in mind, we follow progressive enhancement and responsive web design (RWD) principles.

Benefits of Using Projectmates for Mobile

- Improved efficiency of mobile workforce
- Improved data accuracy
- Flexibility to use on any device
- Live information updates; no syncing required
- Easy of Use
- Zero Management
- Faster project deployment and completion times

I love apps. I have an iPhone and iPad. But you can't use an app to manage a $50,000 to a million dollar project. You've got to use something like Projectmates, which I really consider something like a mega app on steroids." Steve Bohlman, Director of Operational Excellence
Source Refrigeration & HVAC

Request Live Demo



Mobile Access

Construction drawings are accessible right from the field on tablets and smartphones.



Prolog Converge

Web-based Construction Project Management

FOR PROJECT TEAMS CONTRIBUTING TO THE SUCCESSFUL DELIVERY OF PROJECTS, PROLOG CONVERGE PROVIDES WEB-BASED PROJECT MANAGEMENT CAPABILITIES IN THE AREAS OF COLLABORATION, COST CONTROL, REPORTING, DOCUMENT CONTROL, FIELD ADMINISTRATION, PURCHASING, AS WELL AS INTEGRATION SUPPORT USING A POWERFUL WEB SERVICES PLATFORM.

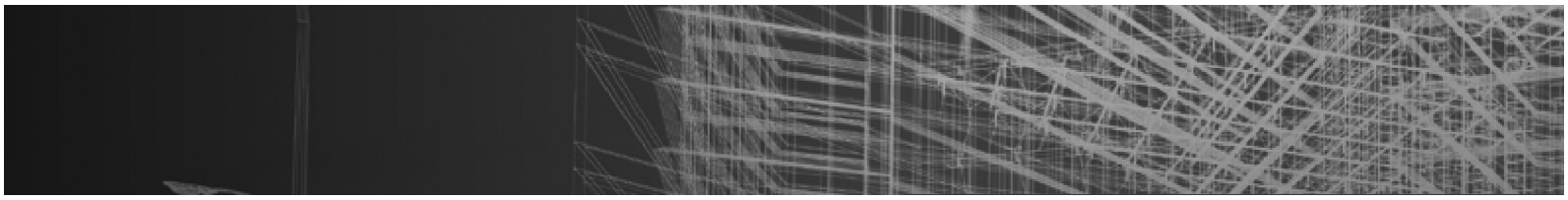
Bring your entire project team together in a real-time, online project management environment and increase user adoption within your organization through role-based user interfaces. Simplify the capture and management of multiple project documents with email and file capture while generating letters, contracts and other correspondence from a library of templates, all linked to the project record. Key project spreadsheets, PDFs, documents and even BIM Collaboration Format (BCF) files are stored in one central location. Prolog Converge allows you to create end-to-end business solutions with an extensible, interoperable Web services platform that allows diverse systems and organizations to work together.



Prolog Converge provides a rich web user interface for viewing and managing construction project portfolios.

Benefits

- Improve collaboration amongst the entire project team.
- Reduce project financial risk and exposure.
- Single system of record enabling delivery of projects on time and on budget.
- Gain visibility into the movement of project dollars with cash flow forecasting.
- Streamline routing and approvals with predefined or ad-hoc workflow.

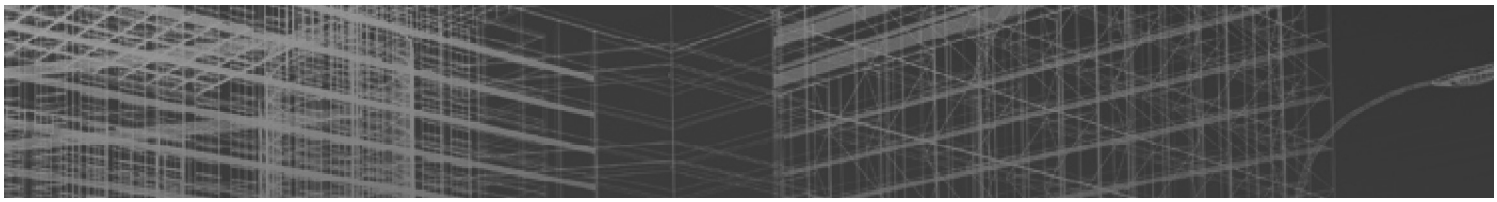


Collaboration

FEATURE	ADVANTAGE
Streamlined web user interface	• Provides an easy-to-use, online environment for your construction project teams to create, read and edit project information.
Anytime, anywhere access to project data	• The Web interface of Prolog Converge, along with the Web services platform, provides a low cost deployment model for collaborating across your extended project teams.
Intuitive, easy-to-use data entry on the following Prolog forms	• Document Control • Field Administration • Cost Control • Company Management • Purchasing
User-defined sorting and grouping of projects	• Customize project views by user level.
Record to Record Linking	• Provides bidirectional link between records within Prolog Converge.
Security	• Role-based security access to projects.
Material Tracking	• Track construction materials throughout the supply chain process. Users can update materials' supply chain statuses, review & update material details and perform QA/QC checklists against those materials.
Mobility	• Prolog Mobile enables field staff to view current project information and to manage construction oversight activities, with or without an Internet connection. Data is collected in real time from the field and synchronized with Prolog back in the office, creating a complete system of record for all project data.
Workflow	• Define workflow rules and Prolog Converge will automatically recognize when a new document requires routing and approval. Prolog Converge will know who must take action, will alert that person by email and determine when certain thresholds trigger different protocols, for example, when a higher dollar amount requires two approvals instead of one.
Project E-Mail Capture	• Creates Prolog Transmittal & Correspondence or Conversation Log records from emails sent to a project-specific email address including any attachments.
Web Based Mail Merge	• Using Prolog Word Templates, Prolog data may be merged, previewed, and saved into configured documents to generate Letters, Contracts, and other standard project-related correspondence.

Insight Module

FEATURE	ADVANTAGE
Comprehensive Dashboards	• Create 360-degree views of Prolog data with drill down capabilities. View dashboard data including project metrics and KPIs.
Configurable by Role	• Provide views that are configured by project team role, such as project executive, owner and project manager.
Export data for enhanced reporting	• Easily export Prolog data into other data formats such as Microsoft Excel, HTML, PDF, RTF or Plain Text.

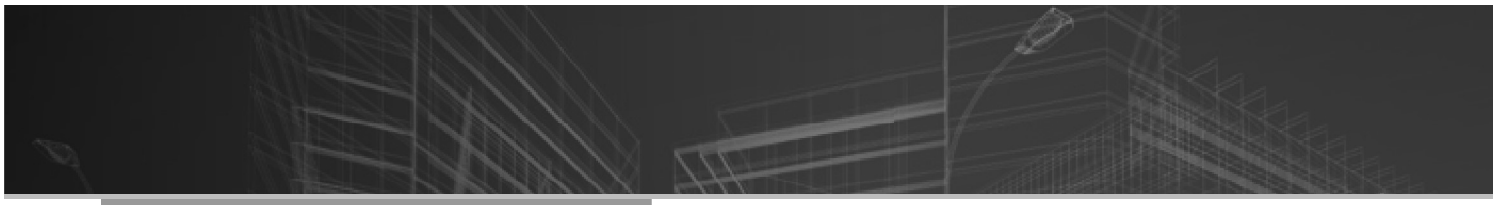


File Management

FEATURE	ADVANTAGE
Drag & Drop	• Enhanced file management allowing drag and drop files (from your desktop) to quick upload folders.
Quick Upload	• Available throughout Converge to easily upload and link project documents directly to Prolog Records.
Check In/Out	• Check in /out documents for tasks such as review and markup.
Version Control	• Control versions on critical project documents maintaining document integrity.
Enhanced URL linking	• Easily link Prolog records to external documents stored in systems such as MS SharePoint.
Security	• Enhanced security settings to ensure document integrity by controlling permissions on files associated with records. The Prolog security model enforces read and write privileges throughout the document management system.
Document Management	• Centrally manage all project-related documents in one location and allow online, secure access based on user permissions. Quickly upload and link one or more files to Prolog data. Organize files into a streamlined folder structure similar to Windows Explorer.
Lookup & List Group Maintenance	• Manage standard codes and lookups for your project, or across your portfolio.
View and Redline	• View files in native applications. Trimble also provides a viewer to view, redline and mark-up hundreds of files types.
Advanced File Searching	• Common file formats are indexed to permit rapid content searching.
Project File Capture	• Monitor project-specific network file systems or FTP sites for incoming documents and automatically upload files. Create new folders or subfolders with appropriate Prolog security. Automatically email notifications for newly uploaded or updated documents
BIM Collaboration Format (BCF) File Viewer	• Store, view, and collaborate on BCF files in Prolog Converge. BCF provides a 2D snapshot image of a 3D model and allows project team members to link the BCF file to a Prolog record, view and add to threaded discussions on the BCF file, then transmit the updated file to any BCF-compliant software product. BCF Viewer provides an easy way for BIM coordinators to collect feedback from other project stakeholders and save it with the model without sharing full BIM files.
Folder Subscriptions	• Monitor selected folders for changes. Anytime a change occurs to files or folders within the subscribed folder, the user will receive an email notification with details of the change. Users can receive notifications for different events - for example when a new file has been uploaded to a subscribed folder, or files and folders are deleted or moved, or new revisions of existing files are created.

Reporting and Queries

FEATURE	ADVANTAGE
Powerful reporting module	• Execute advanced queries across multiple records, project and Prolog databases. View, filter, and group projects based on various metrics such as region, status, project size, and more.
Support for other reporting formats	• Launch Prolog Crystal Reports and easily export to native software such as Excel and Adobe Reader.
Run-time filters	• Enhanced run-time filtering on reports



System Requirements

See Prolog Technical Reference Guide for more details.

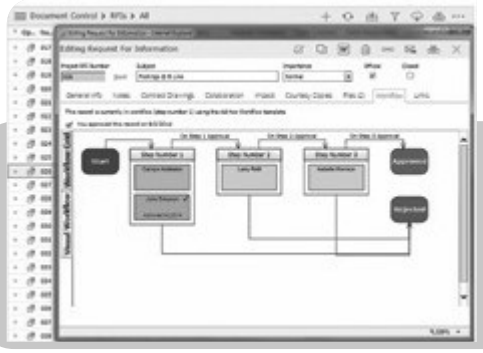
- **Hardware:** In a production environment, Prolog Converge performs best on a modern multi-core processor (Trimble recommends at least 4) with more than 1 GB of memory per core. Better performance is achieved with faster processors and more memory.
- **Server Operating System:** Windows Server 2003, Windows Server 2008, Windows Server 2012 R2
- **Database Server:** SQL Server 2008 R2, SQL Server 2008 R2SP1 Express Edition, SQL Server 2012 or SQL Server 2014
- **Virtualization (optional):** Hyper-V or VMWare
- **Client Browser:** Internet Explorer 9/10/11, Chrome, and Firefox. Most functionality also available in Safari.
- **Prolog Manager:** At least one installation of Prolog Manager 9 and above

Cash Flow Forecasting

FEATURE	ADVANTAGE
Cost Allocation	• Allocate costs using bell-curve, frontloaded, back-loaded, linear algorithms or manual plug input
Track and monitor distribution of dollars over time	• Graphical comparison of actual vs. forecast cash flow, with dynamic updating for changes in budget or schedule, makes trends easy to spot.
Financial Reporting	• Comprehensive reporting capabilities provide a 360° view of project financials with drill-down capabilities. Export reports to HTML, PDF, Word, Excel, and more.
E-Mail Notifications	• Schedule notifications to be sent via email when action is required by a project team member.
Automated reports and alerting	• Schedule reports to run at specific times or for specific intervals. Create automatic email alerts when certain thresholds are met.
Content	• Control content of the notification, and control output of the content.
KPI's	• Use notifications to help facilitate collaboration and mitigate risk, by setting up notifications around key performance indicators.
Hyperlinks	• Notifications can be configured with hyperlinks to drive a user to a specific Prolog record or information location with a single click.
Notifications from other applications	• The Notification subsystem helps monitor and mitigate risk from other applications that have been integrated with Prolog Converge.



Cash Flow forecasting provides a graphical comparison of actual versus forecast cash flow



Create custom workflow for routing and approval.

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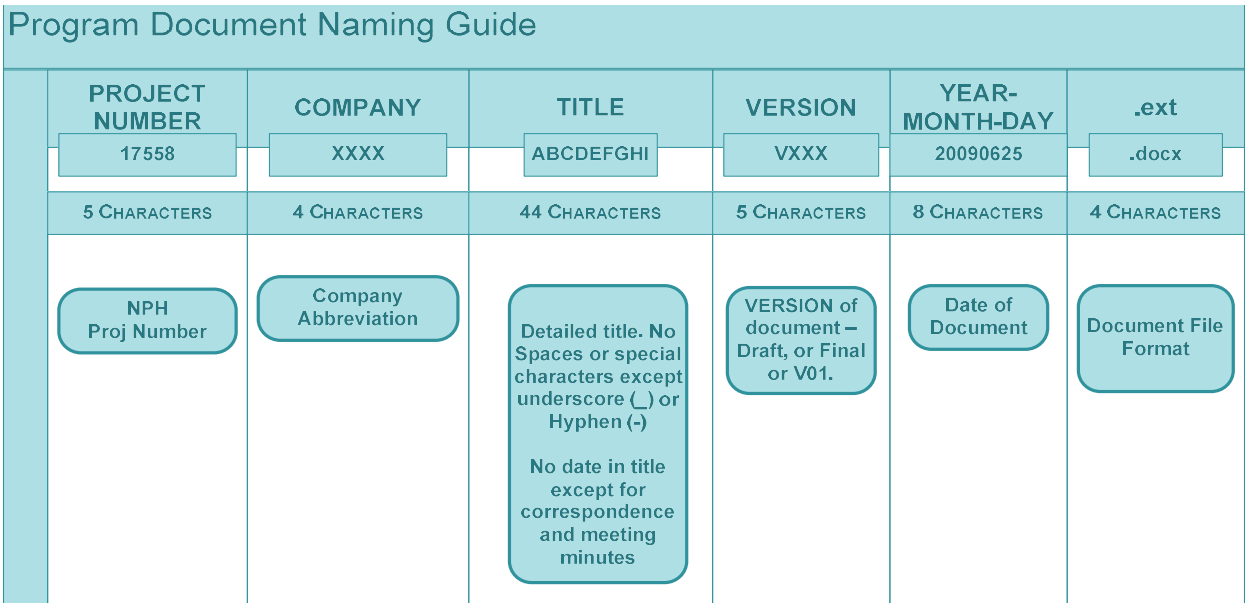
NORTH AMERICA
1720 Prairie City Road, Suite 120
Folsom, CA 95630
For more information:
1.800.850.2660 x3
1.916.294.2000 x3

Trimble

www.trimblebuildings.com

File Naming Conventions

Example 1



SharePoint guidance for file naming:

- 255 character limit for the URL –(this includes folder names)
- Need to limit # of folders – no more than 2 or 3 deep
- Need to limit # of characters in titles
- Create List, Library, and View names using "CamelCase"
- Use underscores "_" to separate words in document names
- use underscores ("_") to separate words in folder names. For example Folder_Name.

Example 2 **DCIP_C140215_PMT_GUI_RecDocNamGui.doc**

Global Information													Document Information																												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29					59	60	61	62	63	64
P	R	O	G	-	P	R	O	J	E	C	T	-	O	R	I	G	-	D	E	P	T	-	D	O	C		-	T	I	T	L	E	.	E	X	T	
Program Abbreviation 4 Characters Alpha-numeric					Project Number 7 Characters Numeric								Originator Abbreviation 4-5 Characters Alpha-numeric					Department Abbreviation 4-5 Characters Alpha-numeric					Document Type 4 Characters Alpha-numeric					Title or Subject 30 Characters Alpha-numeric					.	File Ext 3-4 Char Alpha-numeric			

All Program-wide documents will contain zeroes in place of the project global information

File Name Restrictions

- Filename <64 characters including extension. (Required to support copying files to CD or DVDs, Windows: ISO9660+Joliet CD or Hybrid CD partition).

- Illegal filename characters – Do Not Use: \ (backslash), / (forward slash), : (colon), * (asterisk), ? (Question mark), “ (double quotes), < (left angle bracket), > (right angle bracket), | (pipe), & (ampersand), % (percent), # (pound sign), and $ (dollar), ! (Exclamation mark), + (plus sign), { (left bracket), } (right bracket), [(left bracket),] (right bracket), ; (semi colon), ASCII #149 (bullet).
- Filename may not begin with a hyphen or period, and may not end with a period.
- Filename must have only 1 period as a separator between the filename and the filename extension.
- Filename must include a filename extension that is of the appropriate file content type. (e.g. .doc = Word, .dwg = AutoCAD, .dgn = MicroStation, .pdf = Adobe Acrobat)

Folder Structure Examples

Folder Levels		
1	2	3
01. - Finance		
	1.01 - Budget	
	1.02 - Cost Estimate	
		1.02.01 - Planning
		1.02.02 - Design
	1.03 - Invoices	
		1.03.01 - Engineering
		1.03.02 - Construction
		1.03.03 - Other
02. - Contracts		
	2.01 - Engineering Contracts	
		2.01.01 - Notices
		2.01.02 - Contract Modifications
	2.02 - Construction Contracts	
		2.02.01 - Notices
	2.03 - Intergovernmental Agreements	
03. - Planning		
	3.01 - Meetings	
	3.02 - Land Acquisition/Easements	
	3.03 - Surveys	
	3.04 - Site Assessment	
	3.05 - Project Information	
	3.06 - Studies	
	3.07 - Proposal Documents	
04. - Engineering		
	4.01 - Schedules	
	4.02 - Meetings	
	4.03 - Correspondence	
	4.04 - Photos	
	4.05 - Technical Memoranda	
	4.06 - Drawings	
	4.07 - Construction Documents	
	4.08 - Engineering Design	
03 - Permits		
	3.01 - Local	
	3.02 - State, Federal	
	3.03 - Occupancy	
	3.04 - Utility Encroachments	
	3.05 - Correspondence	
06. - Bidding		
	6.01 - Working Bid Documents	
	6.02 - Pre Bid Meeting Documents	
	6.03 - Final Bid Documents	
	6.04 - Addenda	
	6.05 - Bids Received	

Folder Levels		
1	2	3
04. - Construction		
	4.01 - Conformed Documents	
	4.02 - Schedules	
	4.03 - Correspondence	
	4.04 - Progress Meetings	
	4.05 - Transmittals	
	4.06 - Submittals	
		00 - General
		01 - General Requirements
		02 - Earthwork
		03 - Concrete
		04 - Masonry
		05 - Metals
		06 - Woods & Plastics
		07 - Thermal & Moisture
		08 - Doors & Windows
		09 - Finishes
		10 - Specialties
		11 - Equipment
		12 - Furnishings
		13 - Special Construction
		14 - Conveying Systems
		15 - Mechanical
		16 - Electrical
		17 - Building Management
	4.07 - Requests for Information	
	4.08 - Change Directives	
	4.09 - Change Orders	
	4.10 - Material Testing and Inspection Reports	
	4.11 - QA Daily Reports	
	4.12 - Progress Photos	
	4.13 - Punch Lists	
	4.14 - Close Out Documents	
	4.15 - O&M Manuals	
	4.16 - Warranties	
	4.17 - As Built Documents	
		4.17.01 - Record Drawings
		4.17.02 - GPS Information
		4.17.03 - Conformed Submittals
		4.17.04 - Field Reports
05 - Reports		
	5.01- Contractor Reports	
	5.02- Reports General	

Construction Project Management KPIs

Cost Performance

- Estimated vs budgeted vs actual cost
- On Budget tasks
- Over Budget task
- Under budget tasks
- Planned vs. Actual Cost

Schedule Performance

- On Time tasks
- Key deliverables (milestones) behind plan and by how much
- Tasks ahead of plan & by how much
- Tasks behind plan & by how much
- Time to recover
- Project performance planned to actual

Earned Value

- Planned vs. Earned
- Time to recover

Quality Performance

- # RFIs
- Time to address (close) RFIs
- # Design Clarifications
- # change requests
- %value of change orders
- # Defects (Punch list coding)

Health & Safety Performance

- # safety incidents per project value
- Time lost
- Severity of safety incidents
- Employee Satisfaction
- Staff Turnover
- Sickness Absence
- Working Hours
- Qualifications & Skills
- Impact on Environment
- Waste

NTMWD SharePoint Site Mock-ups



Home - Downtown ... | North Texas Municipal ... | Home - Downtown Ca... | Program Contacts - All ... | Program Contacts - All ... | ntmwd.com

File Edit View Favorites Tools Help

Page Safety Tools

North Texas Municipal Water District

BROWSE PAGE

SHARE FOLLOW

Archive site

Program Contacts

Portal Users

PMIS IT Help

Departments

- Executive
- Engineering
- Operations
- Maintenance

Program Management Plan

- 001 Master Planning and Entitlements
- 006 PMIS Initiation
- 007 Campus Schematic Design
- 008 Displacements
- 009 Program Management
- 010 Offsite Improvements

NTMWD

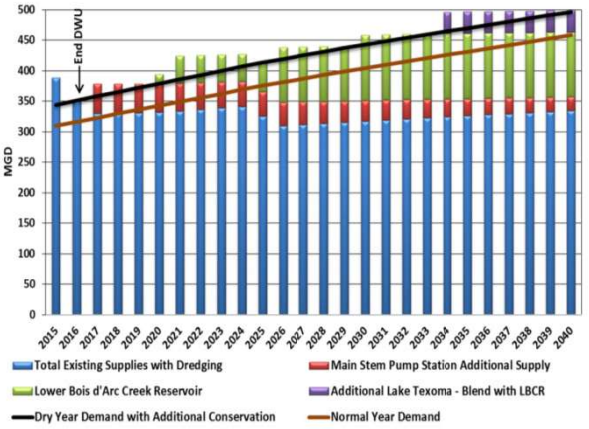
EDIT LINKS

Search...

Executive Department

5-Year Initiatives

- Dredging Lake Intakes
- Dallas Water Interim Contract Extension
- Main Stem Pump Station Construction
- Lower Bois d'Arc Creek Reservoir Construction





Leadership Message

Integrity Is Not Easy

"If doing the right thing were easy, everyone would be doing it." **– Dave Anderson**

Each time I make a choice, it makes it easier to make that choice again in the future. Each time I choose the harder right instead of the easier wrong, it is easier to make that choice the next time.

Doing the right thing is easy if I have nothing at risk, but is that truly integrity or is it just the path of least resistance? When my integrity is challenged, I am really choosing between two things: Compromise or Consequences



Program Calendar



Dashboards



electronic Program Management Plan



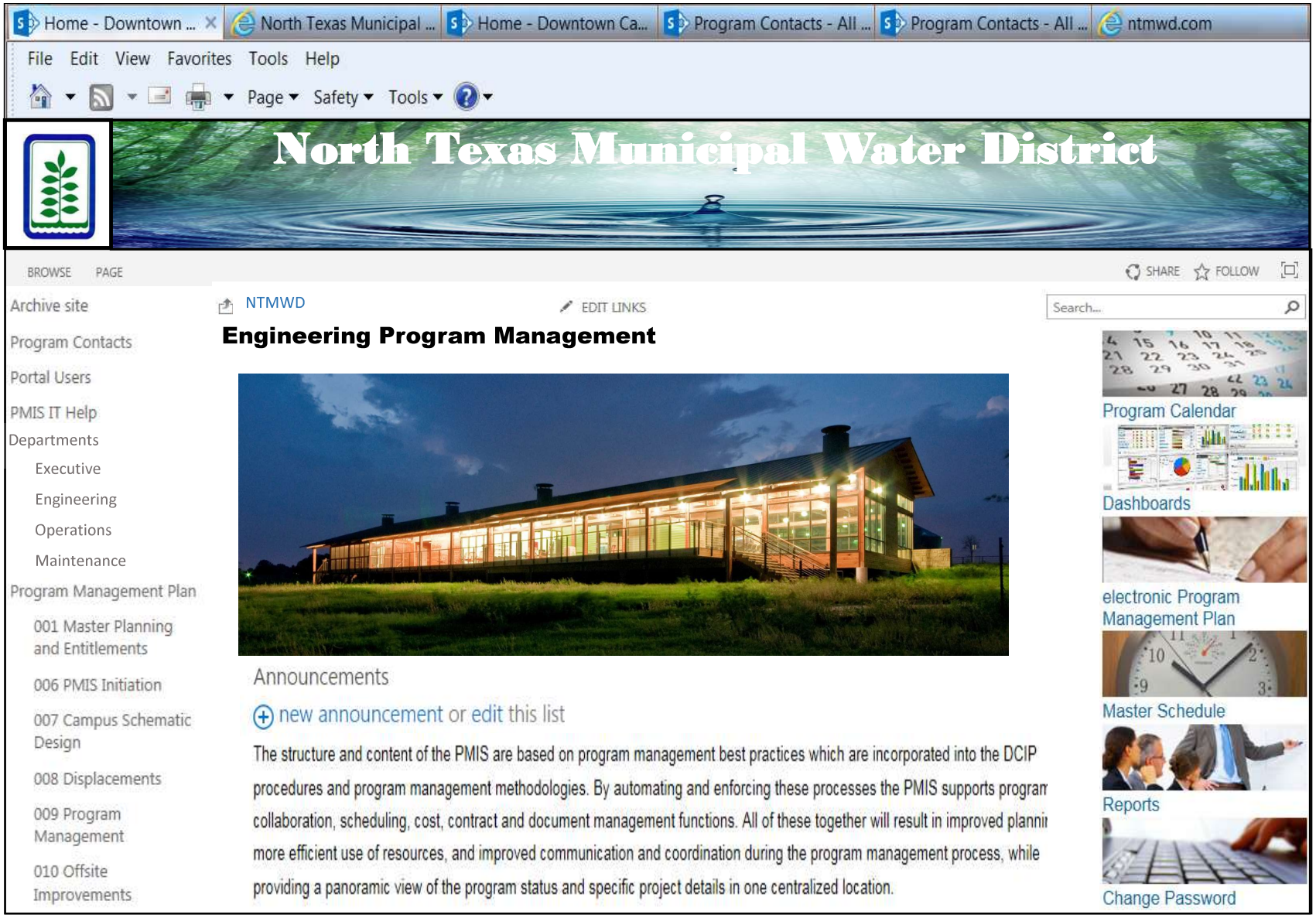
Master Schedule

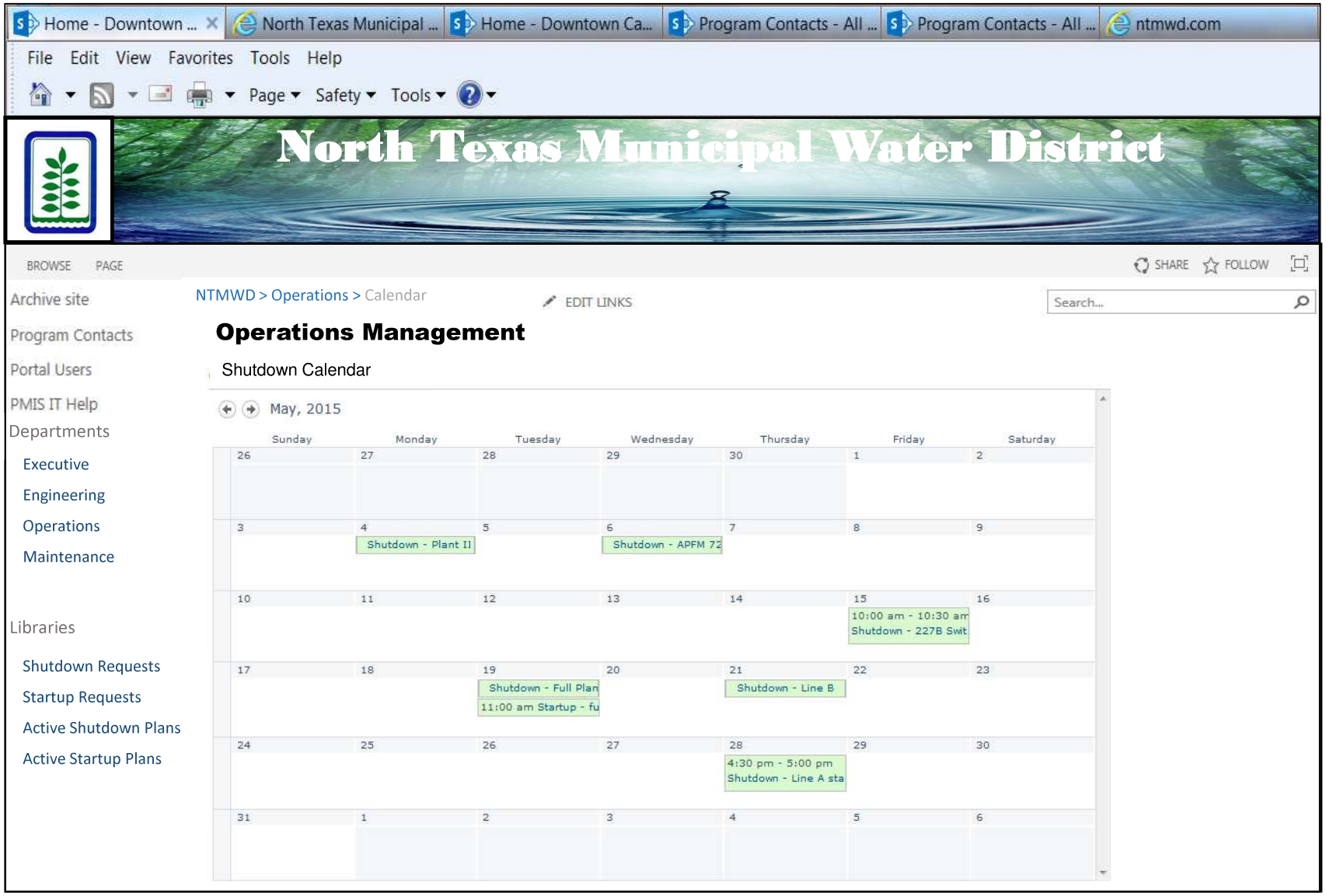


Reports



Change Password


Home - Downtown ...
North Texas Municipal ...
Home - Downtown Ca...
Program Contacts - All ...
Program Contacts - All ...
ntmwd.com
File Edit View Favorites Tools Help
Page Safety Tools
North Texas Municipal Water District
BROWSE PAGE
SHARE FOLLOW
Archive site
Program Contacts
Portal Users
PMIS IT Help
Departments
Executive
Engineering
Operations
Maintenance
Program Management Plan
001 Master Planning and Entitlements
006 PMIS Initiation
007 Campus Schematic Design
008 Displacements
009 Program Management
010 Offsite Improvements
NTMWD
EDIT LINKS
Search...
Engineering Program Management
Announcements
new announcement or edit this list
The structure and content of the PMIS are based on program management best practices which are incorporated into the DCIP procedures and program management methodologies. By automating and enforcing these processes the PMIS supports program collaboration, scheduling, cost, contract and document management functions. All of these together will result in improved planni more efficient use of resources, and improved communication and coordination during the program management process, while providing a panoramic view of the program status and specific project details in one centralized location.
Program Calendar
Dashboards
electronic Program Management Plan
Master Schedule
Reports
Change Password


Home - Downtown ...
North Texas Municipal ...
Home - Downtown Ca...
Program Contacts - All ...
Program Contacts - All ...
ntmwd.com
File Edit View Favorites Tools Help
Page Safety Tools
North Texas Municipal Water District
BROWSE PAGE
SHARE FOLLOW
Archive site
Program Contacts
Portal Users
PMIS IT Help
Departments
Executive
Engineering
Operations
Maintenance
Libraries
Shutdown Requests
Startup Requests
Active Shutdown Plans
Active Startup Plans
NTMWD > Operations > Calendar
EDIT LINKS
Search...
Operations Management
Shutdown Calendar
May, 2015
Sunday Monday Tuesday Wednesday Thursday Friday Saturday
26 27 28 29 30 1 2
3 4 5 6 7 8 9
Shutdown - Plant II
Shutdown - APFM 72
10 11 12 13 14 15 16
10:00 am - 10:30 am
Shutdown - 227B Swit
17 18 19 20 21 22 23
Shutdown - Full Plan
11:00 am Startup - fu
Shutdown - Line B
24 25 26 27 28 29 30
4:30 pm - 5:00 pm
Shutdown - Line A sta
31 1 2 3 4 5 6

Appendix A5
Administrative Memo Guidance Document

ADMINISTRATIVE MEMORANDUM GUIDANCE

Last update: June 8, 2015

Purpose. Provide guidance on when Ad Memos are needed and when they are not, per District Policy No. 40 and Administrative Directive No. 10, both approved March 2015.

Ad Memos Are **NOT** Needed for the Following

Item	Details and Limitations
Expenditures and award of contracts for goods and services in **Board Approved Operating Budget** Per District Policy No. 40, these "are not required to be placed on the agenda."	Approval limits as follows: • $50k and over (Executive Director/GM or Deputy Director – Finance & Personnel) approval • Less than $50k (Deputy Directors) • Less than $10k (Asst. Deputy Directors, Maintenance Officer, IT Officer, Environmental Services Officer) • Less than $5k (Managers)
Contract and Agreement signatures	Approved agenda items involving contracts, agreements, change orders, etc. can be signed by the Executive Director (or designee) without returning to the Board for signature. <<*Note: Change notice to bidders to show Executive Director as recipient of bids*>>

Consent Agenda Items **Are** Needed for the Following (*use Consent Agenda Item Template*)

Item	Details and Limitations
Interlocal Agreements	Interlocal agreements less than $50k and term of less than one year
Contracts	Contracts for professional services, legal services, and construction in amounts less than $50k
Increases to Services Contracts	Increases to contracts for professional services or legal services in amounts less than $50k
Change Orders to Construction Contracts	Change orders to construction contracts less than $100k but greater than or equal to $50k

Monthly Construction Report Items **Are** Needed for the Following (*use Monthly Construction Item Template*)

Item	Details and Limitations
Change Orders	Change orders to construction projects in amounts less than $50k approved by the Executive Director/General Manager.
Adjustment to Contract Quantities	For construction projects with unit bid priced items, an accounting of the final quantities will be made through an adjustment to contract quantities.
Final Acceptance and Payment for Projects	Completion of construction projects and final payment to the contractor will be noted prior to final payment being made to the contractor.

DRAFT

FULL Ad Memos **Are** Needed for the Following (*use Ad Memo Template*)

Item	Details and Limitations
Expenditures NOT in the approved operating budget	
Expenditures in the approved operating budget	When there is • A major change in scope, or • A project cost increase causing the fund to exceed its approved operating budget
Contracts	For professional services, legal services, or construction in amounts $50k or greater in value
Change Orders	For construction projects, Change Orders $100k or greater in value
Increases to Contracts	For professional services or legal services in amounts $50k or greater in value
Interlocal Agreements	Between NTMWD and another governmental entity involving amounts $50k or greater or with a term of one year or greater
Property acquisition and easements	• Property acquisition • Permanent and construction easements
Reduction in Retainage	Approval for reduction of retainage to less than standard 5% of total construction cost.

Workflow Feedback and Approval Assignment Guidelines

Item Type	Feedback (Collaboration)	Approval (accept or reject)	Copied Upon Completion
Ad Memo (including Interlocal Agreements)	Asst Deputy Dir (Owning Ops Division) Asst Deputy Dir (Engr or CIP) *if applicable* Finance Mgr Engr Mgr *if applicable* Initiator's Supervisor	Executive Dir Deputy Dir (Finance) Deputy Dir (Ops) Deputy Dir (Engr) *if applicable*	Initiator *ALL in Feedback column*

Appendix A6
Administrative Memo Examples

1A

NORTH TEXAS MUNICIPAL WATER DISTRICT

APRIL 2015 ADMINISTRATIVE MEMORANDUM NO. 4420

REGIONAL WATER SYSTEM
LOWER BOIS D'ARC CREEK RESERVOIR
FM 897 FROM US 82 TO FM 1396
FINAL ENGINEERING
PROJECT NO. 383

ENGINEERING SERVICES AGREEMENT

RECOMMENDATION

That the Board of Directors authorize the Executive Director to execute an engineering services agreement (ESA) as follows:

Consultant:	Bridgefarmer and Associates, Inc., (BAI)
Scope:	Final engineering design
Project:	No. 383, FM 897 from US 82 to FM 1396 in Fannin County
Amount:	$2,931,000.00

BACKGROUND

PROJECT PURPOSE

- Fulfills NTMWD's commitment to Fannin County to provide north/south vehicular access across LBCR northeast of Bonham prior to impoundment (currently scheduled for 2018).
- FM 1396 near the dam will be inundated.
- FM 897 must be in place and operational prior to impoundment.

PROJECT COMPONENTS

- Replace portion FM 1396 with a six to seven mile extension of FM 897 that will include a new bridge over the proposed LBCR
- FM 897 will commence at US 82 in Lannius, Texas, and will terminate with a connection to the existing FM 1396
- Preliminary design included initiating corridor analysis, developing alignment alternatives, and performing aerial surveying.
- Project will be funded and managed by NTMWD with general Texas Department of Transportation (TxDOT) oversight. Once the new roadway extension is completed, approved, and accepted, it will be turned over to TxDOT to become part of the Texas highway system.

EXAMPLE

BASIC SERVICES

- Development of the preliminary and final roadway schematic and alignment;
- Preparation of environmental documents and technical letters;
- Right-of-way coordination for securing necessary right-of-way; and
- Preparation of design plans, specifications, and estimates in cooperation with a Construction Manager At-Risk (CMAR).

SPECIAL SERVICES

- Development of Right-of-Way Data for Mapping;
- Field Surveying and Photogrammetry;
- Geotechnical Services;
- Wetland Assessment and Delineation;
- Cultural Resources (Archeological and Historical) Review;
- Threatened and Endangered Species Assessment; and
- Phase I Environmental Site Assessment.

ENGINEERING SERVICES FEE

	AMOUNT
BASIC SERVICES	$2,010,000.00
SPECIAL SERVICES	$921,000.00
ADDITIONAL SERVICES	$0.00
REQUESTED AMOUNT	**$2,931,000.00**

CONTRACT: Standard ESA

FUNDING

FUND(S): Regional Water System 2015 Construction Fund

EXAMPLE

1B

NORTH TEXAS MUNICIPAL WATER DISTRICT

APRIL 2015 CONSENT AGENDA ITEM NO. 4420

REGIONAL WATER SYSTEM
LOWER BOIS D'ARC CREEK RESERVOIR
FM 897 FROM US 82 TO FM 1396
FINAL ENGINEERING
PROJECT NO. 383

ENGINEERING SERVICES AGREEMENT
ADDITIONAL SERVICES

RECOMMENDATION

That the Board of Directors authorize the Executive Director to authorize additional services for an engineering services agreement (ESA) as follows:

Consultant: Bridgefarmer and Associates, Inc., (BAI)
Scope: Survey supporting final engineering design
Project: No. 383, FM 897 from US 82 to FM 1396 in Fannin County

Description	Amount
Original ESA	$2,931,000.00
Prior Additional Services	$0.00
Proposed Change	**$48,000.00**
Revised ESA	**$2,979,000.00**

PROJECT PURPOSE

- Fulfills NTMWD's commitment to Fannin County to provide north/south vehicular access across LBCR northeast of Bonham prior to impoundment (currently scheduled for 2018).
- FM 1396 near the dam will be inundated.
- FM 897 must be in place and operational prior to impoundment.

FUNDING

FUND(S): Regional Water System 2015 Construction Fund

EXAMPLE

NORTH TEXAS MUNICIPAL WATER DISTRICT

FEBRUARY 2015 ADMINISTRATIVE MEMORANDUM NO. 4365

UPPER EAST FORK INTERCEPTOR SYSTEM
WILSON CREEK GRAVITY INTERCEPTOR IMPROVEMENTS, PHASE 2
PROJECT NO. 356

TABULATION OF BIDS AND AWARD OF CONTRACT

RECOMMENDATION

That the Board of Directors authorize the Executive Director to award a contract as follows:

Contractor: Insituform Technologies, LLC
Scope: Construction
Project: No. 356, Wilson Creek Gravity Interceptor Improvements, Phase 2
Amount: $4,669,452.25

BACKGROUND

PROJECT PURPOSE

- Advances NTMWD objectives to adequately maintain and operate the collection systems.
- Project as recommended in the Upper East Fork Interceptor System Study, dated June 6, 2013 and prepared by CH2M HILL.

PROJECT COMPONENTS

- Phase 2 –Northern section of the 42-inch Wilson Creek Gravity Interceptor from the Wilson Creek Lift Station southward to the manhole just east of County Road 317, which is the termination point for Phase I improvements on this pipeline
  - 17,300 linear feet of cured-in-place pipe liner
  - Protective lining of 23 manholes.
- Phase 1 – (Previously funded and nearing completion) approximately 12,300 linear feet in length extending from the manhole just east of County Road 317 southward to the McKinney Lift Station.

EXAMPLE

TABULATION OF BIDS

Sealed bids for construction of Phase 2 were received at 1:00 p.m. on Wednesday, February 11, 2015, as tabulated below:

Bidder	Total Bid	Recommendation
Insituform Technologies, LLC	$4,669,452.25	Lowest responsible bid Recommended for Award
Ric-Man Construction	$4,945,297.00	
Kenny Construction Co.	$5,572,227.60	
Layne Inliner, Inc.	$6,675,181.00	
IPR	$7,489,122.08	
ENGINEER'S OPINION OF PROBABLE COST	$5,700,000.00	

LOWEST RESPONSIBLE BIDDER HISTORY

- Successfully completed several similar projects for the NTMWD.
- Currently under contract for Project No. 228, UEFIS Cottonwood Creek Outfall Sewer Improvements
- Currently under contract for Project No. 278, UEFIS Wilson Creek Gravity Interceptor Improvements, Phase 1

FUNDING

FUND(S): Upper East Fork Interceptor System 2012 Construction Fund

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EXAMPLE

NORTH TEXAS MUNICIPAL WATER DISTRICT

FEBRUARY 2015 ADMINISTRATIVE MEMORANDUM NO. 4365

UPPER EAST FORK INTERCEPTOR SYSTEM
WILSON CREEK GRAVITY INTERCEPTOR IMPROVEMENTS, PHASE 2
PROJECT NO. 356

CHANGE ORDER

RECOMMENDATION

That the Board of Directors authorize the Executive Director to execute a change order as follows:

Contractor: Insituform Technologies, LLC
Scope: Construction, C.O. No. 1
Project: No. 356, Wilson Creek Gravity Interceptor Improvements, Phase 2

Description	Amount	Days
Original Contract	$4,669,452.25	330
Prior Change Order(s) Total	$0.00	0
Replace 100 linear feet of pipe, delay for ordering	$150,000.00	25
Proposed Change Order	**$150,000.00**	**25**
Revised Contract	**$4,819,452.25**	**355**

BACKGROUND

PROJECT PURPOSE

- Advances NTMWD objectives to adequately maintain and operate the collection systems.
- Project as recommended in the Upper East Fork Interceptor System Study, dated June 6, 2013 and prepared by CH2M HILL.

PROJECT COMPONENTS

- Phase 2 –Northern section of the 42-inch Wilson Creek Gravity Interceptor from the Wilson Creek Lift Station southward to the manhole just east of County Road 317, which is the termination point for Phase I improvements on this pipeline
  - 17,300 linear feet of cured-in-place pipe liner
  - Protective lining of 23 manholes.

EXAMPLE

- Phase 1 – (Previously funded and nearing completion) approximately 12,300 linear feet in length extending from the manhole just east of County Road 317 southward to the McKinney Lift Station.

PROPOSED CHANGE ORDER

- Replace a portion of the Wilson Creek Gravity Interceptor, based on pipe condition discovered in the field indicating lining was not feasible, to improve the overall condition of the line and increase service life.

FUNDING

FUND(S): Upper East Fork Interceptor System 2012 Construction Fund

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EXAMPLE

NORTH TEXAS MUNICIPAL WATER DISTRICT

FEBRUARY 2015 CONSENT AGENDA ITEM NO. 4365

UPPER EAST FORK INTERCEPTOR SYSTEM
WILSON CREEK GRAVITY INTERCEPTOR IMPROVEMENTS, PHASE 2
PROJECT NO. 356

CHANGE ORDER

RECOMMENDATION

That the Board of Directors authorize the Executive Director to execute a change order as follows:

Contractor: Insituform Technologies, LLC
Scope: Construction, C.O. No. 1
Project: No. 356, Wilson Creek Gravity Interceptor Improvements, Phase 2

Description	Amount	Days
Original Contract	$4,669,452.25	330
Prior Change Order(s)	$0.00	0
Replace 50 linear feet of pipe, delay for ordering	$99,000.00	25
Proposed Change Order	**$99,000.00**	**25**
Revised Contract	**$4,768,452.25**	**355**

PROJECT PURPOSE

- Advances NTMWD objectives to adequately maintain and operate the collection systems.
- Project as recommended in the Upper East Fork Interceptor System Study, dated June 6, 2013 and prepared by CH2M HILL.

PROPOSED CHANGE ORDER

- Replace a portion of the Wilson Creek Gravity Interceptor, based on pipe condition discovered in the field indicating lining was not feasible, to improve the overall condition of the line and increase service life.

FUNDING

FUND(S): Upper East Fork Interceptor System 2012 Construction Fund

EXAMPLE

NORTH TEXAS MUNICIPAL WATER DISTRICT

FEBRUARY 2015 CONSENT AGENDA ITEM NO. 15-02-02

MONTHLY CONSTRUCTION REPORT

RECOMMENDATION

That the Board of Directors approve the Monthly Construction Report in accordance with District Policy.

1. CHANGE ORDERS

WASTEWATER SYSTEM

a. Project No. 356 – C. O. No. 2, Wilson Creek Gravity Interceptor Improvements, Phase 2
Contractor: Insituform Technologies, LLC

Description	Amount	Days
Original Contract	$4,669,452.25	330
Prior Change Order(s)	$99,000,00	25
Remobilization pipe lining crew and equipment	$10,000.00	0
Line additional 6 manholes	$10,000.00	10
Line additional 400 linear feet of 36 inch pipe	$26,000.00	20
Arborist and required tree trimming	$2,000.00	0
Proposed Change Order	**$48,000.00**	**10**
Revised Contract	**$4,816,452.25**	**365**

Completion Dates	Substantial	Final
Original	November 10, 2014	December 10, 2014
Revised	April 21, 2015	May 21, 2015

FUND(S): Upper East Fork Interceptor System 2012 Construction Fund

b. Project No. XXX – YYYY

etc.

EXAMPLE

Appendix A7
Administrative Memo Templates

NORTH TEXAS MUNICIPAL WATER DISTRICT

<<MONTH>> <<YEAR>> ADMINISTRATIVE MEMORANDUM NO. ____

_____ SYSTEM
<<PROJECT NAME>>
PROJECT NO. ____

CHANGE ORDER

RECOMMENDATION

That the Board of Directors authorize the Executive Director to execute a change order as follows:

Contractor: <<insert successful contractor name>>
Scope: Construction, C.O. No. ___
Project: No. ___, <<Project Name>>

Description	Amount	Days
Original Contract		
Prior Change Order(s) Total		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
Proposed Change Order		
Revised Contract		

BACKGROUND

PROJECT PURPOSE

- <<Brief bullets, typically 3 to 5, describing purpose of entire project, the need or problem addressed, and key or most important issues, if any, that the Board should be aware of in approving this Ad Memo. If project was identified by a study or master plan, provide that source as a bullet. Refer to example>>.

PROJECT COMPONENTS

- <<What are the components of the project? Ex. 4,000 linear feet of pipe from __ to ___; Ex. Six (6) new sand filters and associated piping and pumps for Water Treatment Plant 2; see example Ad Memo>>

PROPOSED CHANGE ORDER

- <<Brief description of the change order, and reason for change order. Refer to example>>

FUNDING

FUND(S): <<Appropriate fund name inserted by Finance Manager>>

NORTH TEXAS MUNICIPAL WATER DISTRICT

<<MONTH>> <<YEAR>> ADMINISTRATIVE MEMORANDUM NO. ____

_____ SYSTEM
<<PROJECT NAME>>
PROJECT NO. ____

TABULATION OF BIDS AND AWARD OF CONTRACT

RECOMMENDATION

That the Board of Directors authorize the Executive Director to award a contract as follows:

Contractor:	<<insert successful contractor name>>
Scope:	Construction
Project:	No. ___, <<Project Name>>
Amount:	$_____

BACKGROUND

PROJECT PURPOSE

- <<Brief bullets, typically 3 to 5, describing purpose of entire project, the need or problem addressed, and key or most important issues, if any, that the Board should be aware of in approving this Ad Memo. If project was identified by a study or master plan, provide that source as a bullet. Refer to example>>

PROJECT COMPONENTS

- <<What are the components of the project? Ex. 4,000 linear feet of pipe from __ to ___; Ex. Six (6) new sand filters and associated piping and pumps for Water Treatment Plant 2; see example>>

TABULATION OF BIDS

Sealed bids for construction of project were received at <<time>> on <<day>>, <<month>> <<day>>, <<year>>, as tabulated below:

Bidder	Total Bid	Recommendation
		Lowest responsible bid Recommended for Award
ENGINEER'S OPINION OF PROBABLE COST		

LOWEST RESPONSIBLE BIDDER HISTORY

- <<insert pertinent items on prior work and performance…see example>>

FUNDING

FUND(S): <<Appropriate fund name inserted by Finance Manager>>

NORTH TEXAS MUNICIPAL WATER DISTRICT

<<MONTH>> <<YEAR>> ADMINISTRATIVE MEMORANDUM NO. ____

_____ SYSTEM
<<PROJECT NAME>>
PROJECT NO. ____

ENGINEERING SERVICES AGREEMENT

RECOMMENDATION

That the Board of Directors authorize the Executive Director to execute an engineering services agreement (ESA) as follows:

Consultant: <<insert successful consultant name>>
Scope: <<Preliminary engineering design, Final engineering design, Study, Planning, Surveying, etc.>>
Project: No. ___, <<Project name>>
Amount: $_____

BACKGROUND

PROJECT PURPOSE

- <<Brief bullets, typically 3 to 5, describing purpose of project, the need or problem addressed, and key or most important issues, if any, that the Board should be aware of in approving this Ad Memo. If project was identified by a study or master plan, provide that source as a bullet. Refer to example…>>

PROJECT COMPONENTS

- <<What are the components of the project? Ex. Design of 4,000 linear feet of pipe from __ to ___; Ex. Design of Six (6) new sand filters and associated piping and pumps for Water Treatment Plant 2; Study for process improvements at Water Treatment Plant 3; see example Ad Memo>>

BASIC SERVICES

- <<Brief list of basic services…see example>>

SPECIAL SERVICES

- <<Brief list of special services…see example>>

ADDITIONAL SERVICES

- <<List of additional services, if any>>

ENGINEERING SERVICES FEE

	AMOUNT
BASIC SERVICES	
SPECIAL SERVICES	
ADDITIONAL SERVICES	
REQUESTED AMOUNT	

CONTRACT: <<"Standard ESA" or "Revised ESA" noting significant (not minor) changes>>

FUNDING

FUND(S): <<Appropriate fund name inserted by Finance Manager>>

NORTH TEXAS MUNICIPAL WATER DISTRICT

<<MONTH>> <<YEAR>> CONSENT AGENDA ITEM NO. ____

_____ SYSTEM
<<PROJECT NAME>>
PROJECT NO. ____

CHANGE ORDER

RECOMMENDATION

That the Board of Directors authorize the Executive Director to execute a change order as follows:

Contractor: <<insert successful contractor name>>
Scope: Construction, C.O. No. __
Project: No. ___, <<Project name>>

Description	Amount	Days
Original Contract		
Prior Change Order(s)		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
Proposed Change Order		
Revised Contract		

PROJECT PURPOSE

- <<Brief bullets, typically 3 to 5, describing purpose of entire project, the need or problem addressed, and key or most important issues, if any, that the Board should be aware of in approving this Ad Memo. If project was identified by a study or master plan, provide that sources as a bullet. Refer to example>>.

PROPOSED CHANGE ORDER

- <<Brief description of the change order, and reason for change order. Refer to example>>

FUNDING

FUND(S): <<Appropriate fund name inserted by Finance Manager>>

NORTH TEXAS MUNICIPAL WATER DISTRICT

<<MONTH>> <<YEAR>> CONSENT AGENDA ITEM NO. ____

_____ SYSTEM
<<BRIEF PROJECT NAME>>
PROJECT NO. ____

ENGINEERING SERVICES AGREEMENT
ADDITIONAL SERVICES

RECOMMENDATION

That the Board of Directors authorize the Executive Director to authorize additional services for an engineering services agreement (ESA) as follows:

Consultant: <<insert successful consultant name>>
Scope: << Preliminary engineering design, Final engineering design, Study, Planning, Surveying, etc >>
Project: No. ___, <<Project Name>>

Description	Amount
Original ESA	
Prior Additional Services	
Proposed Change	
Revised ESA	

PROJECT PURPOSE

- <<Brief bullets, typically 3 to 5, describing purpose of project, the need or problem addressed, and key or most important issues, if any, that the Board should be aware of in approving this Ad Memo. If project was identified by a study or master plan, provide that source as a bullet. Refer to example…>>

FUNDING

FUND(S): <<Appropriate fund name inserted by Finance Manager>>

NORTH TEXAS MUNICIPAL WATER DISTRICT

<<MONTH>> <<YEAR>> CONSENT AGENDA ITEM NO. ____

MONTHLY CONSTRUCTION REPORT

RECOMMENDATION

That the Board of Directors approve the Monthly Construction Report in accordance with District Policy.

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1. CHANGE ORDERS

<<WATER, SOLID WASTE, OR WASTEWATER>> SYSTEM

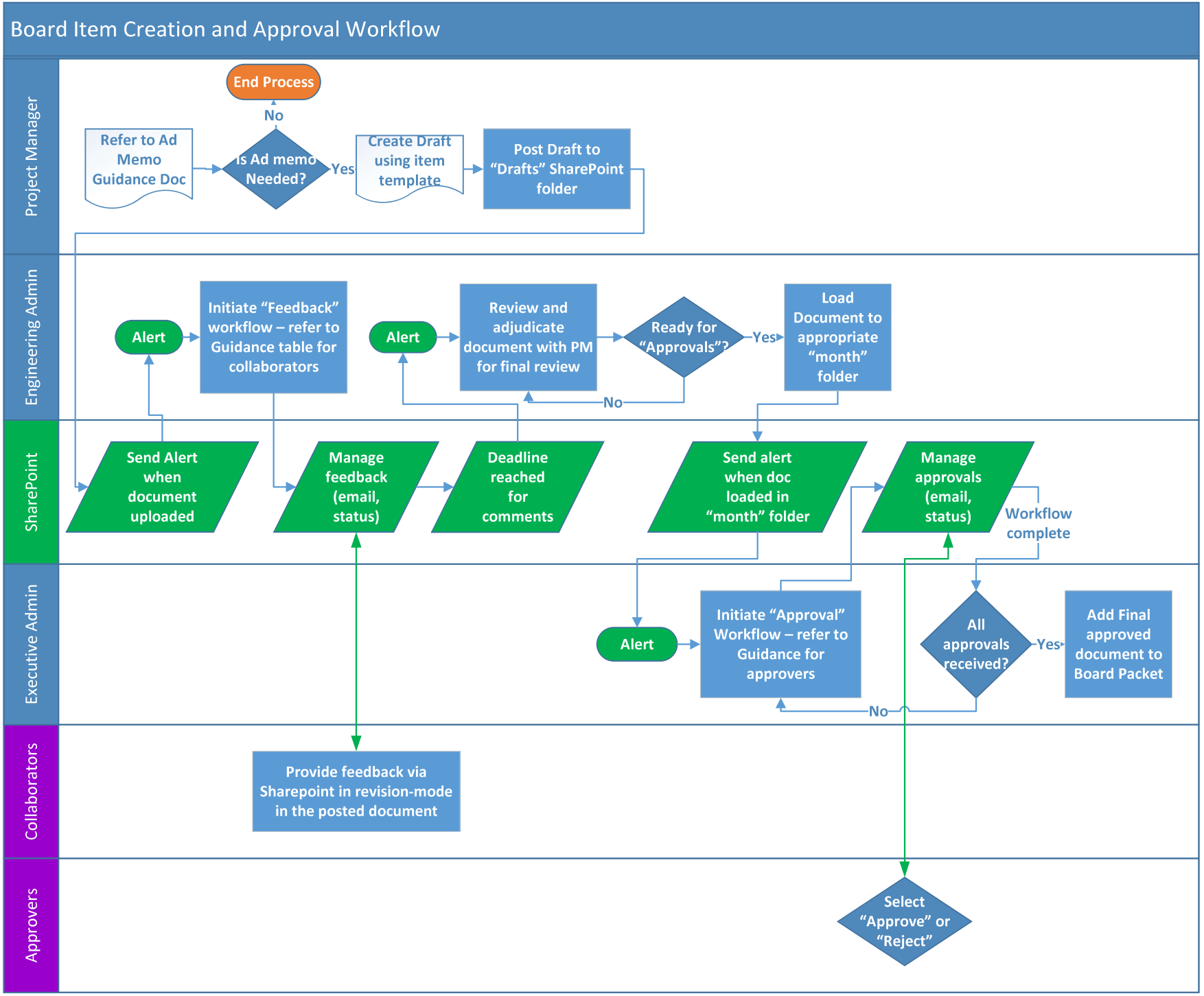
a. Project No. ____ – C.O. No. __, <<Project name>>
Contractor: <<Contractor name>>

Description	Amount	Days
Original Contract		
Prior Change Order(s)		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
<<Proposed CO component – see example>>		
Proposed Change Order		
Revised Contract		

Completion Dates	Substantial	Final
Original	<<date>>	<<date>>
Revised	<<date>>	<<date>>

FUND(S): <<Appropriate fund name inserted by Finance Manager>>

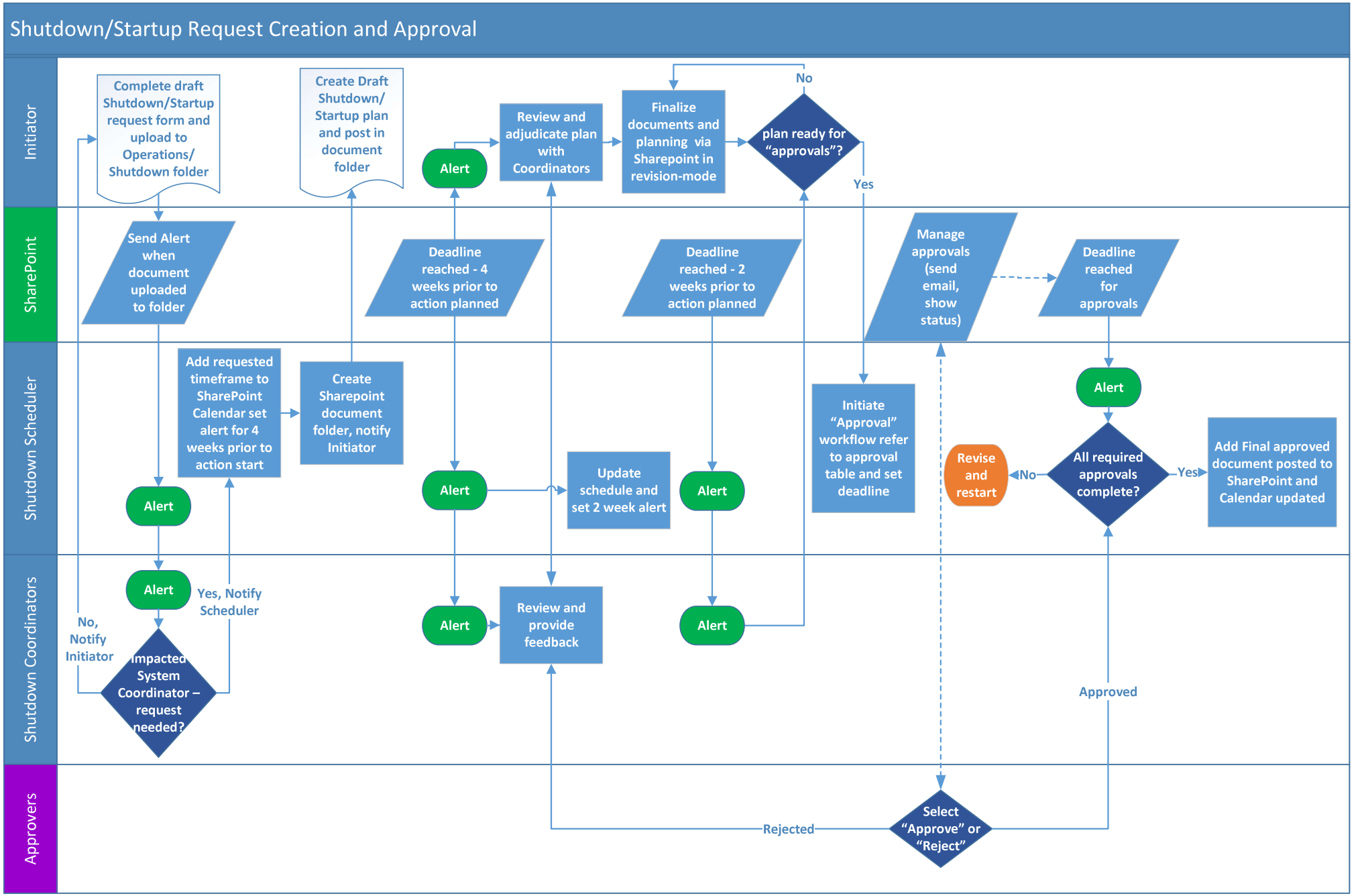
Appendix A8
Administrative Memo Workflow


Board Item Creation and Approval Workflow
Project Manager
Engineering Admin
SharePoint
Executive Admin
Collaborators
Approvers
End Process
No
Refer to Ad Memo Guidance Doc
Is Ad memo Needed?
Yes
Create Draft using item template
Post Draft to "Drafts" SharePoint folder
Alert
Initiate "Feedback" workflow – refer to Guidance table for collaborators
Alert
Review and adjudicate document with PM for final review
Ready for "Approvals"?
Yes
No
Load Document to appropriate "month" folder
Send Alert when document uploaded
Manage feedback (email, status)
Deadline reached for comments
Send alert when doc loaded in "month" folder
Manage approvals (email, status)
Workflow complete
Alert
Initiate "Approval" Workflow – refer to Guidance for approvers
All approvals received?
Yes
No
Add Final approved document to Board Packet
Provide feedback via Sharepoint in revision-mode in the posted document
Select "Approve" or "Reject"

Appendix A9
Shut-down Collaborate/Approve/ Inform Matrix

Group	Feedback	Approve	CC
Engineering	Initiator Coordinator PrgM Engr Mgr Asst Deputy Dir	PrgM	Initiator PrgM Engr Mgr Asst Deputy Dir Deputy Dir
Operations	Coordinator Facility Mgr or equiv System Mgr or equiv Asst Deputy Dir	Facility Mgr or equiv System Mgr or equiv Asst Deputy Dir	Facility Mgr Asst Deputy Dir Deputy Dir Envir Svcs Officer Exec Dir
Maintenance	Coordinator	Coordinator	Maint Mgr
IT/SCADA	Coordinator	Coordinator	IT Mgr

Appendix A10
Shut-down Workflow


Shutdown/Startup Request Creation and Approval
Initiator
SharePoint
Shutdown Scheduler
Shutdown Coordinators
Approvers
Complete draft Shutdown/Startup request form and upload to Operations/ Shutdown folder
Create Draft Shutdown/ Startup plan and post in document folder
Alert
Review and adjudicate plan with Coordinators
Finalize documents and planning via Sharepoint in revision-mode
plan ready for "approvals"?
No
Yes
Send Alert when document uploaded to folder
Deadline reached - 4 weeks prior to action planned
Deadline reached - 2 weeks prior to action planned
Manage approvals (send email, show status)
Deadline reached for approvals
Add requested timeframe to SharePoint Calendar set alert for 4 weeks prior to action start
Create Sharepoint document folder, notify Initiator
Initiate "Approval" workflow refer to approval table and set deadline
Alert
Update schedule and set 2 week alert
Revise and restart
No
All required approvals complete?
Yes
Add Final approved document posted to SharePoint and Calendar updated
Alert
Alert
Alert
Alert
Alert
Yes, Notify Scheduler
No, Notify Initiator
Impacted System Coordinator – request needed?
Review and provide feedback
Approved
Rejected
Select "Approve" or "Reject"