Engineering Management
Field Project

Development of an Implementation Plan for an Electronic Document Management System in a Global Engineering Firm

By

Robert N. Kisuve

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Tom H. Bowlin
Tom H. Bowlin
Committee Chairperson

Tim Wilcoxon
Committee Member

Michael D. Profit
Committee Member

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Executive Summary

It is critical that an organization employ a well defined process when deploying an Electronic Document Management (EDM) system. A well implemented EDM system can be a great asset to an organization especially with the proliferation of distributed project teams in project execution. The goal of this field project is to establish such a process for deploying an EDM system, ProjectWise, in Organization X's Division Y Asia-Pacific offices. This deployment process will be established by developing an implementation plan.

To develop the implementation plan, the following research procedures were utilized: documentation review, interviews, and surveys. Since Organization X uses an external IT services provider to develop and manage its IT infrastructure, the research for this field project focused only on the implementation activities that will be performed by Organization X's internal IT group and did not look at those activities performed by the external IT services provider. The activities that were investigated in this field project include: configuration identification, pilot testing, system roll-out, and training.

Recommendations

Based on the findings of the research done for this field project, the following recommendations were made to IT and subsequently included in the implementation plan attached in Appendix A – EDM System Implementation Plan:

- Alternative methods of delivering training should be developed to augment web-based training. Live training and recordings of live training were the alternatives preferred most by the survey participants.

- Notifications should be issued to end-users after the EDM system has been installed on a workstation.
- Templates used to identify configuration items in North America and Europe shall be used in Asia-Pacific.
- Since pilot testing is crucial to meeting the overall implementation schedule, potential pilot projects should be selected as early in the implementation process as possible.
- Risk factors and proposed mitigations have been identified and included in the implementation plan.

Chapter 1 - Introduction

In today's techno-centric world, document management systems play a critical role in the execution of engineering projects. Advances in technology have made it easier for Architectural/Engineering/Construction (A/E/C) firms to generate and process large quantities of data as they execute projects. This increase in data has led to an increase in the volume of documents generated by these projects. Since most of these documents are managed electronically, the need to invest in robust Electronic Document Management (EDM) systems has become a priority for A/E/C firms.

In addition to having an impact on the production of engineering documents, technology has also changed the way projects are executed in the A/E/C industry. Advances in technology have fueled the use of distributed project teams when executing projects. As A/E/C firms seek to gain a competitive edge in the marketplace, they are increasingly striving to execute projects more efficiently by leveraging resources across the entire firm through the use of distributed project teams. EDM systems are at the heart of this trend. These systems allow firms to efficiently manage standardization of created documents and the secure transfer of these documents.

Recognizing the aforementioned importance of an EDM system, Organization X –a leading global engineering, consulting and construction company–is in the process of upgrading its existing system in Division Y. After conducting an extensive review of the EDM systems available in the market today, Organization X's Division Y selected Bentley's ProjectWise V8i to replace its existing 10-year-old system.

The new system is being deployed in three phases which are divided by geographical regions: North America, Europe, and Asia-Pacific. While Organization X's

Division Y Information Technology (IT) group seeks to maintain uniformity in the system across the regions, each region has some unique operating requirements that need to be considered when implementing the EDM system. Currently, Organization X's Division Y has fully deployed ProjectWise in North America, it is performing pilot tests in Europe, and has not commenced the deployment process in Asia-Pacific.

The intent of this field project is to develop an implementation plan for the deployment of the EDM system in Organization X's Division Y Asia-Pacific offices. This field project seeks to replicate at Organization X work done previously in the area of deployment of EDM systems and to augment it with original research to address issues unique to Organization X.

Scope of Work

Organization X's Extended Enterprise Information Technology model employs collaboration among internal IT professionals, an external IT services provider, and vendors to deliver IT resources and services to its globally distributed project teams. In the deployment of the EDM system, HP Enterprise Services and Bentley Systems, Inc. are responsible for the development of the system while Organization X's Division Y IT group is responsible for planning, managing, and rolling out of the system. Therefore, the implementation plan will only cover items related to planning, managing, and rolling out of the system. These will include:

- configuration identification
- pilot testing

- roll-out and training
- budget and schedule

Chapter 2 – Literature Review

Sprague defines electronic document management as "the application of technology to save paper, speed up communications, and increase the productivity of business processes" (Sprague 1995). This business function is so crucial to an organization that a 1990s Gartner Group Strategic Analysis Report predicted that, by 1995, document management functions will become the most important service on Local Area Networks after basic connectivity (Sprague 1995). A more recent research by TechNavio on the 2010-2013 document management systems market found that these systems have become critical across industries and countries (TechNavio, 2011). Taking into account the importance of document management systems, and considering the complexity of today's information systems, it is critical that an organization employ a defined process and team approach when implementing an EDM system (Smith 1997).

A defined process ensures that the implementation of a project is consistent with an organization's objectives, that a project can be effectively utilized once deployed, and provides a road map so that important aspects of the project are not overlooked (Smith 1997). In conjunction with Organization X's Division Y IT policies and procedures, the implementation plan will be used to provide such a framework for deploying the EDM system. This literature research looked at some key subject areas that need to be understood to better develop the implementation plan. These key subject areas are: importance of EDM systems, configuration identification, pilot testing, system roll-out, and training plan.

Importance of EDM Systems

In 1978, Swanson and Culnan claimed that they believed that document-based systems were finding their way into contemporary management information system thinking, especially in the area of management planning and control (Swanson and Culnan 1978). At the time, Swanson and Culnan were concerned that the use of document-based information systems in management was being neglected; little did they know how central these systems would become to organizations.

EDM systems are used to create, maintain, and distribute documents. Unlike records management applications, which are used to archive documents that are infrequently accessed by users, EDM systems maintain the 'current version' of a document, which is accessed and updated frequently by multiple users (Sprague 1995). Salvendy notes that EDM systems are used to integrate flow of information and processes into business processes by processing every demand and supplying the right information at the right time, as shown in Figure 2 - 1 (Salvendy 2001, 195-198). He notes that these systems create the basis for:

- *the integration of application systems for technical and commercial processes as well as for office systems in a common database*
- *the task-oriented supply of all operations with actual and consistent data and documentation*
- *the control and optimization of business processes (Salvendy 2001, 196)*

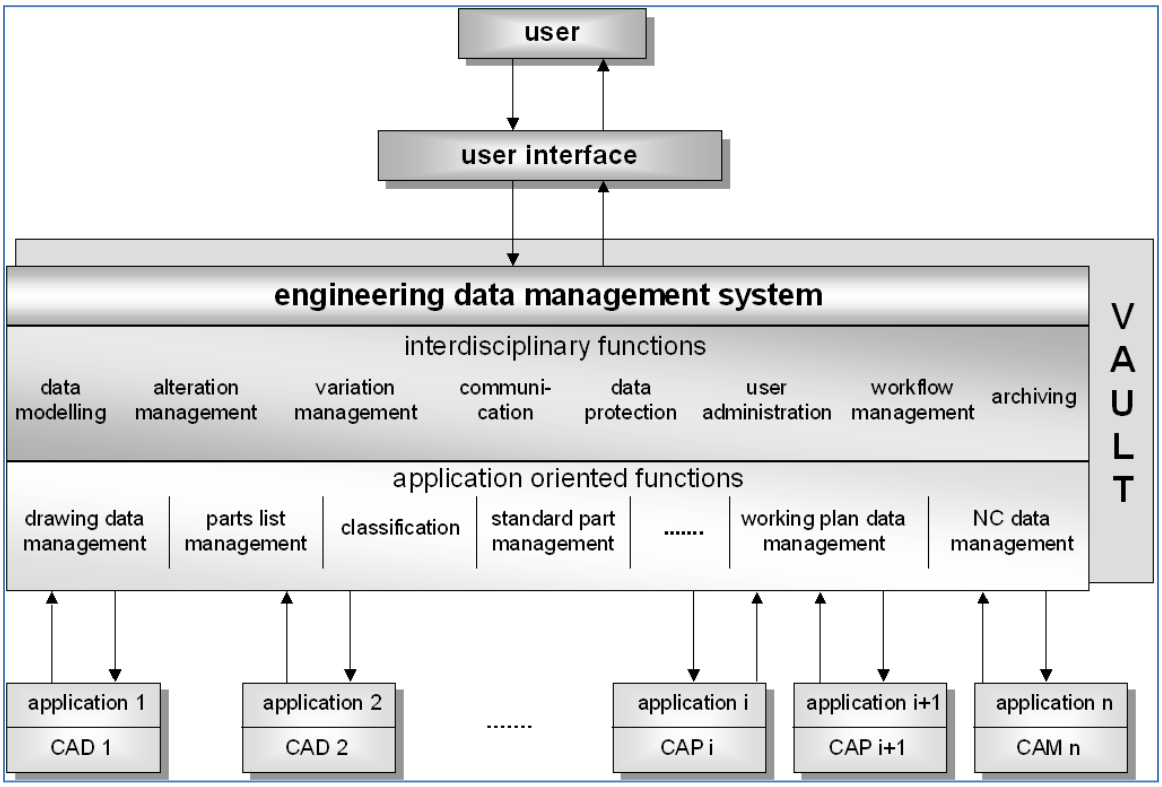

Figure 2 - 1: *Architecture of an EDM System with Integrated Applications* (Salvendy 2001, 198)

In the A/E/C industry, one area that has been affected significantly by the use of EDM systems is the creation and production of computer-aided design (CAD) drawings. If these systems are well implemented, they can greatly increase productivity. Dawson notes that these systems enable users to (Dawson 1996):

- tag and view in-depth information about a file, such as why a revision was made and who made it
- display checked-out drawings and the person who checked them out
- allow users to define document properties
- store drawings and related documents in a secure central location
- monitor authorization and access rights to maintain security

- automatically back up drawings and related documents
- automate workflow by automatically routing drawings to the project team

Configuration Identification

Configuration identification is the process of identifying the configuration items for the system. Thompson defines a configuration item as "a stand-alone, test-alone, use-alone element of software that requires control during development and subsequent use in the field" (Thompson 2006). This is a key process in the development of the EDM system and, according to Morris and Pinto, typically includes (Morris and Pinto 2004, 501):

- defining product structure and selecting elements to be managed
- assigning unique identifiers
- defining product attributes, interfaces, and details in product information

A key method that is used in identifying the configuration items is field survey. Field surveys are used to ensure that the IT professionals have an accurate picture of the current environment of the users and to get input on what the users expect from the solution (Smith 1997). In addition to the configuration items, Smith notes that these field surveys can also be used to determine (Smith 1997):

- usage patterns
- level of training required
- operating environment
- security constraints
- and other factors that may affect development and deployment of the system

Large organizations, especially those that have global operations, may need to carry out the configuration identification process for each distinct business unit in the organization. This enables IT professionals to identify and include configuration items that may be unique to these business units. However, in cases where integrated teams are used, it is important to make sure that some degree of uniformity is maintained across the different systems (Watts 2008, 21). Maintaining uniformity allows interoperability among the distinct business units, and thus better collaboration among the business units.

Pilot Testing

A pilot is a limited roll-out of the proposed system in the production environment. This limited roll-out is used to perform a final reality check of the proposed system without exposing the entire organization to danger (Smith 1997). Smith notes that the pilot test offers an opportunity to (Smith 1997):

- validate all aspects of the system prior to the full-scale implementation
- test and refine the training processes
- validate deployment mechanisms prior to full-scale implementation

Teschler suggests that when selecting a pilot project, an organization should pick the smallest project that gives a recognizable return and that the project should be kept as simple as possible (Teschler 1996). He cautions against ‘heroism’ and ‘grandeur’ when selecting pilot projects and instead recommends that a pilot project be limited to few critical functions that are important to the organization.

System Roll-Out

After the pilot test production processes have been tested and approved, the system is ready to be installed in the production environment. There are several system management products available in the market for software distribution. These include: LANDesk, Symantec's Altiris, Microsoft's System Center Configuration Manager (SCCM), and Casper from JAMF software (Holtsnider and Jaffe 2010, 204). As indicated on the Microsoft System Center website, system packages like SCCM allow more effective, automated and secure deployment of software to geographically dispersed users. During the deployment, the actual installation of the software can be carried out without the end-users knowing–that is, no messages or windows displayed–or require some action from the end-users.

Training Plan

Training is used to get the full benefits of the system by taking into consideration the organization's unique business requirements. Well implemented training programs seek to minimize productivity losses associated with transition to a new system by getting end-users to the skill level required to do their jobs as quickly and accurately as possible (Shinder 2006).When selecting a training delivery method, the users' skill levels, number of users to be trained, and timeframe for deploying the system need to be considered. Shinder outlines the following methods for delivering training (Shinder 2006):

- Individual hands-on instruction – instructor walks an individual user through the use of the software and answers questions.

- Hands-on classroom style – instructor walks a class through the software with each user performing the functions on a computer.
- Seminar style group demonstration – a live demonstration for a larger group with the instructor performing the functions on a computer.
- Computer Based Training – CD-based or online self-paced training which includes interactive lessons that walk the user through the software.
- Book-based self-paced training – user completes workbook lessons on how to use the software.

To meet the training needs of an organization, the training program may need to utilize a combination of these training methods. In selecting the training methods to include in a training program, a key consideration should be scalability of the program; that is, flexibility to accommodate both small and large numbers of users (Shinder 2006). Of the training methods listed above, the individual hands-on instruction, computer based training, and book-based self-paced training are more scalable. Computer based training is the most scalable and most efficient form of training.

Chapter 3 – Research Procedures

In developing the EDM system's implementation plan for Organization X's Division Y Asia-Pacific offices, several research procedures were used. These procedures were used to gather information, define problem areas, evaluate alternatives, and determine the best implementation approach. The following are the research procedures used in this field project: documentation review, interviews, and surveys.

Documentation Review

Documentation review was performed at the beginning of the field project to define the problem and gather historical information. Since Organization X's Division Y was in the process of deploying an EDM system in North America, there was a wealth of information on the system and on the overall deployment strategy for the entire business group. However, IT had not developed an implementation plan for North America or any other region.

The documents reviewed were obtained from the ProjectWise portal on Organization X's intranet and some were provided by Organization X's Division Y IT Director. Table 3 - 1 lists the documents that were reviewed.

Table 3 - 1: List of Documents Reviewed

Document Name	Document Type
IT Management Council Presentation 02/10/09 – Strategic Development Update: System Z Next Generation	PowerPoint
Simplified Discover, Acquire, Produce, Process, Share (DAPPS) model HDF	Excel
System Z Briefing 07/17/09 – System Z Overview	PowerPoint/Video
System Z Briefing 07/24/09 – Microsoft Office Integration	PowerPoint/Video

Document Name	Document Type
System Z Briefing 07/31/09 – File Transfer	PowerPoint/Video
System Z Briefing 08/14/09 – Document Action Options	PowerPoint/Video
System Z Briefing 08/21/09 – Search Tools	PowerPoint/Video
System Z Briefing 09/09/09 – Security	PowerPoint/Video
System Z Briefing 09/25/09 – Support and Training	PowerPoint/Video
System Z Briefing 10/02/09 – Project Navigation	PowerPoint/Video
System Z Briefing 10/09/09 – Copy & Export	PowerPoint/Video
System Z Briefing 10/16/09 – 2009-2011 Deployment Plan	PowerPoint/Video
ProjectWise Environments	PowerPoint
System Z Migration FAQ	Word
System Z Summary	Word
ProjectWise Introductory Training	Video
EDS – Organization X Engineering and Collaboration Assessment	Word
System Z Next Generation Bentley Phase 3A SCOPE STATEMENT	Word
System Z Next Generation Bentley Phase 3B SCOPE STATEMENT	Word

Interviews/Meetings

Interviews were performed at different stages of this field project to help define the problem areas, evaluate alternatives, and determine the best implementation approach. These interviews were carried out one-on-one over the phone and there were no set questions developed beforehand; only key items to be discussed were identified. The following professionals were interviewed:

- Organization X's Division Y IT Director
- Organization X's Division Y Training Lead
- Organization X's Division Y Americas' operations professionals

In addition to the interviews, information was also gathered during the ProjectWise walk-through meetings. The walk-through meetings were held by IT with a

select group of operations professionals in Asia-Pacific to familiarize them with ProjectWise so that they could assist in determining system preferences and configuration items unique to their region. These ProjectWise walk-through meetings were held via the web using Microsoft Office Live Meeting. Table 3 - 2 lists the professionals who took part in these walk-through meetings. Table 3 - 3 provides a list of topics covered during these meetings and the dates that the meetings took place.

Table 3 - 2: Asia-Pacific ProjectWise Walk-Through Meetings Participants

Title	Office Location
Division X IT Director	Kansas City
Division X IT Manager of CAD Technology & Development	Kansas City
Robert Kisuve – MS EMGT Candidate	Atlanta
Project Controls Manager	Singapore
Regional CAD Coordinator	Singapore
Design Manager, Electrical & ICA Lead	Australia
Operations Manager	Shenzhen (Mainland China)
Principal Engineer	Hong Kong
Project Manager Bentley (Meetings 4 & 5)	Bentley Systems
MicroStation Technical Expert (Meeting 4)	Bentley Systems
AutoPLANT Technical Expert (Meeting 5)	Bentley Systems

Table 3 - 3: Topics Covered in the ProjectWise Walk-Through Meetings

Description	Date Held
Meeting 1 - Demonstration of ProjectWise Explorer desktop client and review of corporate standard project filing system	01/19/11
Meeting 2 - Security Model and Document Workflows	01/26/11
Meeting 3 - Document, Folder, and Project Level Attributes and Environments	02/09/11
Meeting 4 - Use of MicroStation with ProjectWise	02/16/11
Meeting 5 - Use of AutoPLANT with ProjectWise	02/23/11

Surveys

A survey was performed to determine the effectiveness of the current roll-out method and training strategies for the EDM system and to evaluate alternatives for training and rolling out the system. Since the EDM system has been deployed fully in North America and to select users in Europe, the survey was able to gather information from professionals who have actually been affected by the implementation of this system. A copy of the survey questionnaire is included in Appendix B – ProjectWise Roll-Out and Training Communication Survey.

Since the Asia-Pacific offices are regional offices, the survey was administered to professionals in the regional offices in North America and Europe as opposed to those in the head office. The experiences of the professionals in the Asia-Pacific offices should be somewhat similar to those of these professionals in the regional offices in North America and Europe. The following is a list of offices that took part in the survey:

- Atlanta, Georgia
- Boston, Massachusetts
- Dallas, Texas
- Greenville, South Carolina
- Raleigh, North Carolina
- Redhill, United Kingdom
- Toronto, Canada

Chapter 4 – Findings

The resulting deliverable of this field project is the EDM System Implementation Plan for Organization X's Division Y Asia-Pacific region. The implementation plan provides a detailed outline of the deployment of ProjectWise in the Asia-Pacific offices. This implementation plan is attached in Appendix A – EDM System Implementation Plan.

In addition to incorporating the findings of this field project in the implementation plan, this section of the report discusses these findings in detail.

Documentation Review

The documents that were reviewed helped define the problem and provide background information on the EDM system. This information was in turn used in developing the implementation plan for Asia-Pacific. The following is a list of information that was gathered through documentation review:

- the overall schedule for deploying the EDM systems in North America, Europe, and Asia-Pacific
- the scope of work for the EDM system implementation project, the scope for other related IT improvement projects that are being performed concurrently, and how this project fits with other IT initiatives
- the roles and responsibilities of key parties involved in the deployment process
- the available ProjectWise training resources

- an understanding of the configuration identification process and the configurable items for the system

Interviews

The following is a summary of the discussions/decisions from the interviews that were performed during this field project:

a) Organization X's Division Y IT Director – IT will own the EDM System Implementation Plan; therefore, they are the client in this field project. Interviews were carried out on May 26, 2010; September 23, 2010; December 17, 2010; and February 18, 2011 with the IT Director to determine scope, establish expectations, and confirm assumptions. The following is a summary of key discussions/decisions from these interviews:

- May 26, 2010:
  - No official implementation plan was developed for North America; it would be beneficial to develop an implementation plan to act as a road map and to document the strategic approach for implementing the EDM systems for future reference and knowledge retention.
- September 23, 2010:
  - Full roll-out of ProjectWise is underway in North America and pilot tests are underway in Europe. No work has started yet in Asia-Pacific; this will be the focus of this field project.

- The implementation should focus on configuration identification, pilot testing, roll-out, and training. HP Enterprise Services and Bentley Systems, Inc. are responsible for designing and building the system.
- Risk management for the system is critical because IT had to deal with a failure of System Z servers in Hong Kong.

- December 17, 2010:
  - A team of operations professionals in Asia-Pacific needs to be selected to take part in the ProjectWise walk-through meetings and to assist in determining configuration settings unique to Asia-Pacific. Division Y's IT Director and the Operations Director for Asia-Pacific will select the team before the end of the year.
- February 18, 2011:
  - The proposed schedule and budget for this project were discussed.
  - Software installation methods and preferences for the project were discussed.

b) Organization X's Division Y Training Lead – Training delivery methods were discussed with the Training Lead on January 17, 2011. The following are key discussions/decisions from this interview:

- The Training Lead noted that software for recording 'mouse clicks' is becoming more prevalent and that recordings of 'mouse clicks' can be an effective tool for delivering software type training.

- The Training Lead also noted that the cultural/political factors that may affect learning in the Asia-Pacific region have not been looked at by the training department.

c) Organization X's Division Y Americas' Operations Professionals – nine Organization X's Division Y professionals from different offices in North America were interviewed during the administration of the roll-out and communication plan survey. These professionals were selected from the Operations group in some of the main regional offices in North America and interviewed to gauge the use of ProjectWise across North America. The following are key discussions/decisions from these interviews:

- Professionals in several offices were not aware that ProjectWise had been rolled out to their offices or project teams. This perception was contrary to the fact that IT had rolled out ProjectWise to all professionals in North America. The misperception can be attributed to a breakdown in communication during the roll-out phase.
- Most of the professionals were not satisfied with the web-based training that was offered and would have preferred live training. In fact, several were not aware that web-based training was available.

Surveys

A total of 40 professionals participated in the ProjectWise Roll-Out and Training Communication Survey. These professionals were targeted because they had used ProjectWise and thus were in a position to provide meaningful input that could be used to

improve the roll-out process and the training delivery methods. A detailed summary of the survey responses and comments is included in Appendix C – Summary of PW Roll-Out & Training Communication Survey Results. The following is a summary of the responses, followed by a brief discussion of the results:

a) Survey Question # 1: *Have you accessed the ProjectWise portal on Organization X iNET?*

	Yes	*No*
Results	*22*	*17*

Survey Question # 2: *If Yes, on a scale of 1 to 5 how would you rate the effectiveness of the portal as a communication/training tool?*

	1. Not Effective	*2. Slightly Effective*	*3. Neutral*	*4. Mostly Effective*	*5. Very Effective*
Results	*0*	*3*	*9*	*8*	*2*

Observation: Web-based training through the ProjectWise Portal is the only method of delivering training in North America yet only 56% of the participants who responded to Question #1 had accessed this portal; and of these, only 26% found the portal to be effective as a training tool. Based on these results, a recommendation was made to IT to consider developing alternative methods of delivering the training. Survey Question #5 discusses these alternative methods.

b) Survey Question # 3: *Did you access the link on the ProjectWise portal to the User Introductory Training module on Division Y College?*

	Yes	*No*
Results	*9*	*30*

Survey Question # 4: *If Yes, on a scale of 1 to 5 how would you rate the effectiveness of the module as a training tool?*

	1. Not Effective	*2. Slightly Effective*	*3. Neutral*	*4. Mostly Effective*	*5. Very Effective*
Results	*0*	*4*	*3*	*2*	*0*

Observation: Survey Questions # 3 and 4 are an expansion of Questions # 1 and 2. Of the 56% participants who stated that they had accessed the ProjectWise portal, less than half of them (23%) had accessed the *User Introductory Training* module; and of these, only 5% found the module to be an effective tool for training. Once again, these results emphasize the need for IT to consider using alternative methods of delivering the training.

c) Survey Question # 5: *Select any other tools that you think would have been effective as training tools for ProjectWise:*

	A. Live Training Session	*B. Recordings of Live Training Sessions*	*3. Videos of Recorded 'Mouse Click'*	*4. Quick Reference Cards / Charts*	*5. Others*
Results	*16*	*16*	*9*	*18*	*7*

Observation: Live training or recordings of live training were the most preferred methods of delivering the training. Quick reference cards or charts were also preferred for augmenting the other methods of training. Division Y's IT Director has indicated that Europe is considering using either live or recordings of live training methods for delivering the training. These two methods are also being considered in Asia-Pacific to augment the web-based training.

d) Survey Question # 6: *HP performed a 'silent install'– installation without requiring an action from the use– were you aware that ProjectWise was available on your PC or did you need assistance to determine if the software was installed?*

	Aware	*Not Aware*
Results	*31*	*6*

Survey Question # 7: *For future updates/installs, would you prefer 'silent install' or would you like to be prompted to run the install?*

	Silent Install	*Prompted to Install*
Results	*27*	*11*

Observation: Silent install is the preferred method of rolling out ProjectWise. However, considering that several professionals who were interviewed and some of the survey participants were not aware that ProjectWise had been installed on their workstations, it is

recommended that IT consider following up with a notification after the software is rolled out. This can be done by either programming the system management product used for deploying ProjectWise, SCCM, to display a notice or by sending out notification e-mails. IT will discuss this recommendation with HP Enterprise Services during the planning stage of the roll-out phase.

Conclusions/Recommendations

The resulting deliverable of this field project is the EDM System Implementation Plan for Organization X's Division Y Asia-Pacific region. This implementation plan incorporates the findings of the documentation review, interviews, and surveys performed during this field project. The following is a summary of key findings/recommendations included in the implementation plan:

- Based on the outcome of the survey performed, it is recommended that alternative methods of delivering training be adapted to augment web-based training. The most preferred alternatives were live training and recordings of live training. Participants also indicated that they would like to have quick reference cards or charts to augment the training.
- Notifications should be issued after the EDM system has been installed on a workstation. The results of the survey indicated that a number of professionals in North America were not aware that ProjectWise had been installed on their workstations. This perception was also confirmed by some of the interviews performed with professionals in North America.

- Security Settings and the Corporate Standard Filing System templates were developed for North America and later updated for Europe. These templates will be used for configuration identification in Asia-Pacific.
- Selection of pilot test projects is crucial to meeting the implementation schedule. IT will work with Asia-Pacific to identify potential pilot projects as early in the implementation process as possible.
- Risk management is important during the implementation of the system due to the significant role played by the EDM system in execution of projects. Risk factors associated with the deployment of the EDM system and their proposed mitigations have been identified and included in the implementation plan.

Chapter 5 - Suggestions for Additional Work

A key area of the EDM system deployment process that was not investigated during this field project is the design and building of the system. Organization X has outsourced its IT services to HP Enterprise Services; therefore, the development of the EDM system will be performed by HP. Additional work may be required to explore the benefits, both in the functionality of the system and in the development process, that can be realized in this area. Some of the items that may need investigating are: design procedures, installation procedures, pilot testing procedures, and items that can be modified to improve functionality.

Another area that was not investigated during this field project is how local cultural/political factors may affect training in Asia-Pacific. Local cultural and political factors may influence the way people learn in a society and thus may need to be considered when selecting the methods of delivering training. Some areas that may be investigated are: how well local culture lends itself to adopting new ideas, the value of human interaction during training, and the technical savviness of the people being trained.

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Appendix A – EDM System Implementation Plan

1.0 Introduction

Organization X's Division Y is in the process of upgrading its Technology-Enabled Project Execution Architecture, commonly known as System Z. System Z covers the full life cycle of a project and comprises of three key elements: engineering tools, documents, and data. One critical component of System Z, and an important tool in integrating these key elements, is the Electronic Document Management (EDM) system. As part of System Z's upgrade, Organization X's Division Y has decided to replace the existing 10-year-old EDM system with a new system to take advantage of recent changes in technology. The new system selected by Organization X's Division Y is ProjectWise V8i by Bentley System, Inc. ProjectWise will:

- provide a single user interface for all project execution information
- provide a secure, global system for distributed project teams
- provide a platform that will be easier to integrate with Bentley's Lifecycle Server product which will provide significantly enhanced project data management capabilities

Organization X's Division Y will deploy ProjectWise in three phases which are divided by geographical regions: North America, Europe, and Asia-Pacific. This implementation plan outlines the deployment of ProjectWise in Division Y's Asia-Pacific (APAC) region.

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1.1 Purpose

The purpose of this implementation plan is to provide detailed guidelines for the deployment of ProjectWise V8i in Organization X's Division Y APAC region. This plan covers the following key components of the deployment process:

- configuration identification
- pilot testing
- roll-out, training, and support

1.2 Intended Audience

This implementation plan is intended for use by Organization X professionals involved in the deployment process. This will include the following parties:

- IT group
- Regional Managers
- Discipline Leads

1.3 Organization of This Document

This document is organized into the following sections:

- Roles and Responsibilities – lists roles and responsibilities of key parties involved in the implementation.
- Budget and Schedule – presents an overview of the budget and schedule for this project.
- Major Tasks – the following major tasks related to the implementation that will be performed by Organization X are discussed: configuration identification, pilot testing, system roll-out, training, and support.

- Risk Management – risks and mitigations are discussed.

2.0 Roles and Responsibilities

The following are the roles and responsibilities of the key groups that will be involved in the implementation of ProjectWise in APAC.

2.1 Organization X's Division Y IT Group (IT)

IT will lead the implementation process for Organization X's Division Y. The implementation process will be managed by Division Y's IT Director assisted by the Manager of CAD Technology and Development. The following are the roles and responsibilities of IT:

- identify operations' stakeholders in APAC to participate in ProjectWise walk-through meetings
- conduct the ProjectWise walk-through meetings
- facilitate the selection of system preferences and configuration items for APAC
- facilitate the selection of pilot projects and perform the pilot tests
- oversee the development of training curriculum/material and user support plans

2.2 APAC Operations' Stakeholders

APAC operations' stakeholders will include APAC's Operations Director and the operations decision-making team, see Table A-1. The following are the roles and responsibilities of the APAC operations' stakeholders:

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- participate in ProjectWise walk-through meetings
- provide input on configuration items unique to APAC
- recommend projects for pilot testing
- participate in the pilot tests
- provide input on training curriculum/material and methods of delivering the training

Table A-1: APAC's Operations Decision-Making Team

Title	Office Location
Project Controls Manager	Singapore
Regional CAD Coordinator	Singapore
Design Manager, Electrical & ICA Lead	Australia
Operations Manager	Shenzhen (Mainland China)
Principal Engineer	Hong Kong

2.3 HP Enterprise Services and Bentley Systems, Inc

HP Enterprise Services and Bentley Systems, Inc. are responsible for the design and development related activities for the system. The following are the roles and responsibilities of HP Enterprise Services and Bentley Systems, Inc.:

- develop, design, and build a development infrastructure environment in the Singapore data center which will host Bentley's ProjectWise and Life Cycle Server products
- build caching servers for deployment in APAC
- design a production infrastructure environment solution for APAC offices
- expand System Z's plot functionality to accommodate MicroStation drawings

- develop the proposal, including requirements, scope, WBS and budget for HP Enterprise Services activities related to this project

3.0 Budget and Schedule

This section covers the budget and schedule for the implementation of activities outlined in this plan and does not include the cost for other IT related solutions that are required for the overall System Z upgrades in APAC.

3.1 Budget

The budget information contained in this section does not include: hardware costs, software purchase cost, and regular Organization X salary costs. The following are the costs directly associated with the deployment of ProjectWise in APAC:

- Bentley fees - $XX,000
- HP Enterprise Services fees - $XX,000
- Organization X professionals' salaries - $XX,000

3.2 Schedule

The implementation of ProjectWise in APAC commenced late 2010 and is expected to be completed in the fourth quarter 2011. Figure A-1 is a schedule of the key activities related to this implementation.

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ID	Task Name	Duration	Start	Finish	Resource Names
1	Receive Authorization for Expenditure Approval	0 days	3/18/11	3/18/11	
2	Initiate Deployment Activities in APAC	0 days	12/15/10	12/15/10	
3	Identify Op's Decesion-Making Team	20 days	12/15/10	1/11/11	IT & APAC OP Dirs
4	**Identify Configuration Items**	**30 days**	**1/19/11**	**3/1/11**	
5	**Project Walk-Through Meetings**	**25 days**	**1/19/11**	**2/23/11**	
6	Meeting 1 - Demonstration of ProjectWise Explorer c	0 days	1/19/11	1/19/11	IT,APAC Op
7	Meeting 2 - Security Model and Document Workflows	0 days	1/26/11	1/26/11	IT,APAC Op
8	Meeting 3 - Document, Folder, and Project level attri	0 days	2/9/11	2/9/11	IT,APAC Op
9	Meeting 4 - Use of MicroStation with ProjectWise	0 days	2/16/11	2/16/11	IT,APAC Op
10	Meeting 5 - Use of AutoPLANT with ProjectWise	0 days	2/23/11	2/23/11	IT,APAC Op
11	Finalize Configuration Identification	5 days	2/23/11	3/1/11	IT,APAC Op
12	Configure Preferences	25 days	3/18/11	4/21/11	HP
13	Select Pilot Projects	30 days	2/23/11	4/5/11	IT,APAC Op
14	Pilot Testing	120 days	4/22/11	10/6/11	IT,APAC Op
15	Prepare for Full Deployment	30 days	10/7/11	11/17/11	HP
16	Roll-Out ProjectWise to APAC	45 days	11/18/11	1/19/12	IT,HP
17	Training	40 days	10/21/11	12/15/11	IT,Training Dept.

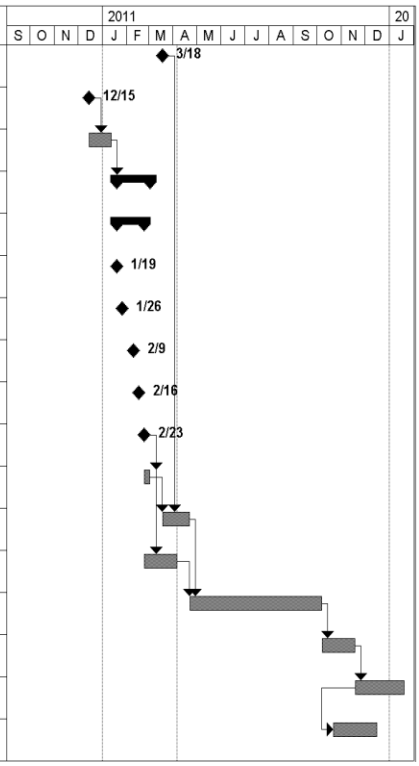

Figure A-1: ProjectWise Implementation Schedule

4.0 Major Tasks

The major tasks associated with this implementation that will be performed by Organization X are: configuration identification, pilot testing, system roll-out, training, and support. The following is a brief description of each task:

4.1 Configuration Identification

IT will work with the APAC's operations decision-making team to identify configuration items and system preferences unique to APAC. A series of walk-through meetings will be held to familiarize the team with ProjectWise and the configurable items for the system. Table A-2 outlines the proposed meetings.

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Table A-2: Proposed ProjectWise Walk-Through Meetings

Description
Pre-Planning Meeting – Discuss purpose of walk-through meetings and schedule subsequent meetings
Meeting 1 - Demonstration of ProjectWise Explorer desktop client and review of corporate standard project filing system
Meeting 2 - Security Model and Document Workflows
Meeting 3 - Document, Folder, and Project level attributes and environments
Meeting 4 - Use of MicroStation with ProjectWise
Meeting 5 - Use of AutoPLANT with ProjectWise

Templates will be provided to the APAC's operations decision-making team to use in determining the configuration items. These templates were developed for North America and Europe and will need to be customized for APAC. The following templates will be made available:

- Security Settings template - project level attributes and security features
- Corporate Standard Filing System template – templates available for both North America and Europe

4.2 Pilot Testing

After the configuration identification task is completed and HP Enterprise Services completes building the development environment for APAC, pilot testing will commence. Prior to commencement of pilot testing, IT will work with APAC to identify projects to be used for the pilot test. Two to three representative projects will be identified. The following criteria will be used when selecting the pilot projects:

- The project should be at the starting phase so that the project team will not be disrupted by a change in project procedures.

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- The project must cover key functional items to allow IT to gather useful information during the pilot test phase.

The pilot projects will be used to test the functional capabilities of ProjectWise and the assumptions configured in the system. During the tests, ProjectWise will be installed on the workstations of the project team members for the selected pilot projects and on the workstations of the operations decision-making team. The tests will either confirm the assumptions made in the development environment or identify areas that need to be improved in the production environment.

4.3 System Roll-Out

System roll-out will commence after the pilot test production processes have been tested and approved. Organization X uses Microsoft's System Center Configuration Manager (SCCM) to distribute software to its globally dispersed users. In North America, SCCM was used to silently distribute ProjectWise–install without displaying messages or windows during or after the installation; however, due to feedback received from a survey performed on the roll-out, IT will work with HP Enterprise Services to include a message notifying users that ProjectWise has been installed.

In addition to the SCCM install notification, IT will proactively communicate the planned roll-out with professionals in APAC. E-mails will be send to APAC professionals prior to and after ProjectWise is rolled out. These e-mails will contain descriptions of the system and information on training/support resources available to the users.

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4.4 Training

IT will work with APAC's Operations Director and the decision-making team to develop a training program suitable for APAC. The training program will build on the existing training resources that were developed for North America and will include four levels of training: general user, CAD/Dynamic user, System Z workspace administrator, and ProjectWise administrator. Table A-3 lists the existing training resources and Table A-4 summarizes the training requirements for each user level.

Table A-3: Existing ProjectWise Training Resources

Training Resource	Type
Introduction to ProjectWise	Video/Web-based
Quick Help - System Z Overview	Video/Web-based
Quick Help - Microsoft Office Integration	Video/Web-based
Quick Help - File Transfer	Video/Web-based
Quick Help - Document Action Options	Video/Web-based
Quick Help - Search Tools	Video/Web-based
Quick Help - Security	Video/Web-based
Quick Help - Project Navigation	Video/Web-based
Quick Help - Copy & Export	Video/Web-based
CAD Integration	Video/Web-based
ProjectWise FAQ	Word/Web-based

Table A-4: Training Requirements for Each User Level

User Level	"Intro. to PW"	"CAD Integration in PW"	Individual Quick Help Topics	PW Help Files	ZWA Training	Bentley 5-day Training
General User	Yes	Optional	As Needed	As Needed	No	No
CAD User	Yes	Yes	As Needed	As Needed	No	No
ZWA	Yes	Yes	As Needed	As Needed	Yes	No
PWA	Yes	Yes	As Needed	As Needed	Yes	Yes

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In North America, ProjectWise training was provided via the web; however, due to feedback received from a survey on the training, IT will work with APAC and the training department to develop other methods of delivering the training. Some alternative training delivery methods that were ranked high by the survey participants are live training, recordings of live training sessions, and quick reference cards/charts.

4.5 Support

A layered ProjectWise support infrastructure has been developed to meet the needs of the end-users. Figure A-1 shows this support infrastructure and how issues will be escalated up the support levels.

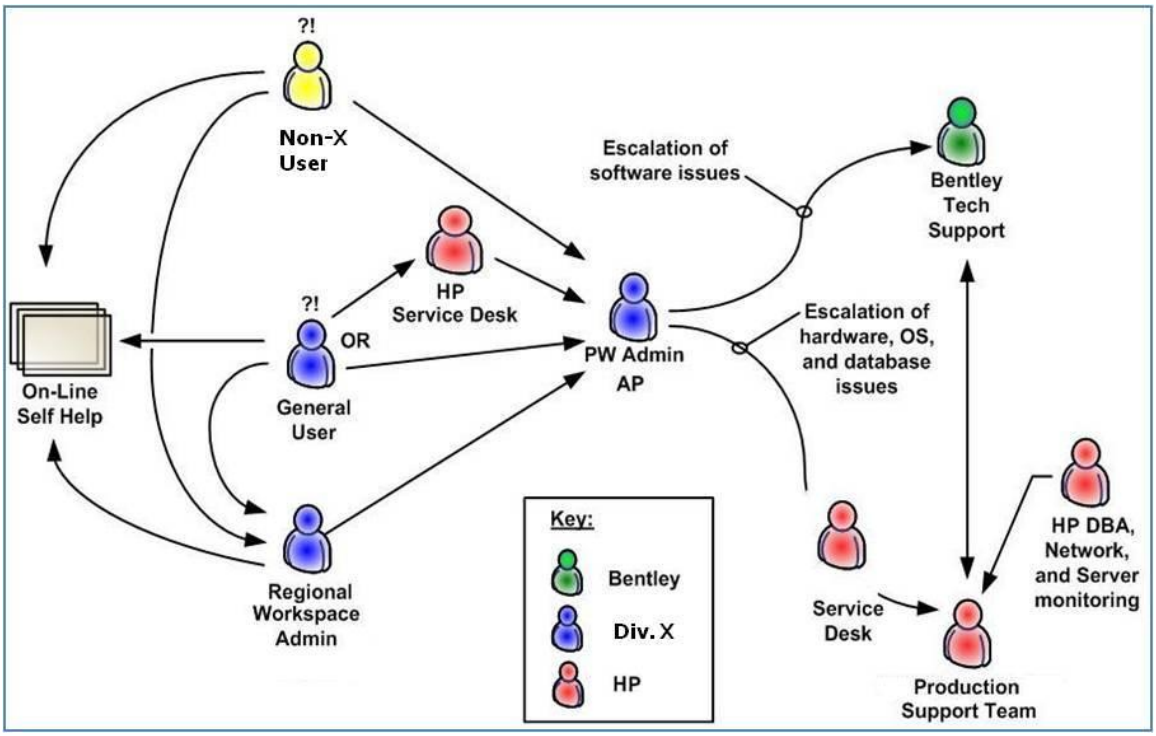

Figure A-2: ProjectWise Support Infrastructure

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A brief summary of the key support roles is provided below:

System Z Workspace Administrators (ZWAs)

- A ZWA will be available in most regional offices.
- First line of support – can answer most user questions regarding ProjectWise.
- A ZWA will be able to create projects and add users/groups to projects.

ProjectWise Administrators (PWAs)

- There will be at least one PWA per global region.
- A PWA will be an escalation point for issues beyond a ZWA.
- A PWA will be able to add/delete users and perform other ProjectWise administration functions.
- A PWA will be responsible for escalating hardware, network, database issues, and software bugs to HP Enterprise Services or Bentley Systems, Inc.

5.0 Risk Management

Table A-5 summarizes the risk factors associated with this implementation, their severity rating, and the proposed mitigation.

Table A-4: Risk Factors and Proposed Mitigation

Risk	Severity	Proposed Mitigation
System Z Server Crash - servers that host ProjectWise may crash during the implementation.	**High**	A non-production environment has been developed in the head office data center that will be used as a test bed and also act as a fall-back environment in case of a failure.

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Risk	Severity	Proposed Mitigation
Pilot Testing - a delay in selecting pilot projects may cause delays in rolling out the system.	**High**	IT will start working with APAC as early in the implementation process as possible to identify pilot projects. In the event that a delay in selecting pilot projects delays the roll out of ProjectWise, IT will proactively communicate roll-out delays to APAC.
Network Latency - in case APAC's network has limited bandwidth capability and latency times exceed recommended latency defaults for vendors' products.	Medium	Hardware is being reviewed by HP Enterprise Services in a separate project. Contingency Mitigation - user experience and expectations may need to be adjusted due to latency constraints.
Budget - due to budget constraints, adequate resources may not be dedicated to the implementation of ProjectWise in APAC.	Low	Organization X IT Management Council is committed to the implementation of ProjectWise. Budget constraints, if any, may cause some tasks to be delayed till 2012. Such delays will be communicated to APAC stakeholders.

Appendix B – ProjectWise Roll-Out and Training Communication Survey

1. Have you accessed the ProjectWise portal on Organization X iNET?

   Yes *No*

2. If Yes, on a scale of 1 to 5 how would you rate the effectiveness of the portal as a communication/training tool?

   1. Not Effective 2. Slightly Effective 3. Neutral 4. Mostly Effective 5. Very Effective

3. Did you access the link on the ProjectWise portal to the *User Introductory Training* module on Division Y College?

   Yes *No*

4. If Yes, on a scale of 1 to 5 how would you rate the effectiveness of the module as a training tool?

   1. Not Effective 2. Slightly Effective 3. Neutral 4. Mostly Effective 5. Very Effective

5. Select any other tools that you think would have been effective as training tools for ProjectWise:
   A. *Live training sessions*
   B. *Recordings of live training sessions*
   C. *Short videos of recorded 'mouse clicks' of ProjectWise functions*
   D. *Quick Reference Cards/Chart*
   E. *Others:* _____

6. HP performed a 'silent install' – installation without requiring an action from the user – were you aware that ProjectWise was available on your PC or did you need assistance to determine if the software was installed?
   A. *Yes, I was aware*
   B. *No, I needed assistance to determine if the software was installed*

7. For future updates/installs, would you prefer 'silent install' or would you like to be prompted to run the install?
   A. *Silent install*
   B. *Prompted to run the install*

8. Additional comments on training/communication of ProjectWise rollout :

   _____
   _____
   _____

Appendix C – Summary of PW Roll-Out & Training Communication Survey Results

	1. Accesed ProjectWise (PW) Portal						3. Accessed 'User Training Module'						5. Preferred Training Methods					6. Silent Install		7. Preferred Install		8. Additional comments
	Yes. if Yes, How Effective (1-Not, 5-very)					No	Yes. if Yes, How Effective (1-Not, 5-very)					No	A. Live	B. Rec. Live	C. Mouse Clicks	D. Ref. Cards	E. Others	Aware	Not Aware	Silent Install	Prompt / Notified	
	1	2	3	4	5		1	2	3	4	5											
Participant #1 - DAL1						x						x	x			x		x		x		
Participant #2 - DAL2						x						x		x	x	x		x		x		Would have liked a 30 min info. session to let people know where recorded training/support info is located. Don't need extensive training because will forget most of it; hands-on use is best training.
Participant #3 - DAL3						x			x					x				x		x		
Participant #4 - DAL4						x						x			x				x		x	
Participant #5 - DAL5				x								x				x		x		x		
Participant #6 - RALH1				x								x							x		x	
Participant #7 - RALH2						x						x	x	x		x						Software installed by request. Supervisor training so portal not used.
Participant #8 - RALH3						x										x		x		x		
Participant #9 - RALH4			x									x					Hands-on[1]	x			x	(1)Training Tools - 5 min. discussion from trained admin.
Participant #10 - RALH5						x						x						x		x		
Participant #11 - RALH6						x						x	x	x	x	x			x		x	Entire team had to learn on the job; more time taken to complete tasks hence impacted project budget. No communication of training/resources by CAD managers. Poor communication on proper project filing
Participant #12 - RALH7			x									x					PW Help[1]	x		x		(1)Training Tools - Help within PW is very effective
Participant #13 - RALH8				x						x			x					x		x		Requests a survey be done on issues resulting from using PW
Participant #14 - RALH9			x					x					x	x		x		x		x		More iNet announcements on updates/new information added. A contact list of who to contact for different issues, environment/attribute requests, and general questions.
Participant #15 - RALH10			x									x			x			x		x		Need more training than received. Had to learn a lot on-the-job; would have been more efficient if proper training was received initially.
Participant #16 - RALH11						x						x			x	x			x		x	
Participant #17 - RALH12			x									x				x		x			x[1]	(1)Preferred Install - prompted that it was installed. (2)Forced use of PW to save documents is very cumbersome and wastes time. If not connected, it sometimes takes three screens to save something to my local hard drive.
Participant #18 - ON1				x								x	x			x		x			x	Training.
Participant #19 - ON2						x						x					Interactive Online[1]	x		x		(1)Training Tools - Interactive training sessions online.
Participant #20 - ON3				x								x		x				x		x		
Participant #21 - ON4												x		x					x		x	
Participant #22 - ON5						x		x					x	x				x		x		
Participant #23 - ON6				x								x				x		x		x		It would be useful to show how to perform functions on PW that System Z users were used to performing on System Z e.g. display versions of documents.
Participant #24 - ON7		x						x								x	PW Help[1]	x			x	(1)Training tools - more in-ProjectWise 'Help' and contextual information.
Participant #25 - ON8		x						x					x	x		x		x		x		System itself is too slow!
Participant #26 - ON9					x							x	x							x		Training is something that is critically required. Group live sessions would be appreciated.
Participant #27 - UK1						x						x	x	x	x	x		x		x		(1)Training Tools - being informed of any available training would have been very useful. (2)Had to learn to use by trial & error. PC collected to install PW and took about a week to get it back. Not a good experience.

	1. Accessed ProjectWise (PW) Portal						3. Accessed 'User Training Module'						5. Preferred Training Methods					6. Silent Install		7. Preferred Install		
	Yes. if Yes, How Effective (1-Not, 5-very)						Yes. if Yes, How Effective (1-Not, 5-very)															
	1	2	3	4	5	No	1	2	3	4	5	No	A. Live	B. Rec. Live	C. Mouse Clicks	D. Ref. Cards	E. Others	Aware	Not Aware	Silent Install	Prompt / Notified	8. Additional comments
Participant #28 - UK2			x									x	x			x						
Participant #29 - ATL1			x									x				x			x	x		
Participant #30 - ATL2		x							x							x	Background Info.[1]	x			x	(1)Training Tools - List of background 'links' to specific PW folders and corresponding restrictions. (2)More info on what is to be installed and what it does. This is a general IT fault.
Participant #31 - ATL3				x						x				x				x		x		
Participant #32 - ATL4				x								x	x	x				x			x	
Participant #33 - ATL5					x							x					Discussion on a Topic [1]	x		x		(1)A discussion regarding how & where PW files are saved to the individuals C: drive and why copies are saved in the C: drive for those files that are viewed only. This seems like it could get one in trouble in terms of maintaining one editable version of the file. (2)I felt that the PW portal on iNet has been a valuable resource & is well organized.
Participant #34 - GRNV1			x						x					x[1]		x		x		x		(1)Training Tools - Updated recording sessions would be nice. (2)The only sessions currently available are from before PW was rolled out.
Participant #35 - GRNV2						x						x	x	x				x		x		
Participant #36 - GRNV3						x						x			x		Intro. Series[1]	x		x		(1)Training Tools - Introduction series by IT Director. (2)I don't remember any info. on an INet link to PW or a link for training. The recorded sessions seemed to have been of an older version of PW as some of the screenshots are different. Most of my help has come from CAD management team.
Participant #37 - GRNV4						x						x	x					x		x		Would love a mobile app. to access documents on the go.
Participant #38 - BSN1						x[1]						x	x	x	x			x[2]		x		(1) Not even aware of projectwise portal. (2)Aware but I had to request a special advance install. (3)Projectwise is relatively straightforward and doesn't need training to be moderately functional. However, I still have a number of questions on more "advanced" issues and have no idea where to turn for an answer.
Participant #39 - BSN2			x									x	x		x			x		x		
Participant #40 - BSN3						x						x		x				x		x		
Total	0	3	9	8	2	17	0	4	3	2	0	30	16	16	9	18	7	31	6	27	11	