Iowa Department of Transportation

Records Management System

Pilot Projects Functional Report

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Introduction

The Iowa Department of Transportation began preparation for the acquisition of an electronic document management system in 1996. The first phase was development of a strategic plan. The plan provided guidelines for defining the acquisition and implementation of a document management system to automate document handling and distribution. Phase 2 involved developing draft standards (document, indexing and technology) for planning and implementation of a document management system. These standards were to identify existing industry standards and determine which standards would best support the specific requirements of the Iowa Department of Transportation. During development of these standards, the decision was made to enlarge the scope of this effort from a document management system to a records management system (RMS). Phase 3 identified business processes that were to be further developed as pilot projects of a much larger agency-wide records management system.

The remainder of this document discusses in detail each of the business processes selected as pilot projects that are relative to the overall RMS effort being undertaken by the Iowa DOT.

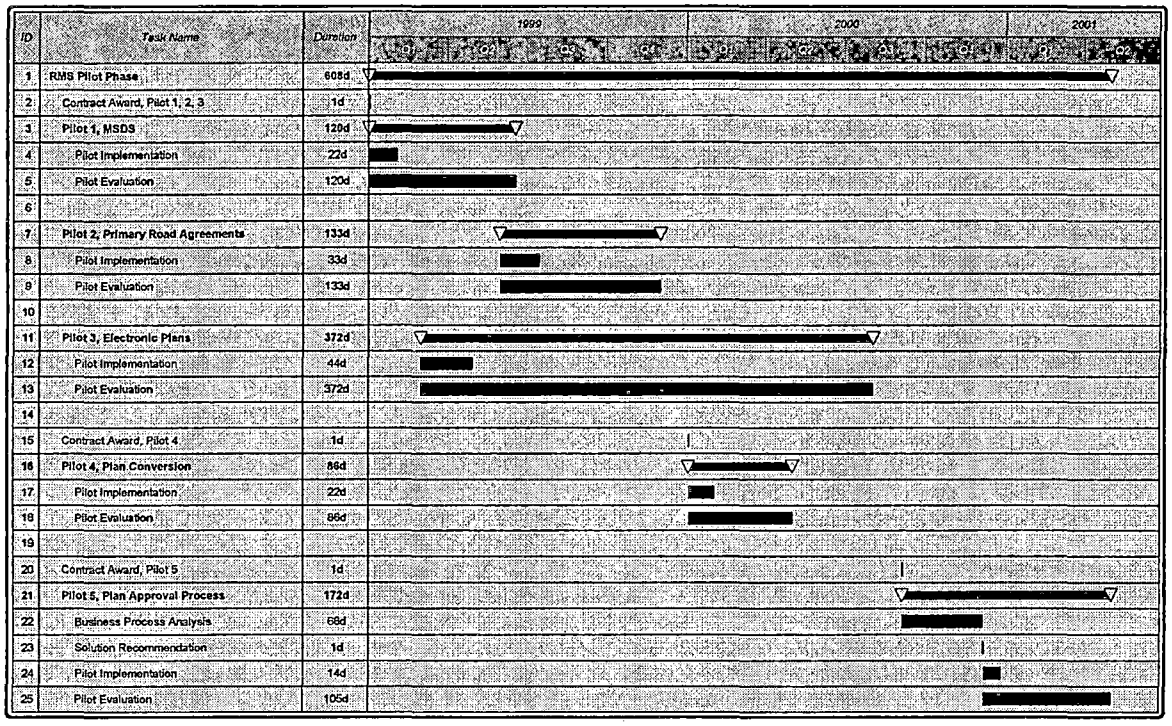
RMS Pilot Projects

The pilot systems developed under this procurement will be fully functional systems that if found to be acceptable by the Department will be used in a full production environment. The process of using pilots to implement proposed solutions has been selected for the following reasons.

- Minimize Risk - Pilots are appropriate for new technology because they minimize losses in case of project failures.
- Learning Experience - A pilot is an excellent opportunity to learn through hands-on experience with the proposed technology.
- Expectation Management - The pilot experience builds realistic expectations for the production system.
- Limit Costs - The cost of a pilot is significantly lower than the cost of a full production system.
- Strategic Planning - A pilot will demonstrate how the proposed technology will fit into the Iowa DOT master plan.

Pilot projects also lend themselves to implementation as one phase of many in an agency-wide implementation. Iowa DOT has elected to pursue a course that capitalizes on the benefits of piloting the selected business processes. Generally, as each business process is successfully passed through the pilot phase, that automated process will be "rolled out" to production and another process will begin the piloting process. Although as is illustrated in Figure 1, some overlapping of pilots will occur. It is the intention of the

Iowa DOT to include three pilot projects in the first contract award. The second and third contract awards will be for one pilot project each.



ID	Task Name	Duration
1	RMS Pilot Phase	608d
2	Contract Award, Pilot 1, 2, 3	1d
3	Pilot 1, MSDS	120d
4	Pilot Implementation	22d
5	Pilot Evaluation	120d
6		
7	Pilot 2, Primary Road Agreements	133d
8	Pilot Implementation	33d
9	Pilot Evaluation	133d
10		
11	Pilot 3, Electronic Plans	372d
12	Pilot Implementation	44d
13	Pilot Evaluation	372d
14		
15	Contract Award, Pilot 4	1d
16	Pilot 4, Plan Conversion	86d
17	Pilot Implementation	22d
18	Pilot Evaluation	86d
19		
20	Contract Award, Pilot 5	1d
21	Pilot 5, Plan Approval Process	172d
22	Business Process Analysis	66d
23	Solution Recommendation	1d
24	Pilot Implementation	14d
25	Pilot Evaluation	105d

Figure 1 - RMS Pilot Phase Timeline

In order to control and closely observe vendor installation and development of proposed RMS solutions and to minimize project risk, Iowa DOT has established an in-house development laboratory. The atmosphere for testing the proposed solutions in our laboratory will be representative of the type of hardware, software and networking environment expected to be used in production.

In preparing replies, vendors should keep in mind and where appropriate adhere to the following requirements.

a. Proposals should specify the minimum hardware and software components and configuration recommended for the laboratory environment.

b. Vendors will set up and test all proposed RMS technology (hardware and software) in the laboratory for the live test demonstration.

c. Pilot project solutions will be developed and tested in the laboratory before integration with the operational network (LAN or WAN).

d. After project implementation agency-wide, the laboratory will be used to maintain the successful application.

e. The Office of Document Services, specifically the Records Management Office, will be a user on all pilots and agency-wide solutions.

f. The RMS software and all files will be held at Central Office; remote user access will be via the statewide WAN.

g. Vendor proposals should discuss computer output to microfilm (aperture cards) and be prepared to demonstrate that concept at LTD.[1] The aperture card format is the preferred medium for long-term storage of plan sheet images at Iowa DOT.

h. Full text retrieval (FTR) is a useful tool that allows users to retrieve documents based on a search of the text contained in documents. Although not specifically mentioned in the discussion of these pilot projects, if vendors consider FTR appropriate they may propose FTR as an option in their solutions.

i. RMS security is a balance of protecting the integrity of the data and documents in the system while still allowing access to as many users as possible to a benefit from the system's wide usage. Vendors should present a detailed discussion of security and how document access may be controlled through the proposed solution.

j. Electronic signature (imaging) and electronic seals (encrypted digital code) are currently under review by the Iowa legislature as valid approvals for official documents, including plan sheets. Vendors should present a discussion of how their solution includes or is integrated with technology permitting the use of electronic signatures and association seals.

RMS Project Management

Overall responsibility for each pilot project has been assigned to a project control office as outlined below.

Pilot Project	*Project Control Office*
Pilot 1, Material Safety Data Sheets (MSDS)	Operations & Finance Division, Office of Procurement and Distribution, Customer Service Unit
Pilot 2, Primary Road Agreements	Project Development Division, Development Support Office
Pilot 3, As-built Plans (Electronic Files)	Operations & Finance Division, Office of Data Services, Project Development Division Support Team, Maintenance
Pilot 4, Plan Conversion to Raster Images	Operations & Finance Division, Office of Document Services, Records Management Office, Maintenance
Pilot 5, Plans Approval Process	Operations & Finance Division, Office of Data Services, Project Development Division Support Team

[1] Vendors are not expected to bring COM hardware to the LTD. However, discussions and demonstrations should include a presentation of COM output modules.

These offices are deeply involved in the business processes being piloted and will monitor and formally evaluate the implementation of the proposed solution from initial laboratory setup to final pilot evaluation. To assist the project control offices in their role, a RMS support organization has been put into place, see Figure 2. Each component of this organization is described in the following paragraphs.

Records Management Team

The Records Management Team has been established by a committee of Iowa DOT division directors to oversee and coordinate the planning, advertising, acquisition and implementation of an agency-wide Records Management System. Responsibilities of the RMT include:

a. Liaison with division directors.

b. Coordination and facilitation of all activities relating to the acquisition of a records management system.

c. Performing an ongoing review of draft RMS standards (business rules, indexing, technology) and initiation of changes when necessary to maintain these documents in an accurate state.

d. Providing guidance and direction to the RMS project manager.

RMS Project Manager

The RMS project manager will be appointed by the Iowa DOT to work with the Records Management Team to coordinate and manage the overall RMS effort. The RMS project manager will:

a. develop budget issues related to RMS;

b. develop the scope of services and task assignments for vendors;

c. monitor vendor deliverables, requests for payment and invoice processing;

d. manage contracts for RMS vendors as they relate to processing change orders, supplemental agreements, and encumbrances;

e. provide daily direction to the vendors involving schedules, deliverables, task completion, new assignments, etc.;

f. coordinate reviews of contract deliverables by the RMT;

g. report to the RMT at each meeting regarding the progress of the vendor, budget issues, and yearly budget expenditures;

h. manage the RMS budget for the Department;

i. supervise the RMS Laboratory and Pilot Project Coordinator;

j. assist in the resolution of issues that are not resolved by the RMS Laboratory and Pilot Project Coordinator and

k. facilitate the creation and coordinate the activities of Pilot Implementation Project Team(s).

Laboratory and Pilot Project Coordinator

The RMS laboratory and pilot project coordinator will be appointed by the Iowa DOT to direct the day-to-day operation of the RMS pilot project lab. In addition, this person will be the liaison between the vendor developing the pilot application and the user office(s). Responsibilities of the laboratory and pilot project coordinator include:

a. report to the RMS Project Manager;

b. direct the daily activities of the laboratory, which includes but are not limited to performance of prioritized work activities, scheduling, issue resolution, and overall monitoring activities;

c. work with the RMS project manager to assist the RMT in prioritizing the work to be accomplished in the laboratory;

d. monitor vendor deliverables, requests for payment, and processing of invoices;

e. coordinate and direct the activities of the implementation teams;

f. coordinate development of the pilot implementation project plans;

g. report project implementation status to the RMT;

h. ensure all offices affected by the implementation project are informed and trained;

i. provide daily guidance to the vendor developing the pilot application;

j. identify the individuals who will assist in the development of the application specifications and system design;

k. arrange meetings and interviews with the business users;

l. resolve issues that arise during the development of the pilot application;

m. conduct initial user testing and schedule other personnel from the user office to test the pilot application; and

n. review and approve all analysis and design specifications for the pilot application.

Implementation Teams

The implementation teams have been established by the RMT. These teams are composed of members from the RMT, project control offices, Applications Technology Support, and division support teams. Responsibilities of the implementation team include:

a. report to the RMS Laboratory and Pilot Project Coordinator;

b. develop a project implementation plan;

c. carry out the tasks associated with the project implementation plan;

d. assist in the development of training materials; and

e. train and provide assistance to the new users of the pilot system.

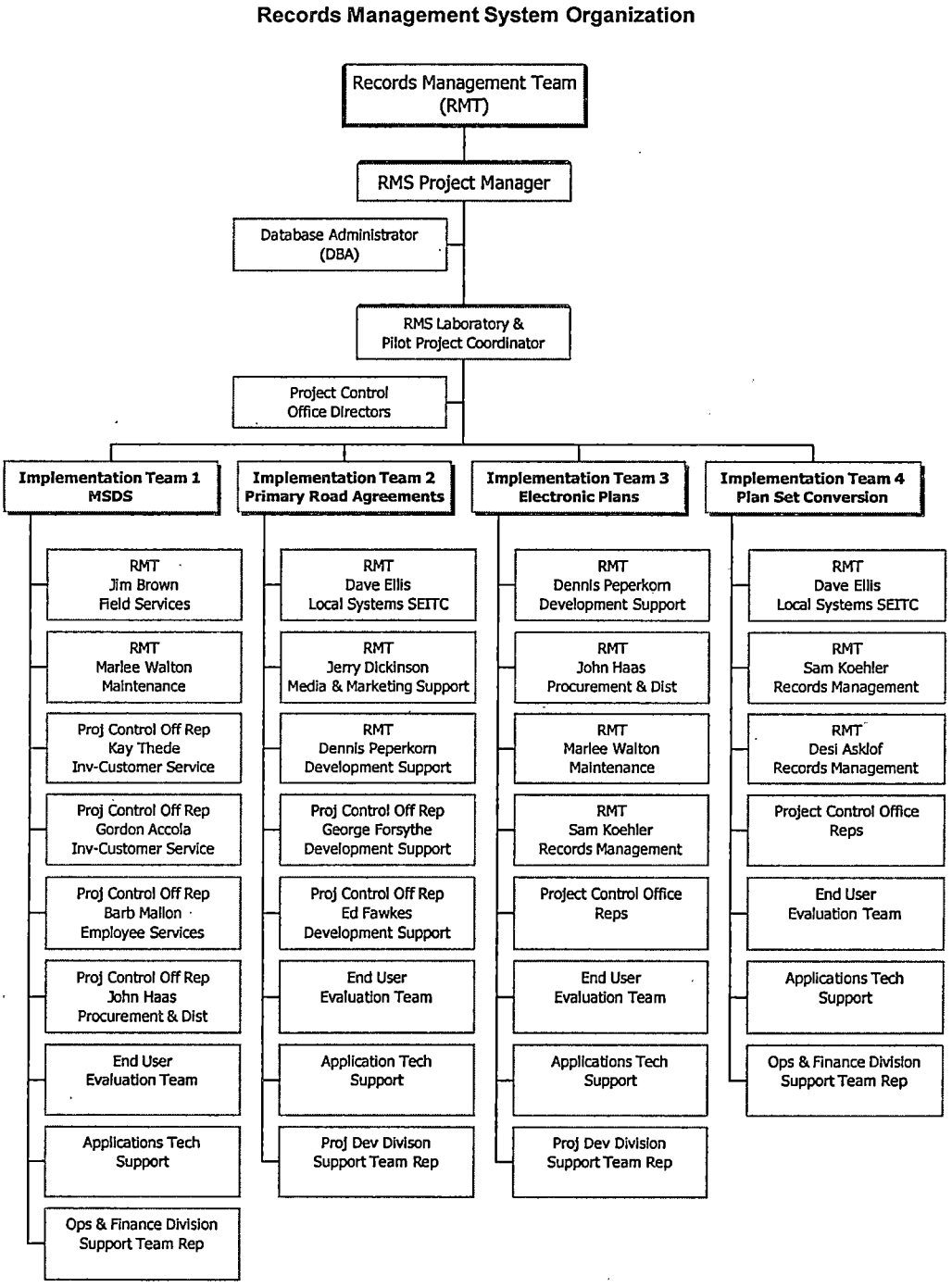


Figure 2 - Project Management Organization

Pilot Project Process

BACKGROUND

In September 1997 the Records Management Team (RMT) launched a department-wide advertising campaign to inform all employees of the records management system initiative and the current status of the effort. Employees and workgroups were encouraged to nominate candidate work processes that could be developed as pilot RMS projects. Candidate business process were identified and documented through the use of an *Application for Records Management System Pilot Project* form (see Appendix A). The RMT reviewed the written nomination forms then interviewed the contact person for each project nominated. Appendix B is the *Records Management System Pilot Project Evaluation Form* used by the RMT.

Pilot Projects Nominated

Project Name	Nominating Division & Office	Contact Person
Clipping Service	Director's Staff, Media & Marketing Services	Dena M. Gray-Fisher
Adopt-A-Highway	Maintenance, Maintenance Services	Pat Makovec
Material Safety Data Sheets	Operations & Finance, Procurement & Distribution	Kay Thede
Land Inventory Management	Project Development, ROW, Property Management Section	Deanne Popp
Traffic Monitoring Data	Planning & Programming, Transportation Data	Patrick Cain
Graphical Information System (GIS) Integration	Planning & Programming, GIS	William Schuman
Project-related Agreements	Project Development, Southeast Iowa Transportation Center	David C. Ellis
Agreements	Project Development, Northwest Iowa Transportation Center	Tracy Roberts, Jim Bump, Rich Michaelis
As-built Plan Archive	Project Development, Southeast Iowa Transportation Center	David C. Ellis
As-builts	Project Development, Northwest Iowa Transportation Center	Russ Follman, Tony Lazarowicz
Right-of-Way Documents	Project Development, Northwest Iowa Transportation Center	Ronald R. Carlson, James A Andresen
Utility Permits	Maintenance, Maintenance Services	Ray Callahan
Utility and Access Permits	Maintenance, Southeast Iowa Transportation Center	Larry A. Johnson
Cartography Maps	Planning & Programming,	Pat Cain

Project Name	Nominating Division & Office	Contact Person
	Transportation Data	
Agreements Records & Reviews	Project Development, Development Support	George Forsythe

Selection Criteria

Following submission of the nomination sheets describing each candidate business process, the RMT examined the priority in which each of the documented business processes should be selected for implementation as pilot projects. The criteria used to prioritize the value of the nominated processes included:

- the pilot selected must be representative of a business process with applicability to a large cross-section of the Department;
- employees in the work group where the pilot would be implemented must be willing, enthusiastic, and comfortable with graphical user interfaces (GUI);
- the pilot project must have management support; and
- the nominated business process must be well defined.

Candidate Pilot Projects Selected

Project 1 – Material Safety Data Sheets

Project 2 – Project-related Agreements (redefined as Primary Road Agreements)

Project 3 – As-built Plans

- Phase 3A – Electronic files
- Phase 3B– Plan Set Conversion to Raster Images
- Phase 3C – Plan Approval Process

Because project three was so large, the phases were reclassified as individual pilots as follows:

Project 3 – As-built Plans (Electronic Files)

Project 4 – As-built Plan Set Conversion to Raster Image

Project 5 – Plan Approval Process

Project five will be initiated by the Iowa DOT as an option based on the result of implementing projects one through four.

Pilot 1, Material Safety Data Sheets (MSDS)

PROJECT DESCRIPTION

This pilot project will replace the current labor intensive, paper-based system with a more streamlined electronic management and delivery system for Material Safety Data Sheets (MSDS) used by Iowa DOT. The department receives MSDS documents from manufacturers and suppliers for hazardous materials acquired and used in various department operations. The United States Department of Labor, Occupational Safety and Health Administration (OSHA), Standard 1910.1200, Hazard Communication (HAZCOM), requires that employees have immediate access to MSDS documents for all hazardous material used in performing a given job. Currently this standard has been addressed at each Iowa DOT primary work site with three-ring binders containing hard copies of all MSDS documents maintained at each Iowa DOT facility. Iowa DOT is seeking an electronic solution to improve MSDS document management and critical information delivery to employees.

The MSDS pilot will be the first pilot implemented under the initial procurement.

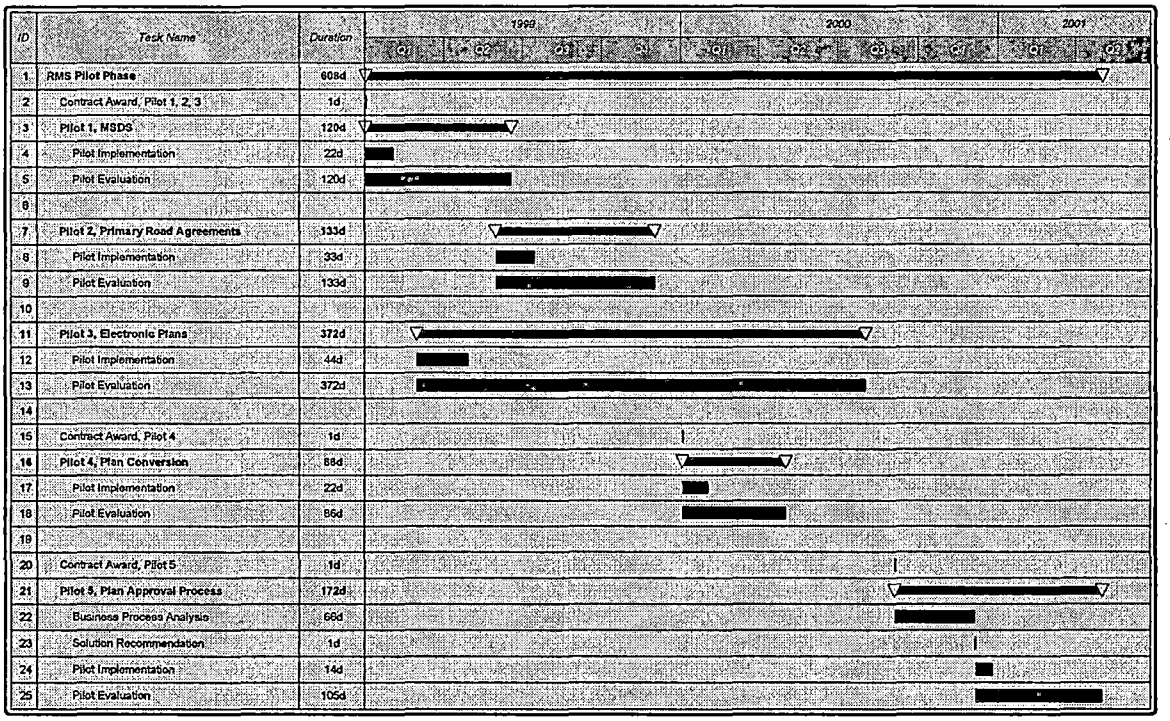


Figure 3 - RMS Pilot Timeline

The Occupational Safety and Health Administration (OSHA) Standard 1910.1200, Hazard Communication (HAZCOM), sets forth certain responsibilities having to do with Material Safety Data Sheets (MSDS). Included responsibilities are:

- It is the responsibility of the manufacturer or importer of a material to determine what hazards are associated with the material, to prepare an MSDS for the material, and to provide the MSDS to any recipients of the material.
- It is the responsibility of an employer to provide MSDS documents and training in their interpretation to that employer's employees. MSDS documents for hazardous materials must be immediately available in the workplace. Electronic access is permitted if it does not create a barrier to immediate employee access.
- It is the responsibility of the employees to read and understand the MSDS documents for any chemicals used on the job.

OSHA specifies that each MSDS must include, at a minimum, the information listed in the 12 sections discussed below. Beyond that, OSHA does not specify the exact format or how the information should be broken into sections, so MSDS documents prepared by different manufacturers tend to look different and contain different information. Even MSDS documents for the same chemical can be quite dissimilar if different manufacturers prepared them.

OSHA Mandated MSDS Information

Item I: Chemical Identity

The chemical identity as listed on the label, the material's chemical and common names, and a list of all hazardous ingredients.

Item II: Physical Data

Physical and chemical characteristics, such as vapor pressure, flash point, density, boiling point, etc.

Item III: Physical Hazards

Fire and explosion data. Reactivity data. These usually appear as two separate sections on the MSDS .

Item IV: Health Hazards

Signs and symptoms of exposure, and any medical conditions generally recognized as being aggravated by exposure to the material.

Item V: Primary Route(s) of Entry

The most likely route(s) by which the material could enter the body.

Item VI: Exposure Limits

Legal exposure limits (OSHA and other recommended limits). This frequently includes toxicity information.

Item VII: Whether the Material is Carcinogenic

States whether the material has been found to be carcinogenic.

Item VIII: Precautions for Safe Handling and Use

Any precautions for safe handling and use known to the party preparing the MSDS such as appropriate hygienic practices, protective measures required during handling of contaminated equipment, and procedures for clean-up of spills and leaks.

Item IX: Control Measures

Any control measures known to the party preparing the MSDS, such as engineering controls, work practices or personal protective equipment.

Item X: Emergency and First-Aid Measures

Procedures to follow in the event of exposure.

Item XI: Revision Data

Date of preparation of the MSDS and the date of the last change to it.

Item XII: Manufacturer Contact Information

Name, address and telephone number of the party responsible for the MSDS who can provide additional information about the material if necessary.

Goals & Objectives

The goal of this pilot project is to develop a user-friendly system to manage and publish (electronically and hard copy) Material Safety Data Sheets for use by employees of the Iowa DOT.

The following objectives support this goal:

- MSDS documents must be made available at approximately 300 Iowa DOT primary work locations for easy access by any Iowa DOT employee.
- System and application screens for accessing MSDS documents must be user-friendly to permit rapid access for viewing documents by users who may not be routine computer users.
- MSDS documents must be available in real time to users.
- Query capabilities for MSDS documents must be provided (possible selection criteria include product name, stock number, and product category).
- Users must be able to easily print an MSDS document or group of documents.
- MSDS documents for items not in the Iowa DOT Distribution Center inventory (non-inventory items) must be included.
- The ability for users to identify recently added MSDS documents must be provided. A monthly, system-generated report of new MSDS documents added may be sufficient.

- The system must have the capability to keep and manage multiple versions of MSDS documents for a single product. By default, users should view the most recent version unless an older version was specifically requested.
- Archived MSDS documents must remain available online.
- Access to MSDS documents by city and county officials, who facilitate acquisition of hazardous products from Iowa DOT, will be a future requirement.

Critical Success Factors

For this pilot project to be considered successful by Iowa DOT, the following factors must be satisfied.

- Retrieval time for an electronic copy of an MSDS document must be equal to or less than the current paper-based system.

  Electronic System: Open the computer-based MSDS application, conduct a search for a specific MSDS document, and display the correct image(s).

  Manual System: Locate the MSDS catalog binder(s), conduct a search for a specific MSDS document, locate the correct document.
- End users (many of whom will be non-computer users) must readily accept the change to electronic access of the MSDS documents.
- The Iowa DOT WAN must be completed to allow electronic access to MSDS documents at each primary work site.
- The Iowa DOT Office of Procurement and Distribution, Customer Service Unit must review MSDS documents currently held to identify those of poor quality or readability. Legible, high quality replacement copies of those documents should be requested from the respective manufacturers or vendors. The copies can be in electronic or paper format.
- As part of the pilot project implementation specific roles and responsibilities should be defined, then assigned to specific individuals for accomplishment. These definitions should address at least the following questions:
  1. Who will decide if a recently received MSDS is to be added to the RMS?
  2. Who will decide how to handle new documents received (include as a new sheet, a replacement sheet, or a new version of an existing sheet)?
  3. Who will perform physical act of scanning new documents?
  4. Who is responsible for image and index quality assurance?

DOCUMENT FLOW ANALYSIS

Existing Process

Currently, Iowa DOT receives most MSDS documents at the Distribution Center with receipt of the ordered product. Items received by the Distribution Center are inventoried items carried on the Iowa DOT standard stock list.

On occasion, divisions (or offices) order products that are not provided by the Distribution Center and OSHA may categorize these items as hazardous material. These items and their associated MSDS documents are normally shipped directly to the work unit. In these instances, it is incumbent upon the recipient to immediately locate the MSDS document and forward it to the Procurement and Distribution Center, Customer Service Unit.

When the Customer Service Unit receives any MSDS document (all MSDS documents are received in hard copy); the following actions are performed.

The Customer Service Unit maintains a master catalog of MSDS documents received for inventoried stock items. There are approximately 300 copies of the MSDS catalog (in binders) throughout Iowa DOT. MSDS documents are organized into 15 categories based loosely on product function. Within each category, MSDS documents are sorted by Iowa DOT stock number.

When an MSDS document is to be included in the catalog, the product category and Iowa DOT stock number are hand-written on the MSDS document. Periodically, copies of the new MSDS documents are sent to the holders of the MSDS catalog. In practice, it has been found that some catalog holders put the new documents in the back of the catalog, rather than putting them in the correct location within the catalog.

Currently, there is no prescribed retention period for MSDS documents. The Customer Service Unit occasionally performs a review of the master catalog and removes MSDS documents for products that they know to be no longer in use by the Department. These sheets are then retained in an "inactive" catalog. Inactive MSDS documents are not removed from the catalogs held in the field. There is no easy method for the customer to determine if an MSDS document should be made inactive and removed from the catalog.

Current Inefficiencies

- There can be a time lag before a newly received MSDS document is distributed to all holders of MSDS catalogs.
- MSDS catalogs at field sites frequently become disorganized as updated or new MSDS documents are received.
- MSDS documents for non-inventoried items could be mistakenly destroyed and therefore may not be available to the personnel working with the hazardous product.

Anticipated Process

The process for handling the MSDS documents could be improve by distributing the documents electronically rather than using a paper-based distribution method.

For inventoried, standard stock items, the MSDS documents will continue to be received in the Distribution Center. MSDS documents received by another office will be forwarded to the Customer Service Unit for processing. If the MSDS document is for a

non-inventory, non-standard stock item, the receiving office should write its cost center number on the MSDS document before sending it to the Customer Service Unit.

The MSDS evaluator in the Customer Service Unit will determine if the MSDS is legible and of sufficient quality as to produce a satisfactory digital image. For documents determined to be unacceptable, the Customer Service Unit will contact the manufacturer or supplier for a suitable copy.

The evaluator in the Customer Service Unit will also determine if the MSDS document is a:

- new item - The MSDS document pertains to a product not already in the inventory.
- revised Item:
  1. replacement – The product remains unchanged, but the MSDS has new or changed safety, handling or first aid procedures.
  2. new version - The product composition has changed and this has resulted in a new MSDS document.
- duplicate - An MSDS with no new information about a product already in the inventory.

If it is a revised item, the MSDS document will be scanned and may be forwarded electronically to the safety officer if it is a replacement for an existing MSDS document. The safety officer will reply electronically to the Customer Service Unit evaluator. Any duplicate MSDS documents that are received by the evaluator will be discarded.

For all other types of MSDS documents, the evaluator will write the Iowa DOT stock number and inventory category on the face of the MSDS document and note whether it is a new item, replacement item, or new version. All MSDS documents will then be sent to a scan and index operator who will scan the MSDS document, perform all indexing, and mark the status for replaced MSDS documents to "inactive". When these actions are completed, an electronic notice will be sent to a quality assurance operator indicating that new work has been processed. The quality assurance operator will check the quality of

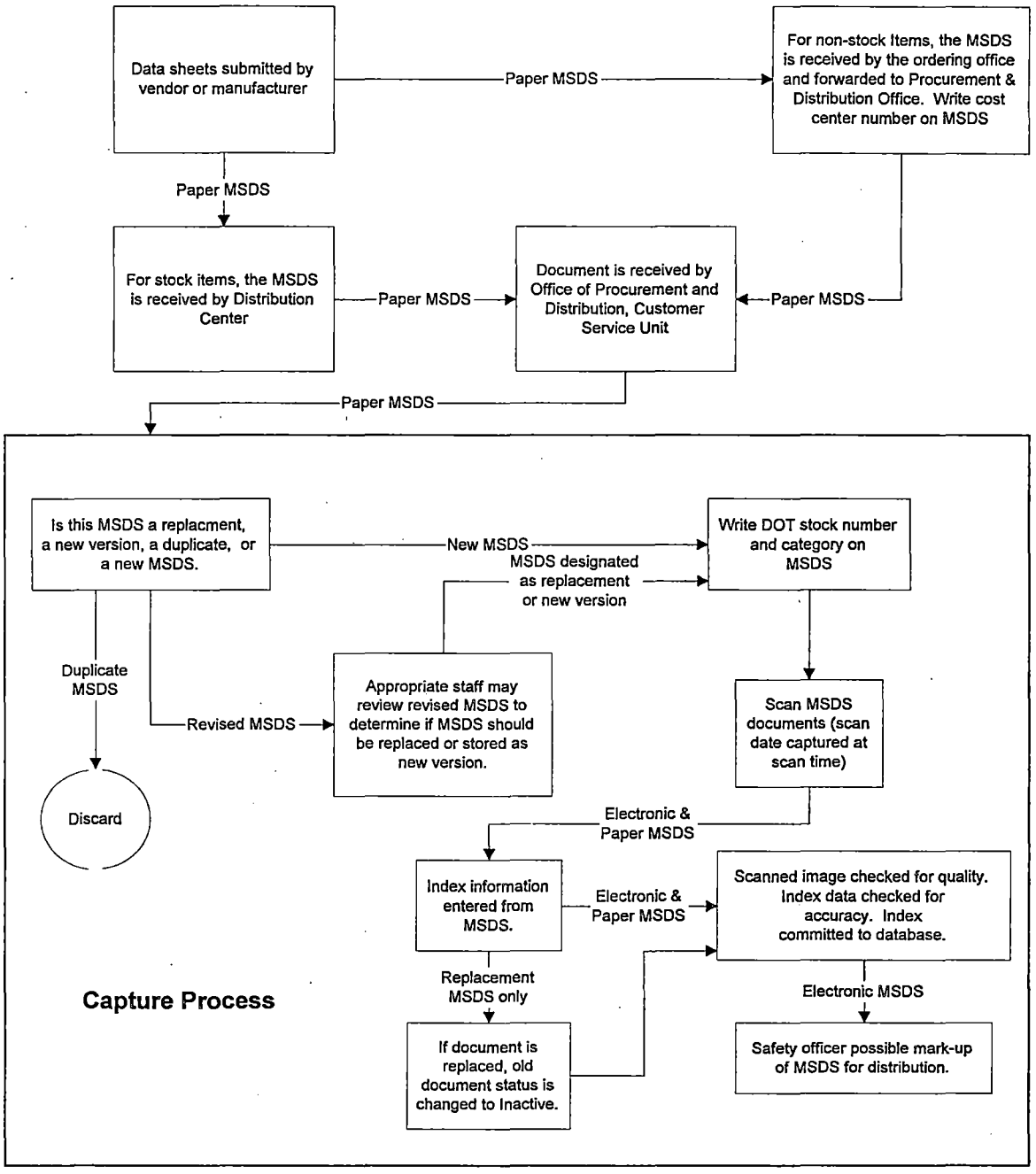


Figure 4 - Anticipated MSDS Document Flow

the image, the accuracy of the index information and the inactive status for replaced MSDS documents. When the quality assurance operator is satisfied that the new entry is correct, the MSDS will be approved, added to the imaging system and immediately is available to the user community. A monthly report of the MSDS documents that have been added to the system will be sent to each of the catalog holders.

Separate from, but attached to, the scanned image of the MSDS document will be comment field available for use exclusively by the safety officer and environmental safety officer. If there is critical information on the MSDS documents that must be

highlighted, the safety officer will use the comment field and highlighting capabilities of the viewing software to identify and call attention to that special information.

Cities and counties who purchase hazardous products from Iowa DOT can request Iowa DOT provide copies of MSDS documents. In the future, it is preferred that these requests be satisfied via electronic means through e-mail or Internet access.

PILOT PROJECT SPECIFICATIONS

Functionality Requirements

- Imaging system. This includes the ability to scan (up to 8.5" x 14" images), index, perform quality control, assign documents to folders, and a limited amount of document routing using workflow. Scanning software must be capable of storing MSDS documents in an Internet accessible format (i.e., TIFF, PDF, JPEG, etc.)
- Fax in (and out). Timely receipt and distribution of accurate, up to date hazard information is the primary goal of this pilot. The ability to receive MSDS documents by fax and to make this information available to employees, as well as other state agencies, counties and municipalities is desired.
- Index fields may be queried. All ad hoc reporting requirements can be fulfilled if the index fields in this application may be queried.
- Ability to print up to 8.5" x 14" images.
- Mark-up or editing of MSDS restricted to appropriate staff.
- Intranet access for Iowa DOT employees. It is preferred that for general access to the MSDS documents, the Iowa DOT employees utilize an Intranet application allowing them to view the MSDS documents.
- Internet access for cities and counties. The system must be able to accommodate requests for information over the Internet without breaching the security of the department's network.
- Monthly 'New Items" report. This report will be made available to all users. The report will list all new MSDS updates and archival actions. The documents will be identified with a catalog category, Iowa DOT stock number, the product and common name.
- Iowa DOT specific on-line help. All RMS vendor-provided user and operator (system and application) manuals should be available on-line. In addition, the product chosen should have the capability for the Iowa DOT to prepare and display on-line MSDS tutorials for internal DOT use.

Document Indexes

Index fields required for this application are shown below.

- DOT stock number (may apply to multiple MSDS, only used for inventoried items)—alpha numeric field

- Product name—alpha numeric field
- Common name—text field
- Manufacturer—text field
- Category (type) —numeric field
  1 - Office supplies
  2 - Copier chemicals
  3 - Cleaners and soaps, shop and janitorial
  4 - Equipment fuel, additives, cleaners, and solvents
  5 - Herbicides
  6 - Insert/rodent killers
  7 - Lubricants/greases
  8 - Maintenance road materials
  9 - Mechanics use materials
  10 - Oil
  11 – Paint, miscellaneous and accessories, other than traffic
  12 - Rest area supplies
  13 - Sign posts
  14 - Traffic paint and materials, district paint crew
  15 - Welding materials
  16 - Others
- Date entered into RMS—date field automatically assigned by system
- Status of MSDS document (active or inactive) —check box
- Cost center (only used for non-inventoried items) —alpha numeric field

MSDS documents will be stored in electronic folders by category. A separate category will be created for non-inventoried items.

HARDWARE & SOFTWARE

Iowa DOT employees will be able to access the MSDS documents from approximately 300 locations using various types of PC workstations on a department-wide WAN. PC applications must be able to operate in both Win NT and Win 95 environments. The minimum Iowa DOT PC configuration is a Pentium 90 with 16MB RAM. Vendors are expected to install any required records management, facsimile or other specialized software needed to support their solution. A low speed scanner will be required for document capture.

The following functions should be supported at the server level (more than one server may be required):

- Intranet access
- Internet access
- Workflow
- Application database
- Fax

- Document capture

STAFFING

The MSDS pilot project will be under the primary control of the Office of Procurement and Distribution. It appears that no new tasks will be required of the existing staff however, the manner in which these tasks are accomplished will change. As part of the pilot project implementation, the division should closely review the desired business process and assign specific tasks to specific staff positions to clearly define revised roles and responsibilities. It is expected that all changes will be confined to the processes of:

- MSDS evaluation;
- performance of scanning and indexing functions; and
- performance of quality assurance.

The Safety officer will have an opportunity to review, comment and/or highlight MSDS documents. However, it is not anticipated that this activity will have any significant impact on the current workload for the Safety officer.

When the RMS vendor is selected, the Iowa DOT should have the RMS support infrastructure defined and in place. The Pilot Project Implementation Team should be composed of employees from the RMT, project control office, Applications Technology Support, and division support team. When implementation of this pilot begins, one technical support team member should be assigned the full-time responsibility of direct support for this application.

The vendor selected to implement this pilot should be required to provide training at three levels:

- system;
- user; and
- "Train the Trainer".

Employees who have been provided "Train the Trainer" will in turn train the rest of the Iowa DOT employees on the use of the MSDS system for document retrieval. Statewide, Iowa DOT employees will view MSDS documents electronically after access and training is provided. However, to ensure full compliance with the intent of OSHA, it is recommended that a printed set of instructions with step-by-step directions about how to access the electronic MSDS documents be posted near each workstation.

BACKFILE CONVERSION

The Iowa DOT is concerned with the management and distribution of approximately 600 MSDS documents. These documents range in size from two to 10 pages each. Some documents are legal size (8 ½ x 14"). Backfile conversion of these documents will be required as part of this pilot implementation.

DOCUMENT VOLUMES & STORAGE REQUIREMENTS

The Iowa DOT will have an initial MSDS application consisting of approximately 600 MSDS documents (ranging in size from two to 10 pages each). Approximately 15 new MSDS documents (comprised of two to 10 pages each) are received every three months.

Because of the uncertainty of when hazardous compounds are no longer in use, and the small size of this application, the Iowa DOT has decided not to require a document purging capability for the MSDS pilot. Rather than purging documents, the application must be able to mark a MSDS document as either "active" or "inactive" in an index field designed specifically for that purpose.

All MSDS documents will remain on-line in magnetic storage for the life cycle of this project.

Pilot 2, Primary Road Agreements

PROJECT DESCRIPTION

The Iowa DOT conducts a significant amount of business using a type of contract known as an agreement. Several offices in the Department use these agreements. This pilot project will focus on the primary road agreements as processed by the Project Development Division, Development Support Office.

Primary road agreements for services or delivery of products are reached between the Department and outside agencies, frequently local municipalities. Agreements are required for any work done by the Department on behalf of cities in Iowa. Frequently, counties also use Department goods and services through agreement.

The primary road agreements and the process of their development have been selected as a pilot project due to the number of offices involved in the process. This presents an opportunity for RMS vendors to demonstrate a workflow product as part of a RMS solution.

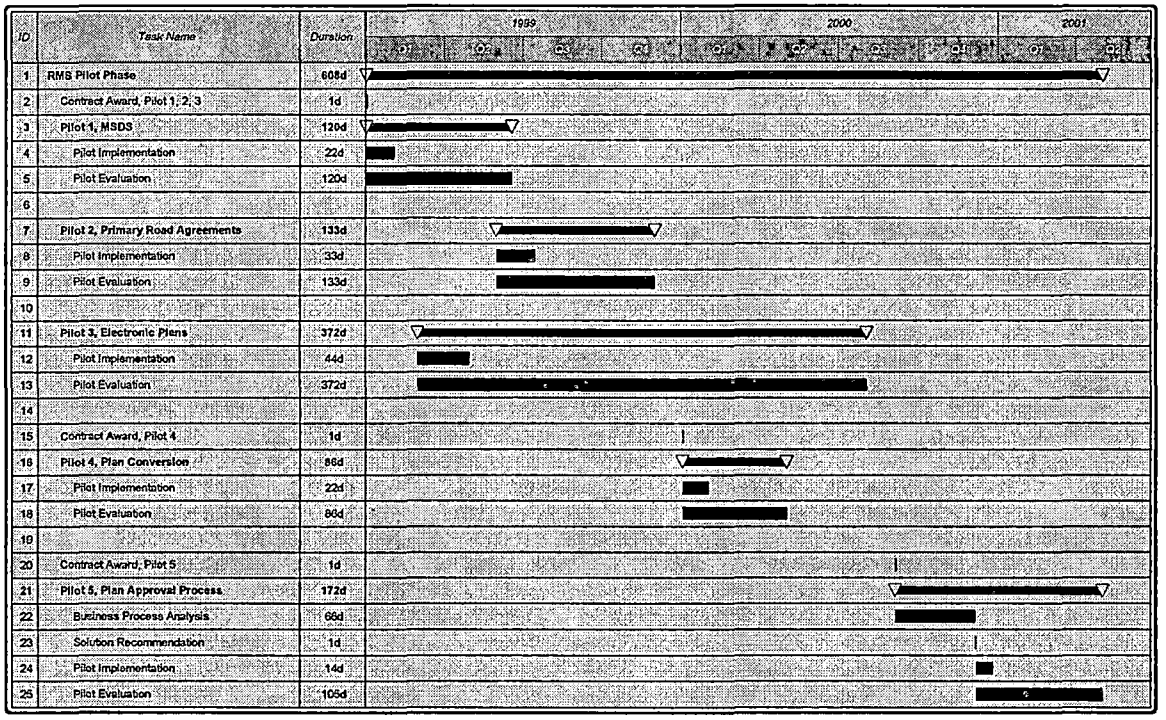


Figure 5 - RMS Pilot Timeline

Figure 5 is a representative timeline that shows the agreements pilot project commencing shortly after initial implementation of the MSDS pilot and concluding near the end of the calendar year.

Goals & Objectives

The goal of the pilot project is to develop a user-friendly system to manage and electronically transmit agreements for review and to facilitate remote printing of agreements at Department sites throughout the state.

The following objectives support this goal:

- easy electronic retrieval by department personnel of all supporting documents related to a given agreement;
- ability to manage agreement text, graphics, attachments and related supporting documentation electronically;
- development of electronic workflow processes to support the review of agreements;
- ability to establish a relationship between an original agreement and subsequent amendments; and
- ability to restrict access to agreements to view-only when necessary.

The following objectives are desired in a future implementation:

- electronic view-only access to fully-executed agreements by cities and counties; and
- introduction of electronic signature technology to support the execution of agreements.

Critical Success Factors

The following factors are critical to the success of the process:

- increased flexibility to accommodate drafting of an agreement at a later stage of the pre-letting schedule through a more efficient agreement review and finalization process;
- acceptance by end users (agreement reviewers);
- ability for authorized users in the defined workflow path to view and comment on text, graphics and attachments; and
- capability for users in the defined workflow path to view comments from all other reviewers in the workflow path.

DOCUMENT FLOW ANALYSIS

Existing Process

The Development Support Office determines the need for a primary road agreement after reviewing a letting schedule. If an agreement is deemed necessary, staff members collect supporting documentation from various sources then begin drafting the original agreement. A file is developed with the agreement and supporting documentation and

drawings. This documentation file may grow to be a folder with 100 or more pages of documents supporting an agreement of two to 15 pages in length.

The Development Support Office drafts the agreement and passes the document to one or more of the following offices via OfficeVision for review and comment:

Office of Design

Maintenance Division

Office of Bridges and Structures

Engineering Division

Office of Right-of-Way

General Counsel, Legal

Office of Project Planning

Office of Program Management

The servicing Transportation Center

The Development Engineer receives the agreement at the Transportation Center (TC) and may choose to send the agreement on to other Offices in the Transportation Center for review. Comments are made and either returned to the Development Engineer for consolidation or returned directly to the Development Support Office.

The Development Support Office receives the comments from all parties via OfficeVision and makes the necessary revisions. The Development Support Office may consult with any of the reviewing parties to resolve any outstanding conflicts.

The Development Support Office then sends two originals of the agreement to the TC. The agreement is forwarded to the agreement party(s) for review and signature. The agreement party(s) review the agreement and either accepts and signs the agreement or annotates the document and returns it to the TC for correction. If a document is returned with notes, the Development Support Office may revise the agreement and return it to the TC. The TC forwards the revised agreement to the agreement party(s) for signature on two originals.

After approval by the agreement party(s), the agreement is returned to the TC. The Development Engineer signs the agreement on behalf of the Iowa DOT. One of the signed copies of the agreement is retained at the TC pending completion of staff action. When the staff action is complete this original is delivered to the agreement party(s). The second signed original of the agreement is returned to the Development Support Office.

Upon receipt of the signed agreement, the Development Support Office initiates a staff action to approve the signed agreement. When the staff action is approved, the Development Support Office provides the TC with a valid staff action number. The TC annotates the signed agreement(s) with the staff action number and sends the approved executed agreement(s) to the agreement party(s).

The Development Support Office sends copies of the approved fully executed agreement to all appropriate offices in Iowa DOT.

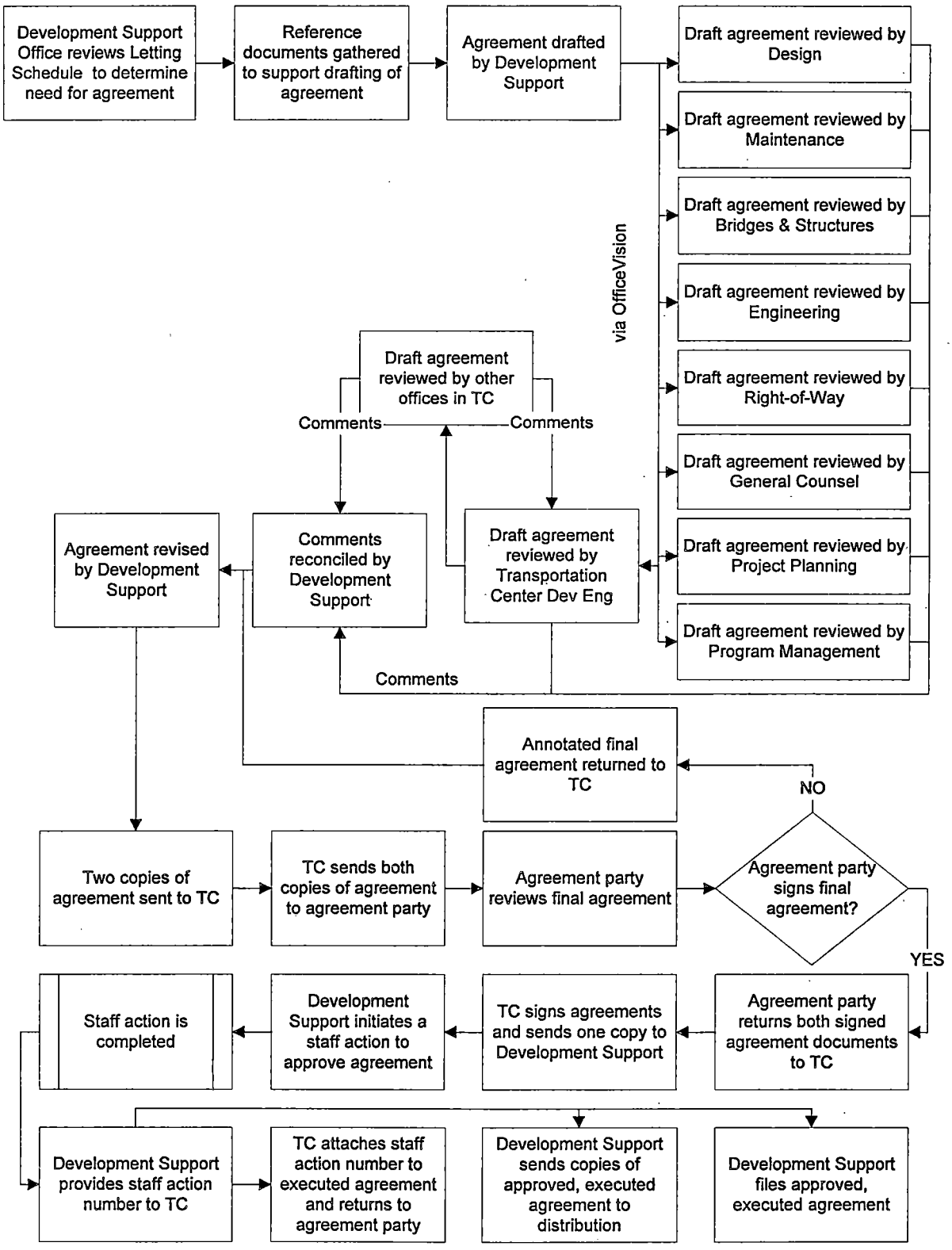


Figure 6 - Current Agreement Process

Current Inefficiencies

The Development Support Office drafts the agreement and passes the document to other offices via OfficeVision for review and comment. Only the unformatted text of the proposed agreement can be viewed in OfficeVision. Attachments or associated graphics are not viewable.

The Development Support Office must consult with any of the reviewing parties to resolve any outstanding conflicts. There is no method for reviewers to see comments made by other offices.

If a document is returned with notes, the Development Support Office may revise the agreement and return it to the TC. Because the TC may be distant from the Central Office, sending revised paperwork between the two offices by conventional mail can be very time consuming.

Anticipated Process

The Development Support Office will review the letting schedule to identify potential agreements. A folder will be created in the records management system (RMS) to hold all documentation related to the agreement. Development Support staff gathers documentation for development of the draft agreement. These documents are added to the folder, either as electronic documents or as raster images. These support documents should be accessible to only the Development Support staff. A draft agreement is written by Development Support using the current word processing application and stored in the newly created RMS folder.

Using the RMS workflow product, the draft agreement is sent to the reviewing personnel. Electronic notification is sent to recipients in the workflow path. Multiple workflow paths will be developed based on types of agreements and the distribution requirements of the six TCs.

Reviewers will view the agreement, adding comments, other documents or graphics, as well as redlines. Comments from reviewers will be forwarded to all other workflow recipients, as well as the Development Support Office. Reviewers may sub-route the agreement to other RMS users outside the initial workflow path if desired.

The agreement is approved or modified by all reviewers and returned to the Development Support Office with any attached comments. Development Support incorporates all appropriate revisions into the agreement, using the word processing application and resolves any conflicting comments. The agreement is stored in the RMS. The Development Support Office advises all concerned parties of the location of the agreement through electronic notification.

The TC retrieves the electronic copy of the agreement from the RMS and produces multiple hard copies of the agreement and forwards them (USPS or hand delivery) to the agreement party(s) for review and signature. The agreement party(s) signs and returns the agreements to the TC. In the event the agreements are returned to the TC with

comments by the agreement party(s), the TC notifies the Development Support Office of the desired changes electronically. Development Support modifies the agreement creating a new version of the agreement in the RMS for access by the TC. The TC prints two new hard copies of the agreement and forwards them (USPS or hand delivery) to the agreement party(s) for approval.

Upon receipt of signed agreements from the agreement party(s), the TC signs the agreements and retains one signed agreement at the TC for future return to the agreement party(s). The other signed hard copy agreement is returned to Development Support Office via facsimile. The electronic image generated by the facsimile software is placed in the RMS folder previously created.

The Development Support Office commences preparation of a staff action to obtain departmental approval of the signed agreement. After completion of the staff action, the Development Support Office notifies the TC of the approved staff action and electronically annotates the staff action number on the agreement. The signature page is scanned and a copy of the agreement is returned to the agreement party(s). Through electronic notification, the Development Support Office advises all concerned parties that the approved-signed agreement is available for retrieval and viewing.

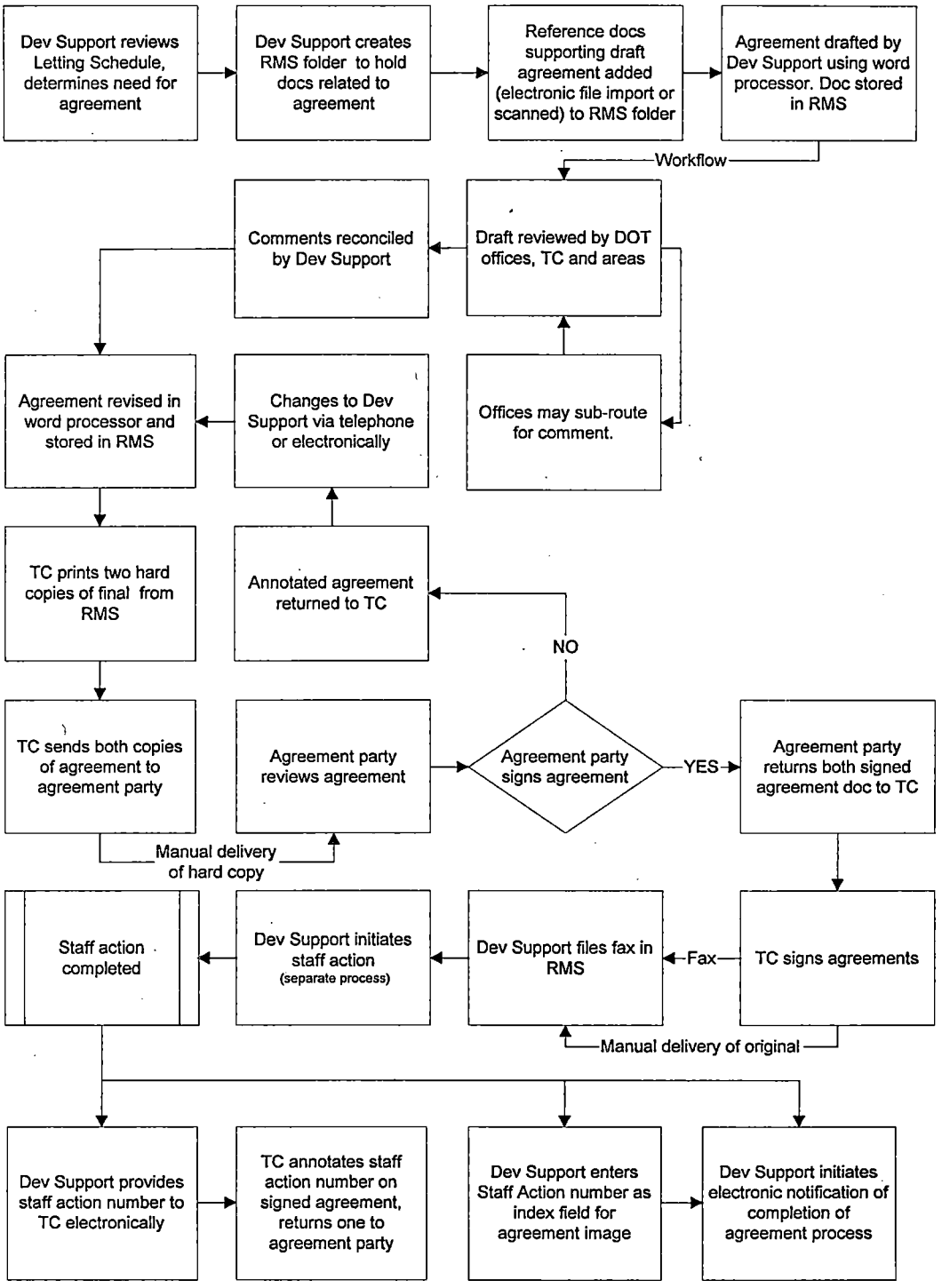


Figure 7 - Anticipated Agreement Process

PILOT PROJECT SPECIFICATIONS

Successful implementation of this pilot will require but is not limited to the following functions.

Functional Requirements

- Route number, agreement party (city and/or county), project number and county index fields must be multiple occurring fields.

  Route numbers can change over time and the agreements associated with either route number must be retrievable using either number.

  An agreement may be negotiated between the Department, a city and a county. In these instances it is necessary that all parties to the agreement be identified.

  Occasionally, project numbers split into two or more smaller (yet independent) projects with their own project number. Usually agreements have been negotiated and signed prior to the time when the project number is split. In these instances it is necessary to be able to retrieve an agreement using either project number.

  Agreements are used whenever bridges and structures are a part of the state highway system. When a bridge connects two counties one agreement may be used. In these cases retrieval must achievable using either county name.

- Agreement number field should be broken into fields (year, agreement type, and sequence number by year, amendment or addendum). Using separate fields in the RMS to record the agreement number and permitting users to view those fields in differing combinations will satisfy a large user group.

  Year - 4 digits.

  Agreement type - two characters, alphanumeric field.

  Sequence number – three digits, sequential number that restarts at the beginning of each year.

  Amendment or addendum – six characters, alphanumeric field (i.e., A1-1998)

- Workflow (ad hoc and procedural flows, parallel and serial distribution, sub-routes, and electronic approval) with comment, document/graphic import and mark-up capabilities. Because of the dynamic nature of the agreement negotiation process, it is unclear which type of workflow will be most advantageous to the department. Vendors should propose as many options as may be available in their solution.

- High speed printing and scanning of raster images up to legal size pages for support documents. This requirement is needed to satisfy requirements in the Central Office (Ames, IA) and remote TCs that will print final agreements for presentation to municipalities and counties for signature. These agreements may have attachments that contain text and/or graphics.

- Incoming and outgoing facsimile capabilities. This functionality will permit the department to transfer agreements or supporting documentation to various locations around the state in a rapid and accurate manner. In addition, being able

to import electronic facsimiles directly into the RMS will reduce the number of images that must be scanned.

- Query capabilities on all index fields. The department has determined that each index field can also serve as a field appropriate for querying.
- Foldering to manage storage of all documents related to an agreement. Folders will be created by users to organize documents into meaningful groups for search and retrieval purposes.
- Intranet access to documents. It is the intention of the Department to make some portion of this pilot project available to the entire user community via the department's intranet (DOTNET).
- Version control. A function of the RMS to manage multiple copies of the same document that may be checked in and/or out ensuring the user is presented with the most current version. Do not confuse this requirement with application software version controls.
- Retrieval of document images at remote sites. The Department will expect TCs around the state to retrieve documents and images from the RMS for many different reasons. Ease of use and speed of retrieval using the RMS will be a critical factor for users.
- Electronic notification to advise users of pending workflow items. (At pilot implementation, Iowa DOT may have a LAN-based e-mail system installed.)

Document Indexes

- Agreement number - agreement number field should be broken into fields—alphanumeric (currently includes year, agreement type, and a sequence number by year for primary agreements).
- Project number—see Appendix C for a complete description..
- Agreement party (city and/or county)—text field.
- County—text field.
- Route number—alphanumeric field.
- Description—text field.
- Date approved—date field.
- Design Bridge number—alphanumeric field
- Maintenance Bridge number—alphanumeric field.
- Agreement completion date—date field.
- Agreement addendum/amendment indicator—alphanumeric.

AGREEMENT TYPES

Agreements are sorted into types. Each type is given a code that is included in the middle section of the agreement number. The types of agreements included in this pilot (those dealing with primary roads) are listed in the following table.

Code	Type
1	Right-of-way acquisition
C	County
P	Pre-design with cities and counties
MP	Maintenance projects
A	Amendment/addendum[2]
M	Notification letters[3]
	Pre-construction agreements
2	Grade and drain
3	Pave
4	Reconstruction
5	Pavement widening
6	Resurfacing
7	Shoulder widening
8	Surface restoration
9	Bridge deck repair
12	Bridge or culverts only
13	Shoulder stabilization
14	Lighting only
15	Signing only
16	Miscellaneous
17	Signals only
TJ	Transfer of jurisdiction
	Agreements with other States
IL	Illinois
SD	South Dakota

[2] Amendments or addendum are currently handled as separate agreements but sometimes have been associated with the original agreement number by adding an 'A' to the end of the agreement number.

[3] Notification letters are not agreements because there are not two signature parties, but are handled the same as agreements.

Code	Type
WI	Wisconsin
NE	Nebraska
MO	Missouri
MN	Minnesota

HARDWARE AND SOFTWARE

For this pilot application, authorized Iowa DOT users able to access agreement documents will be:

- Office of Development Support (Central Office);
- Design (Central Office);
- Maintenance (Central Office);
- Bridges and Structures (Central Office);
- Engineering (Central Office);
- Office of Right-of-Way (Central Office);
- General Counsel (Central Office);
- Project Planning (Central Office);
- Program Management (Central Office); and
- One or more Transportation Centers (to be designated).

These offices will be using various types of PCs on a department-wide WAN. PC applications must be able to operate in both Win NT and Win 95 environments. The minimum Iowa DOT PC configuration is a Pentium 90 with 16MB RAM. Vendors are expected to install any required records management, facsimile or other specialized software needed to support their solution.

The following functions should be supported at the server level (more than one server may be required):

- intranet access;
- workflow;
- application database;
- fax; and
- document capture.

A ***[insert brand name and model number]*** scanner has been installed in the Development Support Office to capture drawings and other documents related to agreements processing. If this scanner is not compatible with proposed solutions, the vendor should suggest a suitable scanning device.

STAFFING

The agreements pilot project will be under the primary control of the Project Development Division, Development Support Office. The Development Support Office will perform all work related to capture, preparation and workflow distribution of the agreements. Since the number of agreements processed each year is small, additional staff or redistribution of responsibilities should not be necessary. It appears that few new tasks will be required of the existing staff. As part of the pilot project implementation, the project control office should closely review the desired business process and assign specific tasks to specific staff positions to clearly define revised roles and responsibilities. It is expected that changes will be confined to the processes of:

- scanning and indexing functions;
- quality assurance; and
- definition and maintenance of workflow paths.

When the RMS vendor is selected, the Iowa DOT should have the RMS support infrastructure defined and in place. The Pilot Project Implementation Team should be composed of employees from the RMT, project control office, Applications Technology Support, and division support team. When implementation of this pilot begins, one technical support team member should be assigned the full-time responsibility of direct support for this application.

The vendor selected to implement this pilot should be required to provide training at three levels:

- system administrator
- user
- "Train the Trainer"

Employees who have been provided "Train the Trainer" will in turn train the rest of the Iowa DOT employees on the use of the agreements system as it is expanded department wide.

BACKFILE CONVERSION

There is no requirement to perform backfile conversion during this pilot. However, vendors should be prepared to demonstrate their approach to backfile conversion during the Live Test Demonstration (LTD). During agency-wide implementation of this pilot, it may be desirable to digitize existing agreements up to five years old.

DOCUMENT VOLUMES & STORAGE REQUIREMENTS

Approximately 225 agreements (two to 15 pages in length, average agreements are four to eight pages) are produced each year for primary roads. Primary road agreements, supporting data and project-related correspondence are retained permanently. These folders can grow to contain up to 100 pages (primarily word processor files).

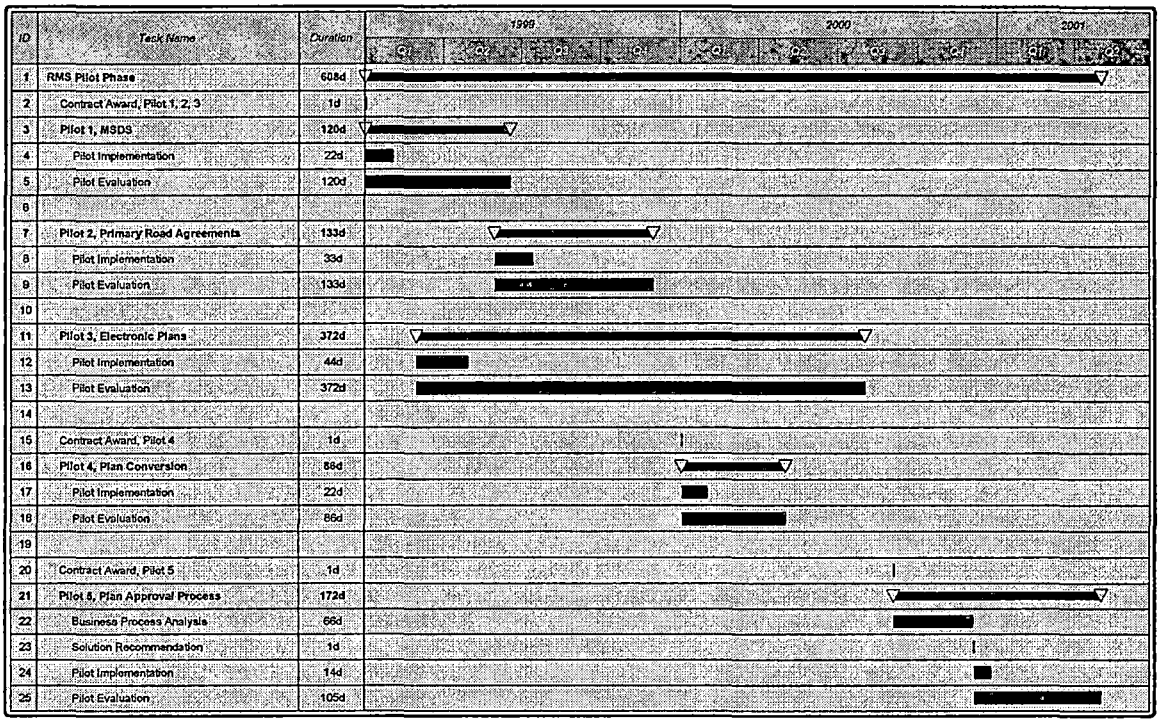
OTHER CONSIDERATIONS

After successful completion of this pilot project and prior to agency-wide implementation, it is anticipated that changes in technology and internal policy will be introduced by the Iowa DOT. At the LTD, vendors should present solutions that are sufficiently flexible to address the following changes:

- inclusion of electronic forms to support the generation of agreements originating in the Maintenance Division;
- addition of index fields to accommodate other types of agreements;
- addition of new workflow routes to facilitate electronic processing of the other agreement types to be added;
- inclusion of electronic signatures on agreements; and
- Internet access to agreement documents.

Pilot 3, As-Built Plans (Electronic Files)

Pilot project 3 will commence after implementation of the MSDS pilot for evaluation. The evaluation period for the as-built plans pilot will conclude approximately 18 months after commencement.



ID	Task Name	Duration
1	RMS Pilot Phase	608d
2	Contract Award, Pilot 1, 2, 3	1d
3	Pilot 1, MSDS	120d
4	Pilot Implementation	22d
5	Pilot Evaluation	120d
6		
7	Pilot 2, Primary Road Agreements	133d
8	Pilot Implementation	33d
9	Pilot Evaluation	133d
10		
11	Pilot 3, Electronic Plans	372d
12	Pilot Implementation	44d
13	Pilot Evaluation	372d
14		
15	Contract Award, Pilot 4	1d
16	Pilot 4, Plan Conversion	88d
17	Pilot Implementation	22d
18	Pilot Evaluation	66d
19		
20	Contract Award, Pilot 5	1d
21	Pilot 5, Plan Approval Process	172d
22	Business Process Analysis	66d
23	Solution Recommendation	1d
24	Pilot Implementation	14d
25	Pilot Evaluation	105d

Figure 8 - RMS Pilot Timeline

The Project Development Division utilizes plans to store information prior to, during and after the construction of roads. The offices of Design, Construction, Maintenance Division, and Right-of-Way all use and modify the plan sets at points during the process. Two major versions of the plan are the as-designed plan and the as-built plan.

The Design Office issues the as-designed plan at the time of letting. The as-built plan is generated in the construction field office after the completion of construction. This pilot is to be a demonstration of the use of a RMS to enable the managed generation and subsequent use of as-built plans using electronic tools.

For clarification, a list of plan sheets used in the as-designed and as-built process is shown in the following table. A given plan set is composed of some number of the following plan sheets.

Page Number	*Description*
A.01	Title Sheet (preliminary and final)
A.02	Signature Block Sheet
A.03-A.99	Revision Sheets
B.01-B.99	Typical Cross Sections
C.01-C.99	Estimate of Quantities And General Information
D.01-D.99	Plan and Profile Sheets - Mainline
E.01-E.99	Plan and Profile Sheets - Sideroad & Channel Change
F.01-F.99	Plan and Profile Sheets - Detour
G.01-G.99	Reference Ties and Bench Marks
H.01-H.99	Right–of–way Sheets (urban)
J.01-J.99	Staging and Traffic Control Sheets
K.01-K.99	Interchange Geometric Staking, Jointing and Edge Profiles
L.01-L.99	Intersection Geometric Staking, Jointing and Edge Profiles
M.01-M.99	Storm Sewer Sheets
N.01-N.99	Traffic Signal Sheets
P.01-P.99	Lighting Layout Sheets
Q.01-Q.99	Soils Sheets
R.01-R.99	Borrow Sheets
S.01-S.99	Schematic Hauling Diagram
T.01-T.99	Tabulation of Earthwork Quantities
U.01-U.99	500 Series, Modified Standards and Special Details
V.01-V.99	Bridge and Culvert Situation Plans
W.01-W.99	Cross Sections - Mainline
X.01-X.99	Cross Sections - Mainline
Y.01-Y.99	Cross Sections - Mainline
Z.01-Z.99	Cross Sections - Sideroads & Channel Change

Not all of these sheets will necessarily occur in every plan but those that do should remain in the same relative order and use the letter designation as specified. Cross-sections (sets W-Z) are often kept in a separate set of plan sheets, especially for larger projects.

The plan sheets used for Bridges and Structures are numbered sequentially in the plan set. Sheets typically included are shown in the following table.

Page Number	*Description*
.s00	Title Sheet
.sr1	Revision Sheet
.s01	Estimate of Quantities for single design project
.se1	Estimate of Quantities for multiple design projects
.s02	Situation Plan
.s03 - .s99	Detail Sheets

PROJECT DESCRIPTION

This pilot project will demonstrate the capabilities of the RMS to manage electronic as-designed and as-built plans. These files will be viewed and marked up by several Iowa DOT work groups in order to keep an up-to-date plan for one specific project within the State during and immediately following the construction phase of that project.

An as-designed plan, created with MicroStation, will be imported into the RMS. Construction personnel at the resident construction engineer's office will annotate and modify the base as-designed plan. Maintenance personnel will use MicroStation levels assigned by the department to document the maintenance activities that take place during construction. When construction is completed, the updated plans will be certified as the as-built plan. Subsequent to certification, the as-built plans will be made available to the TC right-of-way and maintenance personnel to continue to record changes on their respective layers that may occur during the remainder of the roadway life cycle. The as-built plans will become a living document accurately representing the current characteristics of the roadway project.

Goals & Objectives

The goal of this pilot is to develop a user-friendly system to electronically manage the access, update and review of as-designed and as-built plans.

The following objectives support this goal:

- review current manual, paper-based practices for improvement;
- increase standardization of practices throughout the department;
- reduce the time required for production, certification, archiving, reproduction and distribution of as-built plans;
- reduce the number of hard copy plans being retained throughout the department;
- create one common living plan for each project;
- keep the plans up to date to reflect the current state of the roadway project;
- maintain a record of previous versions of plans; and

- manage the infusion of technology in such a way that RMS user training does not become overly burdensome.

Critical Success Factors

- Availability of PCs, software tools and training to all units participating in the modification of as-designed plans into as-built plans. The modification of the as-designed plan is a complex task involving many participants. In order for the RMS to be an effective tool in the accomplishment of this task, it must be available to everyone contributing to the development of the as-built plan.
- Availability of training on RMS and CADD software and hardware components. The RMS will provide timesaving and other advantages to the department. However, as with all new procedures, it is essential that the users be comfortable using the system in order to realize these benefits. Just as it is important to have the hardware and software available to all users, the RMS must not go unused by a member of the as-built development process. In order to make the system work; all users must be comfortable operating in the system and using the tools procured by the department for editing plans.
- Availability of printing and plotting devices at TCs and field maintenance engineer's offices. The as-built plan development is a distributed process. Although the controlling office for the pilot is in Ames, all participating locations must be able to use all functions of the system as piloted.

DOCUMENT FLOW ANALYSIS

Existing Process

Plans for the construction and improvement of highway components under the jurisdiction of the Iowa DOT are prepared through an iterative and collaborative preliminary design process by the Project Development Division. Prior to release of an as-designed project, representatives from the central offices and representatives from the appropriate transportation centers review the plan set at the intended construction site. These field inspections often result in changes to the preliminary design plans. When the changes have been incorporated, the plan is certified as an as-designed plan and made available to contractors who may bid on construction projects announced via the letting schedule. ***The preceding portion of the process description will be addressed as pilot 5. Do not consider this as part of pilot 3.***

At letting, copies of the as-designed plans are sent to many units in the department including the designated transportation center (TC) for further distribution to the Construction, Right-of-Way and Maintenance organizations. Half-size plan sets are distributed to the development engineer's office at the TC, and to the area maintenance engineer (AME). Two full-size sets of plan sheets are forwarded to the resident construction engineer (RCE).

Upon receipt of the as-designed plan, the RCE puts aside one set of full-size drawings for later update. This copy will contain all construction changes to the as-designed plan and

become the as-built plan. One set of full-size plan sheets is taken into the field for use during the actual construction. Many smaller half-size copies are made and used as information copies.

Daily, during construction, notes are made in electronic field books kept by project inspectors reflecting the actual work performed by the contractor on the project. These notes include information regarding change orders, changes in quantities, and various text annotations. Additional information may be recorded in sketches on half-size plan sheets by the inspectors.

When the construction work has been completed, the project manager assigns plan sheets from the reserved full-size plan set at the RCE to the inspectors for update to as-built plans. The inspectors manually edit the plan sheets to reflect the information previously recorded in the field books.

The revised plans are reviewed and signed by the project engineer. When the signature of the project engineer has been affixed to the plan it becomes the official as-built plan.

After approval by the project engineer, the as-built plan is delivered to Records Management for conversion to microfilm (aperture cards) for archival. After conversion, the hard copy plans are passed to Printing in the Office of Document Services. Copies are made for distribution to the TC, RCE, AME and cities or counties that may have been involved in the project. (The time required for preparation and distribution of hard-copy as-built plans varies from one to 10 years). Figure 9 is a representation of the current process.

Both during and after construction, the AME updates the as-designed plans in their possession to indicate changes as a result of maintenance projects performed on the roadway being constructed. The right-of-way staff at the TC also adds information to their copy of the as-designed plans in the development engineer's office after construction is complete. This set of plan sheets is the reference copy for all inquiries received at the TC, regardless of the particular office fielding the inquiry. The public frequently requests copies of specific plan sheets and copies are made and distributed.

The right-of-way organization at the TC continues to make changes to hard copies of the as-designed plans to reflect additional information. These changes may include the purchase of property, the sale of excess property, new or modified roadway access, as well as cornerstones, etc., that occur after completion of construction but before and after the as-built plans are certified. Changes to the as-designed plans may be kept on the as-designed plans or transferred to the hard copy as-built plans when they become available.

On occasion, major changes to as-designed plans are required prior to or during the construction phase. The process to accomplish this is known as a plan revision. In the usual scenario documentation of the plan modification is forwarded to the Project Development Division for approval. When the revision has been prepared the as-designed plans are assigned a revision number and the modified plan sheets are reissued.

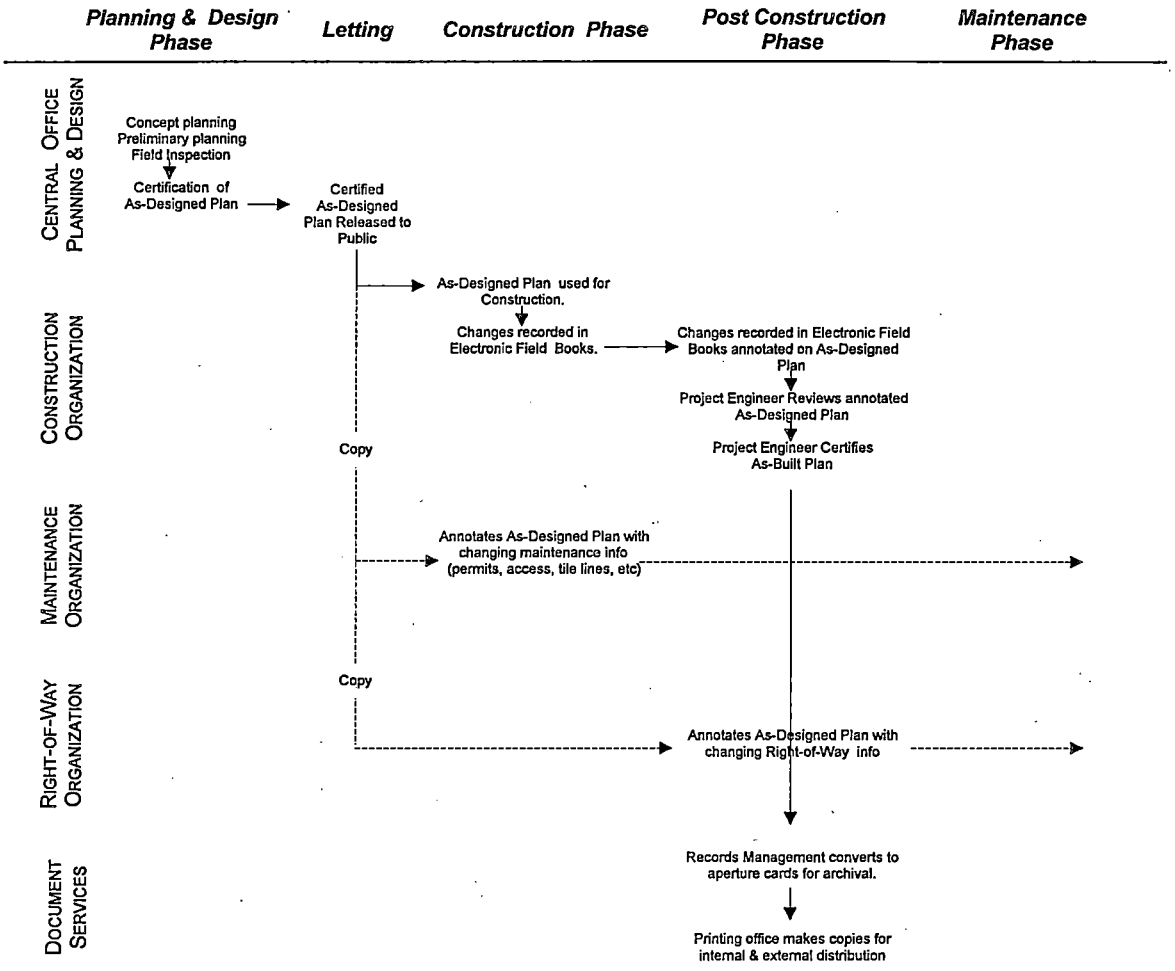


Figure 9 - Current As-Built Process

Existing Inefficiencies

- As-designed plans are now being produced in electronic form. However CADD tools are not available in the construction organization at the level where plans are worked into as-builts. Therefore, hard copy (paper) plans are prepared and distributed to construction. It is expected that PCs and software will be available to construction personnel in field offices in the next 24 months[4]. The right-of-way and maintenance organizations have PCs and CADD (MicroStation) software installed. The right-of-way organizations maintain their data electronically on copies of the as-designed plans that have been downloaded from the WAN to local hard drives. The differences in type and availability of graphic tools between the three disciplines makes it very difficult to present a single plan reflecting the current state of a project.

[4] Acquisition and delivery of PCs and software to the Construction organization involved in Pilot 3 will be accelerated so as not to interfere with the piloting process.

- The time required for preparation and distribution of the as-built plan varies from one to 10 years because of varying priorities, workflow definitions and the understanding of how that may impact other disciplines. The process involves personnel from several offices in the Iowa DOT and there is no common schedule for the tasks to be completed in the generation and distribution of as-built plans.
- All right-of-way and maintenance activity that may have taken place prior to or after completion of construction is recorded on different hard copies of the as-designed plan. Because the process of certifying as-built plans can take as long as 10 years, it is frequently too cumbersome to then transcribe the right-of-way and maintenance information to the certified as-built plan. Therefore, when attempting to determine the current configuration of a completed project, it may be necessary to review as many as three sets of hard copy plans.
- Public requests for information are fielded by TCs, resident construction offices and area maintenance offices by consulting the hard copy plans kept at each particular office. In order to get a complete set of plan sheets with all information in the department, several offices should be contacted.
- Security is an issue because some offices permit as-designed and/or as-built plans to be physically removed from Iowa DOT facilities with little or no assurance that the plans will be returned. Because of differences in work priorities and processes there is no formal, department-wide procedure adhered to for the conversion to microfilm (aperture cards) of as-built plans, the hard copy as-built plans may or may not have been archived, thus there may be no other set in the department.
- Paper copies of plans deteriorate over time. 5 to 10 percent of these plans are the only copies in existence documenting road construction completed in the early 1900's. These paper copies are disintegrating but must be preserved.

Anticipated Process

When the certified as-designed plans are made available to the public at the time of letting, the Office of Document Services, Records Management will be provided one electronic and one hard copy of the plans. The plan sheets containing the engineers' signatures will be scanned and entered in the RMS as images accessible for viewing. The Records Management staff will then import the CADD plan into the RMS and perform the necessary indexing and quality assurance functions. When the administrative processing requirements have been completed, electronic notification will be released announcing the availability of the new plan. At that time, any and all organizational units interested in the plans will have immediate access to them via the RMS.

When required, half-size hard copies may be printed/plotted locally for the development engineer, the AME and the RCE. Full size plotting will continue to be accomplished in the Central Office.

During and/or immediately following construction, project inspectors will access the RMS and electronically check out the as-designed plans. Electronic annotations will be made to reflect actual work performed on the project. These annotations and changes

may include information regarding change orders, changes in quantities and various text annotations. Periodically, the project inspectors will check these plans back into the RMS. This will permit others who may need to view accurate construction information to see updated electronic plan sheets.

Through the use of RMS and CADD technology, the AME will be able to update the as-designed plans to indicate changes as a result of maintenance projects performed on the roadway.

When construction has been completed, the updated as-designed plans will be passed electronically to the project engineer for approval. When approved by the project engineer, the revised electronic plan will become the official as-built plan.

When or if it becomes appropriate, suggested plan revisions will be documented at the remote site and forwarded for acceptance and initiation of a plan revision by the Office of Design. When the revision has been approved the as-designed plan sheets will be prepared and assigned a revision number by the Office of Design. At that time the modified plan sheets will be reissued to Records Management for indexing then released electronically for use in the RMS.

Upon signature and certification of the as-built plans, the RCE will advise Records Management of project completion so that a microfilm (aperture card) record may be made of the as-built plan. Authorized users will continue to access this electronic as-built plan for viewing. The Maintenance and Right-of-Way organizations will continue to record changes that may occur subsequent to as-built certification in their assigned CADD levels on the as-built plan. These changes may include additional purchase of property, the sale of excess property, new or modified roadway access, tile lines, utilities, drainage structures, etc. Figure 10 is a representation of the current process.

Subsequent to pilot implementation, the Department intends to make selected sheets in certified as-built plans available on the Internet for public viewing.

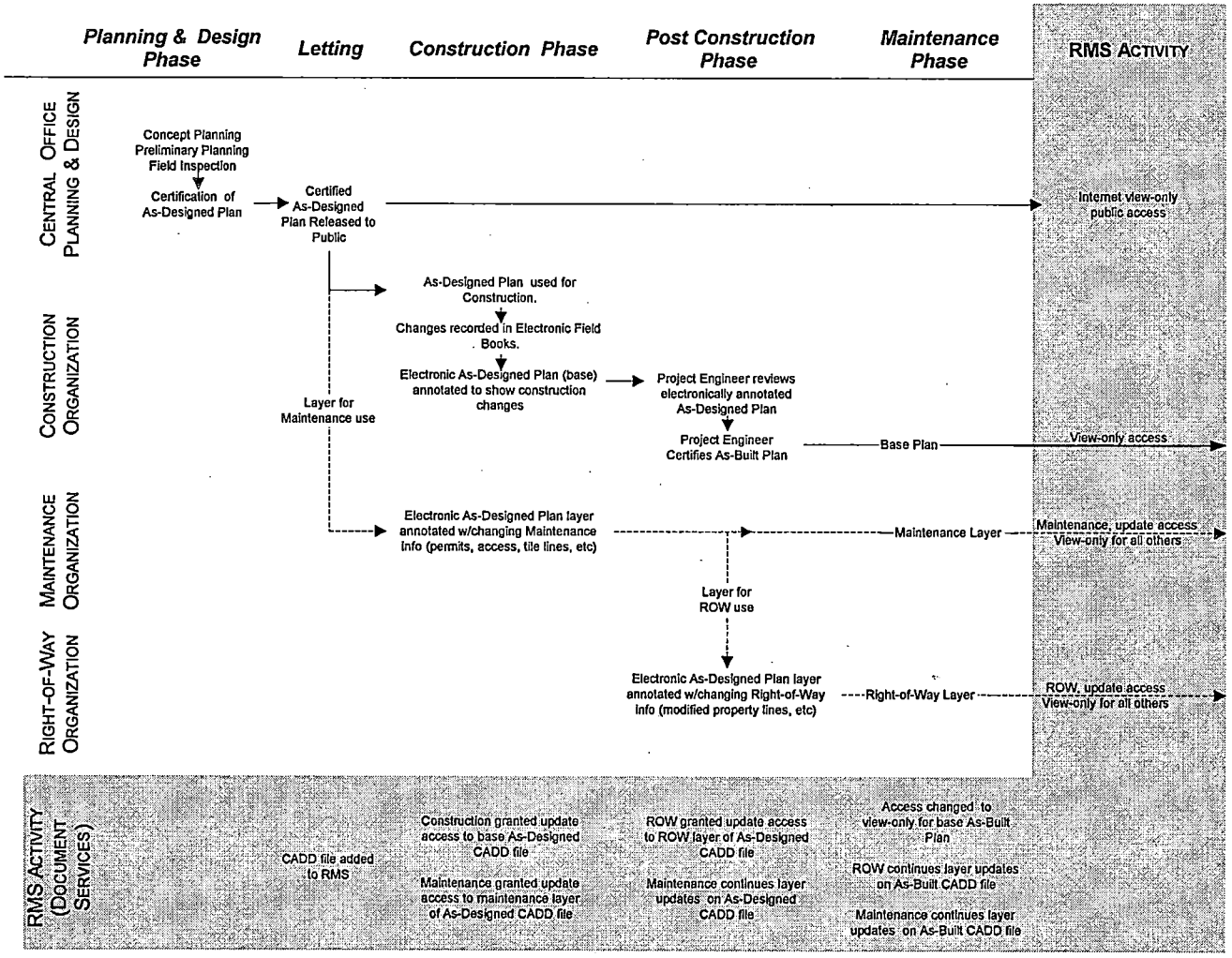


Figure 10 - Anticipated As-Built Process

PILOT PROJECT SPECIFICATIONS

The pilot project should meet the technology standards outlined for the RMS by the Records Management Team. All indexing fields should meet the indexing standards established for the RMS.

Successful implementation of this pilot will require, but is not limited to the following functions.

Functional Requirements

- Route number, project number, bridge number and county index fields must be multiple occurring fields. Route, project and bridge numbers may change of the course of time for a given plan. Certain projects, for example bridges, may exist in two counties.
- Workflow (ad hoc and procedural, parallel and serial distribution, sub-routes, electronic approval), with commenting and mark-up capabilities. Workflow must be able to accommodate changes in the personnel or offices involved in the as-built plan development. Some steps are accomplished simultaneously by distant offices, therefore the workflow rules must allow for parallel processing of a document. Electronic approval, through digital signature codes or through electronic signature or both is a key requirement, since a responsible party (the project engineer) approves the plans. The entire process will depend on the ability of the RMS to manage edit layers, both internal and proprietary to the CADD tool used by the Department.
- Scanning of color images up to 11" x 17" in size.
- Printing and plotting of color images up to E-size (34" x 44").
- Facsimile capabilities, both in and out. In order to support the goal of easy public access to the plans, municipalities, commercial concerns and individual citizens should be able to retrieve plans via fax. In addition, the Department should be able to receive updated plan sheets from contractors and other relevant parties by fax.
- Query capabilities on all index fields.
- Document check-in and checkout (revision control). The RMS is both a repository for publicly accessible documents *and* a tool for the development of documents. The pilot product must control the revision process so those approved documents are clearly designated as such. In addition, the ability to change or update these official documents should be restricted using a security regimen.
- Version control. The RMS should maintain old versions of documents for historical purposes according to Department retention schedules.
- Retrieval of document images at remote sites.

- Unlimited retention of as-built plans. As-designed plans are retained for 5 years. If the as-built plan is not received within this 5-year period an aperture card is made and archived.
- On-line storage of all pilot project plans. Off-line backup of RMS data is certainly acceptable, however no active plans should be taken off-line.
- Restricted write access based on user IDs.

Document Indexes

- Project number—see Appendix C for a complete description
- County—text field
- Route number—alphanumeric field
- Sequential number for specified route—numeric field
- Description—text field
- Date as-built plan is certified by project engineer—date field
- Type of project (Grade & Pave, Resurface, etc.)—text field
- Milepost (beginning and ending)—numeric field
- Station—alphanumeric field
- Year of construction—date field
- Design Bridge number—alphanumeric field
- Maintenance Bridge number—alphanumeric field
- Physical location of hard copy—text field

HARDWARE & SOFTWARE

For this pilot project, Iowa DOT employees will access plans from approximately four remote locations using various types of PCs equipped with MicroStation software and access to the department WAN. PC applications must be able to operate in both Win NT and Win 95 environments. The minimum Iowa DOT PC configuration is a Pentium 90 with 16MB RAM. The vendor should propose any additional software, scanners, printers and plotters required to support their proposed pilot solution.

The following functions should be supported at the server level (more than one server may be required):

- workflow
- application database
- fax
- document capture

STAFFING

The Project Control Office for this pilot project will be the Operations and Finance Office, Data Services Division, Project Development support team.

When the RMS vendor is selected, the Iowa DOT should have the RMS support infrastructure defined and in place. The pilot project implementation team should be composed of employees from the RMT, project control office, Applications Technology support, and division support team. When implementation of this pilot begins, one technical support team member should be assigned the full-time responsibility of direct support for this application.

The vendor selected to implement this pilot should be required to provide training at three levels:

- technical support
- System Administrator
- pilot project user

Vendors should propose methods, course content and cost to conduct user training for all Construction and Maintenance organization personnel (approximately 500)

BACKFILE CONVERSION

There is no requirement to perform backfile conversion during pilot 3.

OTHER CONSIDERATIONS

After successful completion of this pilot project and prior to agency wide implementation, changes will be introduced by the Iowa DOT. At the LTD, vendors should present solutions that are sufficiently flexible to address the following changes:

- addition of direct output to microfilm (aperture card)
- addition of index field to accommodate a change in geographical reference information (milepost index field may be changed)
- addition of Intranet access for access to as-built plans
- addition of Internet access by the public to selected sheets of as-built plans
- capability to link to other documents from as-built plans.
- consultant project engineer, as-builts received from outside the Iowa DOT

Pilot 4, As-Built Plan Set Conversion To Raster Images

PROJECT DESCRIPTION

The Records Management center in the Office of Document Services maintains plan sheets in the central Iowa DOT office in Ames. Hard copy plan sheets are received from the Design office for as-designed plans and from the field offices for as-built plans upon certification. These plans together represent the current status of roadway projects.

As-built plan sheets are microfilmed and maintained as aperture cards indefinitely. Prior to microfilming, plan sheets are found in a variety of media. In general, plans were generated as blueprints until approximately 1962, sepias from the early 60s until the mid-80s, and are currently plotted on bond paper. Mylar sheets are also found with some plans.

During the course of this pilot project, hard copy plans documenting either the as-designed or as-built plans for several previously completed construction projects will be scanned and converted to raster images. After conversion the RMS will be expected to manage these plans for retrieval, viewing, mark-up, and archival. The Office of Document Services, Records Management will be the Pilot Project Control Office for this pilot. This pilot project should:

- demonstrate the ability of the RMS to accept and manage existing documents from a variety of hard copy formats;
- develop a comprehensive conversion process;
- identify the hardware and software components needed to successfully complete this project.

As shown in Figure 11, this pilot project will be accomplished in conjunction with pilot project 3. The evaluation period for this pilot will end no later than the termination date of pilot project 3. Vendors should demonstrate their approach to high volume, complex, backfile conversion tasks during the Live Test Demonstration (LTD).

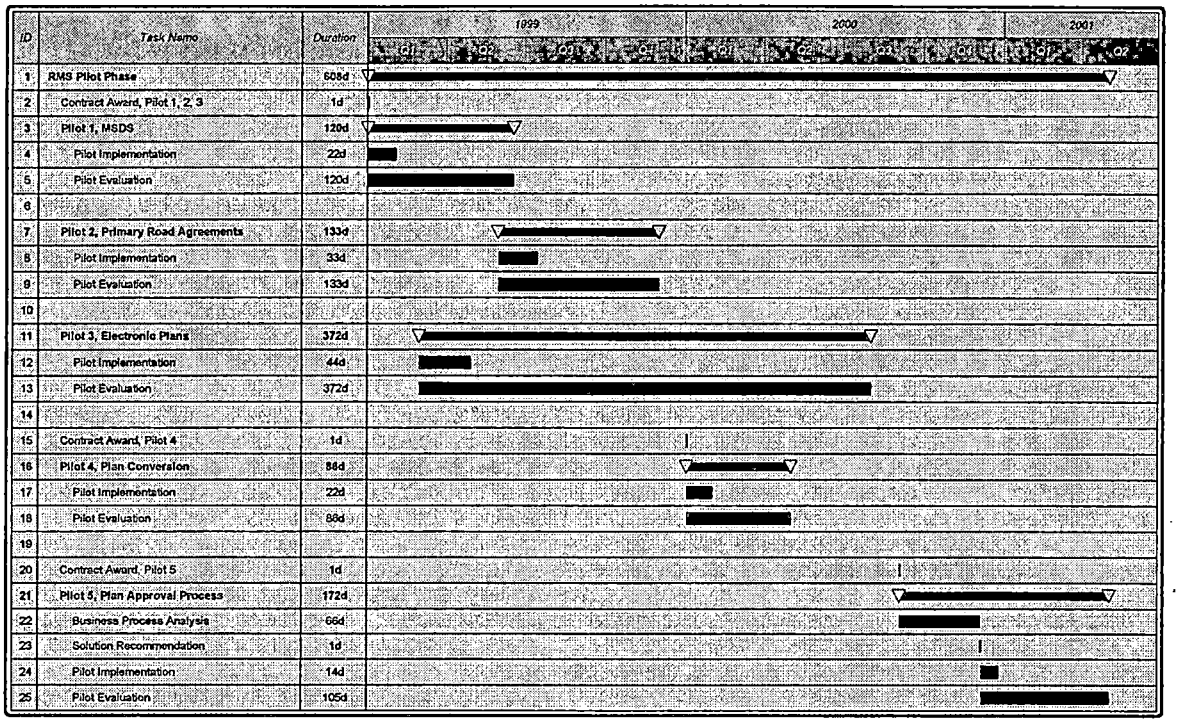


Figure 11 - Pilot Project Timeline

Goals & Objectives

The goal of the pilot project is to develop an efficient process to convert hard copy plans to raster images that can then be managed electronically through the RMS for viewing, editing, and archival.

The following objectives support this goal:

- Wider access to plans both within the Department and by the public.
- Preservation of deteriorating plans.
- Reduction of storage space needed for hard copies in Central Office, TCs and Resident Construction offices.
- Reduce time required to retrieve, update, review and archive plans.
- Management of plan sheets so as to maintain one common as-built plan for a given project.

Critical Success Factors

- Development of an efficient document conversion process. The Department and vendor should develop a logistics plan for the preparation of documents for conversion. This plan should take into account the duplication of plan sheets at various sites and should explain the process for consolidation of these sheets into one plan.

- Conversion of deteriorating hard copy plans into raster images.
- The vendor and the department should develop a plan to inventory and account for all plans selected for conversion in this pilot in order to capture the complete plan for the RMS.
- Capability to retrieve converted raster images. The conversion of documents in pilot project 4 should result in additional documents in the RMS that may be managed using the same products used in pilot project 3.

DOCUMENT FLOW ANALYSIS

Existing Process

When hard copy as-designed plans are made available to the public at the time of letting, a copy of the plan set is also provided by the Design Office to Records Management for conversion to microfilm (aperture cards). When the conversion process is completed Records Management destroys this hard copy plan set. Field offices keep their as-designed plans and maintain the sheets with new and updated information.

When construction is complete and the as-built plan has been signed and certified, it is forwarded to Records Management for conversion to microfilm (aperture cards). When as-built plans are not received within five years of letting, the as-designed plans are microfilmed (aperture cards) for archival.

After conversion of the as-built plan is complete the plan is forwarded to Printing for reproduction and distribution. The hard-copy plan is then returned to the generating field office. Other field offices receive copies of the as-built plan. Depending on the local practice, new information may now be maintained on this as-built plan, or that new information may continue to be maintained on the as-designed plan set.

Existing Inefficiencies

- Certified hard copy as-built plans are not always returned to Records Management for microfilming. Therefore the central file of finished construction is incomplete.
- Some early microfilming was of poor quality; therefore microfilmed plans cannot be relied on to be a good source of original or backup information.
- Storage space required for hard copy plans at the Central Office, TCs and Resident Construction Offices is excessive.
- The older plans maintained at field offices are suffering from severe deterioration.
- The current status of the project is reflected on as many as three plans that may be located at different geographic locations.
- Processing time for printing and distribution of hard copies is excessive.

Anticipated Process

The Records Management Center in cooperation with the Southeast Iowa Transportation Center, in Fairfield, IA will identify projects for inclusion in the pilot project. The Project Development office at the TC will coordinate the activities in the field offices. The Resident Construction Office housing the hard copy and the Area Maintenance Engineer's office will send their plans containing any changes kept by their respective staff to the TC for consolidation and forwarding to the Records Center for processing.

No duplicate pages should be contained in the system. Documents will be scanned, indexed and quality checked at the Records Center. Hard copy plans will be returned to the offices from which they were sent where the final quality check will be completed.

The images will be made available through the RMS for viewing. The offices of Maintenance and Right-of-Way will be able to edit plans to reflect additional changes to information on the sheets. All other users will be restricted to view-only access.

Plans successfully converted will be immediately imported into the RMS and made available for retrieval and viewing. The following guidelines are provided for planning purposes.

- Hard copy plans will be provided by the Southeast Iowa Transportation Center located in Fairfield, IA.
- Conversion activity will be performed at the Iowa DOT Central Office in Ames, IA.
- Normal work hours are 8:00 a.m. to 5:00 p.m. Monday through Friday.
- The vendor will provide all hardware and software required for this effort.
- Estimates for quantity of work should be based on converting plans containing 200-300 sheets ranging from B- to D-size. The conversion pilot will last no longer than three months.
- Conversion will require scanning the most current sheets from each of three different plans from the same project. These plans will be converted from hard copies that exist in the Southeast Iowa Transportation Center.
- Vendor is expected to perform all document preparation and conversion tasks while the Department will perform quality control of converted documents.

PILOT PROJECT SPECIFICATIONS

The work under pilot project 4 will be to demonstrate the proposed plan conversion processes and document the level of effort required to digitize (to raster format) files currently held in hard copy and place them under management control of the RMS. The conversion plan should address the selection, preparation and conversion of documents as well as indexing and quality control. The images must be retrievable for viewing and editing using the RMS in conjunction with pilot project 3.

Successful implementation of this pilot will require but is not limited to the following functions.

Functional Requirements

- Route number, project number, bridge number and county index fields must be multiple occurring fields.
- Scanning of color images up to E-size (34" x 44").
- Query capabilities on all index fields.
- Multi version access
- Intranet access to as-built plans. The RMS will be available to many Department users through an Intranet interface. The converted images should be available as a commonly viewable format for easy view-only retrieval.

Document Indexes

- Project number—see Appendix C for a complete description
- County—text field
- Route number—alphanumeric field
- Description—text field
- Type of project (Grade & Pave, Resurface, etc.)—text field
- Year of construction—date field
- Design Bridge number—alphanumeric field
- Maintenance Bridge number—alphanumeric field
- Physical location of hard copy—text field

HARDWARE & SOFTWARE

Iowa DOT employees accessing the RMS will be using various types of PCs on a department WAN. PC applications must be able to operate in both Win NT and Win 95 environments. The minimum Iowa DOT PC configuration is a Pentium 90 with 16MB RAM. Vendors are expected to install any required records management software on those PC's.

The following functions should be supported at the server level (more than one server may be required):

- intranet access
- workflow
- application database
- fax
- document capture

The vendor should propose all hardware including peripherals for scanning, viewing and plotting plans required supporting their proposed solution for the RMS application.

STAFFING

This pilot project will be under the primary control of the Office of Document Services, Records Management. It appears that several new tasks will be required of the existing staff and the manner in which existing tasks are accomplished will change. As part of the pilot project implementation, Records Management should closely monitor the vendor proposed business process. It is expected that vendors will recommend changes as the pilot proceeds.

Records Management will need to closely coordinate this conversion effort between the vendor and the Southeast Iowa Transportation Center. Two items requiring attention will be:

1. Method to assemble sheets from Maintenance and Right-of-Way that may be currently in use.
2. Designation of Southeast Iowa Transportation Center coordinator responsible for gathering hard copy plans, monitoring conversion process, performing quality assurance of raster plans, providing input to pilot evaluation process.

When the RMS vendor is selected, the Iowa DOT should have the RMS support infrastructure defined and in place. The Pilot Project Implementation Team should be composed of employees from the RMT, Project Control Office, Applications Technology Support, and Division Support Team. When implementation of this pilot begins, one Technical Support Team member should be assigned the full-time responsibility of direct support for this application.

The vendor selected to implement this pilot should be required to provide RMS training at two levels:

- system
- user

BACKFILE CONVERSION

This is a backfile conversion pilot project. The purpose of conducting a backfile conversion during a pilot is to gauge the effectiveness, worth and cost of backfile conversion. This process will involve not only the documents themselves but the personnel charged with performing the conversion and those using the documents in the RMS.

Pilot 5, Plans Approval Process

As shown in Figure 12, this pilot project will be accomplished after completion of pilots 1 through 4 and at the option of the Iowa DOT. It will be an extension of the previously completed pilot analysis, workflow functionality, workflow paths and RMS accessibility to the remaining workgroups and offices involved in the plan approval process performed at the Central Office in Ames, IA. This effort will encompass the entire process from concept to the issuance of as-designed plans at letting. The expansion will extend to approximately 18 offices.

It is anticipated that the Office of Data Services, Project Development Division Support Team, will become the Pilot Project Control Office for this final phase of the RMS pilot.

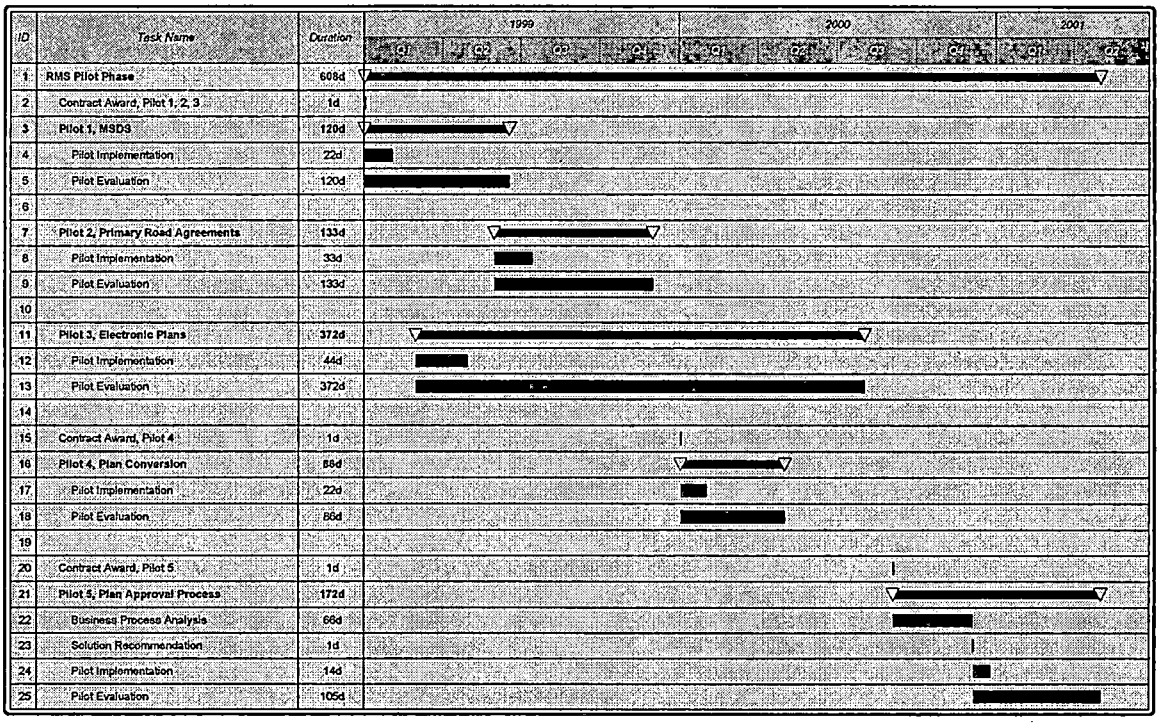


Figure 12 - Pilot Project Timeline

Appendix A

APPLICATION FOR RECORDS MANAGEMENT SYSTEM PILOT PROJECT

Contact Person:	
Office Vision ID:	
Telephone: ( )	
Division:	
Office:	
Other Offices Affected:	

Attach additional sheets if necessary

Project Name

Name to be used to identify this pilot project

Project Description

Briefly describe the proposed project. Outline the scope of business to be covered by the pilot. Identify the beginning and end of the process(es), who has access needs, routing needs, and/or update needs. Describe other processes that will be affected by this pilot, and how users of those processes may interact with the pilot.

Project Urgency

Specify the urgency of automating this project. Identify any background information or facts that might be available about progress to date.

Project Staffing

Rate your staff in the following areas, make one choice that best represents the majority:

How willing is your workgroup to support a pilot project?

1. Reserved 2.Ready 3. Willing

Is your workgroup familiar with a graphical user interface environment, such as Windows or OS/2?

1. No understanding 2. Some familiarity 3. Very familiar

Are you willing to dedicate staff to make the pilot project successful?

1. Yes 2. No

Project Benefits

Describe the expected benefits of this pilot. Include the benefits for other offices or the public.

Current Process/Workflow

Explain how the process(es) is currently being handled. If available, include a flowchart of the process(es).

Proposed Process/Workflow

Explain how the process is to be improved by the use of an Electronic Records Management System. Include a flowchart of the proposed process if available.

Backfile Conversion

Will the project include documents from this day forward or require conversion of old files? Provide an explanation of access frequency of old files and justification to convert (such as disaster recovery).

Appendix B

RECORDS MANAGEMENT SYSTEM PILOT PROJECT EVALUATION FORM

Project Name _____ **Project Reviewer** _____

QUESTION	CRITERIA	SCORE	COMMENTS
Willingness to Participate In Project	1. Very Reserved 2. Reserved 3. Willing 4. Very Willing		
Identifiable Process	1. No defined process 2. Not a well defined process 3. Well defined process 4. With links to other processes		
Simplicity	1. Leading edge technology, complex business processes, and integration with existing systems. 2. Mainstream technology, complex processes and integration with existing systems. 3. Leading edge technology, complex business processes, no integration with existing systems. 4. Leading edge technology or complex business processes and no integration with existing systems. 5. Mainstream technology, simple business processes and no integration with existing systems.		
Process Redesign	1. No redesign included in the project. 2. Some redesign of existing process. 3. Complete redesign within the originating office. 4. Complete redesign and expansion within the originating		

RECORDS MANAGEMENT SYSTEM PILOT PROJECT EVALUATION FORM

Project Name **Project Reviewer**

	office and with other processes.		
Resources Available	1. No resources available for pilot development. 2. Minimal resources available. 3. Moderate resources available. 4. Staff or funds or equipment and facilities available. 5. Staff, funds, equipment and facilities available.		
Need	1. Current process satisfies all needs. 2. Minimal need for new process. 3. New process needed for office. 4. Urgent need for new process within the office. 5. Urgent need for new process by multiple offices.		
Small Scope	1. Single internal office process. 2. Single process expandable to other offices. 3. Multiple internal office processes. 4. Multiple processes expandable to other offices. 5. Multiple, complex processes expandable to the Department.		
Growth Potential	1. Process will not be replicated, one of a kind, no expansion to other document types and functional areas. 2. Can be expanded to include other document types or expanded functionality. 3. Project encompasses a distinct and singular work process that can be replicated throughout the department. 4. Project includes distinct and singular work process that can be replicated through the department. Other offices will benefit from		

RECORDS MANAGEMENT SYSTEM PILOT PROJECT EVALUATION FORM

Project Name **Project Reviewer**

	interface. 5. The process can be expanded within the office to include other similar processes and replicated to other offices.		
Education: Knowledge of automated document management concepts	1. No understanding 2. Little knowledge 3. Some knowledge 4. Knowledge 5. Very knowledgeable		
GUI Familiarity	1. No understanding 2. Little understanding 3. Some familiarity 4. Familiar 5. Very familiar		
Management Support	1. No other management contacted 2. Management support from originating office 3. Minimal support from other office management 4. Moderate support from other office management 5. Total support from other management		
Backfile Conversion	1. Backfile conversion required for large numbers of docs plus ongoing conversion of new docs 2. Backfile conversion of some existing docs and new docs 3. Conversion of all new docs 4. Conversion of new docs on an as needed basis 5. No conversion needed		
How much of staff will be involved in the pilot		N/A	
How much training will workgroup need to be		N/A	

RECORDS MANAGEMENT SYSTEM PILOT PROJECT EVALUATION FORM

Project Name **Project Reviewer**

productive in an operational system that has a GUI?			
Any foreseen difficulties the end user may have?		N/A	
Are there an reservations about this pilot?		N/A	
What reservations?		N/A	
Are these reservations limiting?		N/A	
	Total Evaluation Score		

Discussion Notes

Appendix C

Project and Project Control Numbering, Iowa DOT Policy and Procedures Manual, Policy Number 130.01

4-97

Iowa Department of Transportation
POLICIES AND PROCEDURES MANUAL

Title	Policy No.
Project and Project Control Numbering	130.01
Responsible Office(s)	Related Policies & Procedures
Office of Finance	
Effective/Revision Date(s)	Approval(s)
9-1-76 1-2-97	Ty Richardson

Authority: Director of the Operations and Finance Division.

Contents: This policy explains the format for project control numbers and project numbers and lists the established system prefixes.

Affected Offices: All

Definitions:

Alpha-Numeric System Prefix - The first 2 digits of the project control number.

- The first digit is a number.
- The second digit may be a letter or a number. The letters I, O and Z should not be used because they can be read as numbers.
- In computer printouts, number-letter prefixes are listed ahead of number-number prefixes. For example, 2A to 2Y is followed by 20 to 29, 3A to 3Y, and 30 to 39.

FAP - Federal-Aid Primary.

FAS - Federal-Aid Secondary.

FAUS - Federal-Aid Urban System.

FM - Farm-to-Market.

Project Control Number - An 11-digit number which begins with a 2-digit alpha-numeric system prefix. It is used to accumulate costs to a project and shall be reported on time sheets, vouchers and all cost reporting documents. It is required with cost centers 60XX through 68XX and 8010.

Project Number - A number which corresponds to the project control number but begins with a system prefix letter code. It shall be used on inter-office correspondence, plans and all production-oriented documents.

System Prefix Letter Code - A combination of letters at the beginning of a project number. It corresponds to the alpha-numeric system prefix and is based on the federal numbering system.

Forms: None

Policy and Procedure:

I. General

A. Unique project/project control numbers shall be assigned to highway construction, maintenance and research, rail, aeronautics, public transit, capital improvement, and other projects based on the system prefixes which have been established by the Office of Finance.

B. Each office shall be responsible for assigning costs to the appropriate project control number, and identifying other documents by the appropriate project number.

C. The project control number is required with cost centers 60XX through 68XX and 8010. Costs reported to these cost centers must also be coded to indicate rural or urban, and participating or non-participating, as follows:

Rural - Work performed on any road that is not in an incorporated city.
Urban - Work performed in an incorporated city, regardless of population.

Participating - Work that is approved for federal reimbursement.
Non-participating - Work that is not approved for federal reimbursement.

D. System prefixes are grouped into 7 ranges. The following lists the number and name of each range, the alpha-numeric system prefixes falling in each range, and the offices responsible for assigning project/project control numbers:

Range	Road System	Alpha-numeric System Prefix	Responsible Division/Office
1	Interstate	0A thru 0Y 01 thru 09 1A thru 1Y 10 thru 15	Project Scheduling (All)
2	Primary	16 thru 19 2A thru 2Y 20 thru 29 3A thru 3Y 30 thru 39 4A thru 4Y 40 thru 49	Project Scheduling, except 2T which is assigned jointly by Finance and Project Planning; 41 which is assigned by Maintenance; and 4C which is assigned by Local Systems.
3	Farm to Market	5A thru 5Y 50 thru 59 6A thru 6Y 60 thru 63	Local Systems, except 59, which is assigned by Materials
4	Other State Roads	64 thru 68 7A thru 7Y	Project Scheduling (All)
5	Locally Funded Off-System and Federal-Aid Urban System Projects, and State Non-Construction Categories	69 70 thru 79 8A thru 8Y 80 thru 89	69: Maintenance 70, 71: Local Systems 72: Materials 73: Counties 74, 75: Local Systems 76, 77: Maintenance 78: Materials 79: Local Systems 8A-8Y: Local Systems, except 8A, which is assigned by Maintenance; and 8H, 8L, 8M, 8Q, 8W, and 8Y, which are assigned by Finance 80: Facilities Support 81, 82: Local Systems 83: Finance 84-86: Local Systems
6	RISE Program (Locally Funded) and Recreational Trails	9A thru 9H	9A-9F: Local Systems 9G: Finance and Project Planning 9H: Project Planning

7	Non-Highway Projects	9I thru 9Y 90 thru 99	9I: Local Systems 9J: Maintenance 9L-9M: Finance 9N: Engineering 9P: Local Systems 9R: Finance 9T: Program Management 90: Finance 91: Local Systems 92: Program Management 93, 94: Finance 95, 98: Systems Planning

E. The format for project control numbers and project numbers is as follows from left to right:

1. Interstate

   a. Project Control Number 01-85-0354-005
   b. Project Number I-35-4(5)123--01-85

   a. 01 - 2-digit alpha-numeric system prefix.
      85 - 2-digit county number.
      0354 - first 3 digits are the route number; the last is the federal control section number.
      005 - 3-digit paren number representing a chronological sequence of the assignment of projects on a given route and control section.

      NOTE: For correct coding, all spaces in the project control number must contain significant digits or 0s as shown in the example above.

   b. I - system prefix letter code (corresponds to 01 in "a" above).
      35 - route number (corresponds to 035 in "a" above).
      4 - federal control section number (corresponds to 4 in "a" above).
      (5) - paren number (corresponds to 005 in "a" above).
      123 - mile post number (not used in project control number; corresponds to the mile post markers posted along the highways).
      01 - alpha-numeric system prefix (same as 01 in "a" above).
      85 - county number (same as 85 in "a" above).

2. Primary

   a. Project Control Number 20-59-0346-001
   b. Project Number F-34-6(1)--20-59

   The format for primary numbers is the same as for interstate numbers except that the mile post number is not used.

3. Farm-to-Market and Federal-Aid Secondary

   a. Project Control Number 61-85-1027-004
   b. Project Number RS-1027(4)--61-85

   The format is the same as for the interstate numbers except:

   1027 - this 4-digit field is all route number; there is no control section.

   Mile post number is not used.

4. Local Secondary

   a. Project Control 73-85-1234567
   b. Project Number L-1234567--73-85

   a. 73 - 2-digit alpha-numeric system prefix.
      85 - 2-digit county number.
      1234567 - any 7 letters or digits assigned by the county.

   b. L - system prefix letter code (corresponds to 73 in "a" above).
      1234567 - 7 letters or digits assigned by county, same as "a" above.
      73 - alpha-numeric system prefix (same as 73 in "a" above).
      85 - county number (same as 85 in "a" above).

5. Federal-Aid Urban System

   a. Project Control Number 81-10-3900-001
   b. Project Number M-3900(1)--81-10

   a. 81 - 2-digit alpha-numeric system prefix.
      10 - 2-digit county number.
      3900 - 4-digit federal-aid route number assigned to a city street.
      001 - 3-digit paren number representing a chronological sequence of the assignment of projects on a given federal-aid route number assigned to a city street.

   b. M - system prefix letter code (corresponds to 81 in "a" above).
      3900 - 4-digit federal-aid route number assigned to city street, same as "a" above.
      (1) - paren number (corresponds to 001 in "a" above).
      81 - 2-digit alpha-numeric system prefix, same as "a" above.
      10 - 2-digit county number, same as "a" above.

6. Maintenance MP Projects

   a. Project Control Number 76-97-0203-001
   b. Project Control Number bb-97-0020-010
   c. Project Number MP-20-3(1)33--76-97

   a. This format for the project control number shall be used on vouchers and by all except Maintenance Division personnel on time sheets.
      76 - 2-digit alpha-numeric system prefix.
      97 - 2-digit county number.
      0203 - first 3 digits are the route number; last digit is the transportation ctr. number.
      001 - 3-digit number representing a chronological sequence of maintenance contracts assigned to each route within a county.

   b. This format for the project control number shall be used on time sheets by Maintenance Division personnel when performing inspection on an MP project.
      bb - means leave blank.
      97 - 2-digit county number.
      0020 - 4-digit route number.
      010 - 3-digit unit (surface type) number.

   c. MP - system prefix letter code (corresponds to 76 in "a" above).
      20 - route number.
      3 - transportation center number.
      (1) - number representing chronological sequence of contracts assigned to each route within a county, corresponds to 001 in "a" above.
      33 - mile post number (not used in project control number).
      76 - 2-digit alpha-numeric system prefix, same as 76 in "a" above.
      97 - 2-digit county number, same as 97 in "a" above.

7. Maintenance MB Projects

a. Project Control Number 77-07-2182-001
b. Project Control Number bb-07-0218-bbb
c. Project Number MB-218-2(1)1--77-07

a. This format for the project control number shall be used on vouchers and by all except Maintenance Division personnel on time sheets.
77 - 2-digit alpha-numeric system prefix.
07 - 2-digit county number.
2182 - first 3 digits are the route number; last digit is the transportation center number.
001 - 3-digit number representing a chronological sequence of maintenance contracts assigned to each route within a county.

b. This format for the project control number shall be used on time sheets by Maintenance Division personnel when performing inspection on an MB project.
bb - means leave blank.
07 - 2-digit county number.
0218 - 4-digit route number.
bbb - means leave blank.

c. MB - system prefix letter code (corresponds to 77 in "a" above).
218 - route number.
2 - transportation center number.
(1) - corresponds to 001 in "a" above.
1 - mile post number (not used in project control number).
77 - 2-digit alpha-numeric system prefix, same as "a" above.
07 - 2-digit county number, same as "a" above.

8. Maintenance MM Projects

a. Project Control Number bb-67-0175-090
b. Project Number MM-J102--69-67

a. bb - leave blank.
67 - 2-digit county number.
0175 - 4-digit route number.
090 - 3-digit unit (surface) type.

b. MM - system prefix letter code (corresponds to 69 below).
J102 - the letter designates the area; the remaining 3 digits are assigned in sequence by all areas from 001 to 999.
69 - alpha-numeric system prefix.
67 - 2-digit county number, same as "a" above.

9. Research Projects

a. Project Control Number 59-00-0140-000
b. Project Number HR-140

a. 59 - 2-digit alpha-numeric system prefix.
00 - always 00.
0140 - chronological sequence number for a project.
000 - always 000.

b. HR - system prefix letter code (corresponds to 59 in "a" above). (HR projects could use prefixes 59, 72 or 78.)
140 - chronological sequence number for a project, corresponds to 0140 in "a" above.

10. Capital Improvement Projects

a. Project Control Number 80-78-9N30-000
b. Project Number BG-9N30(000)--80-78

a. 80 - 2-digit alpha-numeric system prefix.
78 - 2-digit county number.
9N30 - First digit - type of facility:

1 Garages for Interstate Highways and Freeways
2 Garages for Primary Highways and Expressways
3 Offices
4 Salt Sheds
5 Storage (heated or cold)
6 Rest Areas
7 Scales
8 Radio Buildings
9 Land Parcels

Second digit - Alpha code naming town; e.g. N = Neola. (The letters I, O and Z should not be used.)

Third digit - Numeric code identifying a specific site within a county.

Fourth digit - Sequential number assigned to a land parcel or structure at a site.

000 - item number. 000 is used for all operational (non-capital) activities associated with a 12XX Cost Center. Facilities acquired or constructed from a capital improvement appropriation are assigned item numbers.

b. BG - system prefix letter code (corresponds to 80 in "a" above).
9N30 - same as 9N30 in "a" above.
(000) - same as 000 in "a" above.
80 - 2-digit alpha-numeric system prefix, same as "a" above.
78 - 2-digit county number, same as "a" above.

11. Safety Projects

a. Project Control Number 88-00-CD91-135
b. Project Number Do not use project number

a. 88 - 2-digit alpha-numeric system prefix.
00 - always 00.
CD91 - CD is a 2-digit alpha representation of the safety project standard. 91 is a chronological sequence of projects within the standard.
135 - chronological sequence of all safety projects.

II. System Prefixes

The following section lists the alpha-numeric system prefixes which have been established, the corresponding system prefix letter codes, a description of each system prefix, and whether or not each system prefix involves federal-aid highway funds.

Alpha-Numeric System Prefix	System Prefix Letter Code	Description	Federal-Aid Highway
RANGE 1:		INTERSTATE ROAD SYSTEM	
0E	IMN	Interstate Maintenance - No Federal Aid	No
01	I; EWS	Interstate System; Early Warning System	Yes
02	IMX	Interstate Maintenance - Exempt	Yes
06	ER	Emergency Relief Projects on Interstate System	Yes
11	NHS	National Highway System - Interstate	Yes
12	IR	Interstate System Resurfacing, Restoring and Rehabilitating	Yes
13	IM	Interstate Maintenance	Yes
15	IN	Interstate System Improvements For Which No Federal Aid Is Requested	No
RANGE 2:		PRIMARY ROAD SYSTEM	
16	RP	RISE Projects on Primary Roads	No
17	RPX	Combination of 16 with any or all of 54, 9A or 9D	No
18	PLH; ETC	Public Lands Highway; Safety	Yes
19	NHS	National Highway System - Primary	Yes
2A	DE	Demonstration Project on FAP System-1987 Highway Act	Yes
2C	STP	Surface Transportation Program	Yes
2E	DPS	Avenue of the Saints	Yes
2H	HES; ETC	Hazard Elimination on FAP Highways; Global PS	Yes
2J	STPN	Surface Transportation Program - No Federal Aid	No
2L	BHF	Special Bridge Rehabilitation Projects on the FAP System	Yes
2M	TJ	Transfer of Highway Jurisdiction	No
2P	BRF-F	Combination of 38 and 20	Yes
2R	NHSN	National Highway System - No Federal Aid	No
2T	SB-IA	Scenic Byways	Yes

Alpha-Numeric System Prefix	System Prefix Letter Code	Description	Federal-Aid Highway
2W	BRF-NBIS	Bridge Inventory/Inspection	Yes
2Y	BHF-F	Combination of 2L and 20	Yes
20	F	Federal-Aid Primary (FAP) Projects	Yes
21	FN	Primary Projects For Which no Federal Aid is Requested	No
22	STP-A	Iowa Clean Air Attainment Program (ICAAP), Global Positioning System	Yes
23	STP-E	Mandatory Transportation Enhancements	Yes
26	MBE	Minority Business Enterprise	Yes
28	ER	Emergency Relief Projects on FAP System	Yes
3B	HDP	Highway Demonstration Project	Yes
3C	HDPPE	Highway Demonstration Project - Preliminary Engineering	Yes
3E	DPI/DPR	Demonstration Project - Innovative	Yes
3H	NHSX	National Highway System - Exempt	Yes
3K	BRFX	Bridge Replacement - Exempt	Yes
3L	HESX	Hazard Elimination - Exempt	Yes
3P	IX	Interstate Substitution	Yes
30	P	Primary Non-Federal Aid on Highways When Relocation Has Been Made	No
31	CAF	Primary System Advertising Control	No
33	DE-RP	Combination of 2A and 16	Yes
35	BRF-RP	Combination of 38 and 16	Yes
36	F-RP	Combination of 20 and 16	Yes
38	BRF	Special Bridge Replacement Projects on FAP System	Yes
39	BRFN	Primary Bridge Replacement - No Federal Aid	No
4A	UST	Urban-State Traffic Engineering Program (U-STEP) (used when DOT is letting contract for a city, and when paying a city)	No
4C	CST	County-State Traffic Engineering Program (used when DOT is letting contract for a county, and when paying a county)	No
41	MPX	Emergency Relief	Yes
48	RRP	Railroad-Highway Crossings - Protective Devices or Hazard Elimination	Yes

Alpha-Numeric System Prefix	System Prefix Letter Code	Description	Federal-Aid Highway
RANGE 3:		FARM TO MARKET ROAD SYSTEM	
5B	FM-TSF	Combination of 55 and 92	No
5C	CST	County/State Traffic Engineering Program	No
5D	SBRFM	State Bridge Replacement Fund on FM Roads	No
5E	STP-S	Surface Transportation Program - Secondary	Yes
5F	BROS	Bridge Replacement on FM Roads not on the FAS System	Yes
5K	STP-E	County FM Enhancement	Yes
5L	AG-MC	Defense Access Road	Yes
5M	STP-A	Iowa Clean Air Attainment Program (ICAAP)	Yes
5N	BHOS	Bridge Rehabilitation on FM Roads not on the FAS System	Yes
5P	STP-S-TSF	Combination of 5E and 92	Yes
5X	SN-TSF	Combination of 51 and 92	No
51	SN	Projects on the FAS System for Which no Federal Aid is Requested	No
54	RFM	RISE Projects on FM Roads	No
55	FM	Projects on the FM System, part of which may be on a Designated FAS Route, for which no Federal Aid is requested	No
56	RFMX	Combination of 54 with any or all of 16, 9A or 9D	No
58	ER	Emergency Relief Projects on FAS System	Yes
59	HR	Farm to Market Research Projects	No
60	BRS	Special Bridge Replacement on the FAS System	Yes
61	RS	Rural Secondary - Special Federal Appropriation	Yes
63	BHS	Bridge Rehabilitation on the FAS System	Yes

Alpha-Numeric System Prefix	System Prefix Letter Code	Description	Federal-Aid Highway
RANGE 4:		OTHER STATE ROADS (INSTITUTIONAL ROADS, ETC.)	
7A	BR	Board of Regents	No
7C	SP	State Parks	No
7D	NG	National Guard	No
7E	MAS	Merged Area Schools	No
7F	SCG	State Capitol Grounds	No
7G	SFB	State Fair Board	No
7H	DHS	Department of Human Services	No
7J	DC	Department of Corrections	No
7K	J-HS-C	Joint Human Services/Corrections	No
RANGE 5:		LOCALLY FUNDED OFF-SYSTEM AND FEDERAL-AID URBAN SYSTEMS PROJECTS; AND STATE NON-CONSTRUCTION CATEGORIES	
* 69	MM	Maintenance Materials Paid from 55XX Cost Centers	No
70	STP-U	Surface Transportation Program - City/County	Yes
71	HDP/DE	Highway Demonstration Project	Yes
* 72	HR	Primary Highway Research Projects	No
73	L	Local Secondary	No
74	L-TSF	Combination of 73 and 92	No
75	CS-TSP-STP-U	Combination of 84, 92 and 70	Yes
* 76	MP	Surface Restoration Maintenance Projects Paid from 65XX Cost Centers	No
* 77	MB	Bridge Painting and Bridge Maintenance Projects Paid from 65XX Cost Centers	No
78	HR	Street Research Projects	No
79	IX	Interstate Substitution on Local Roads/Streets	Yes
8A	RRP	Railroad-Highway Crossings - Protective Devices or Hazard Elimination	Yes
8D	SBRC	State Bridge Replacement Fund on Local Secondary Roads	No

* Indicates State Non-Construction categories. For all other categories in Range 5, funding including match-funding is provided by local units of government (county or city).

Alpha-Numeric System Prefix	System Prefix Letter Code	Description	Federal-Aid Highway
8E	TBCG/TBNR	Timber Bridge	Yes
8F	SBRM	State Bridge Replacement Fund on City Streets	No
8H	HPR	For Office of Finance Use Only	Yes
8I	STP-ES	Statewide Enhancement	Yes
8J	BROS	Bridge Replacement on Off-System Roads	Yes
8K	BHM; NRT	Bridge Rehabilitation; National Recreation Trail	Yes
8L	RD&TT	For Office of Finance Use Only	Yes
8M	TAP, IV	For Office of Finance Use Only	Yes
8N	BRM	Bridge Replacement on FAUS	Yes
8P	AER	Combination Aeronautics Trust Fund	No
8Q	TCP	For Office of Finance Use Only	Yes
8R	ER	Emergency Relief	Yes
8V	STP-E	Regional Enhancement	Yes
8W	IVH, ETC	For Office of Finance Use Only	Yes
8X	M-MG	Combination of 81 and 82	Yes
8Y	CVIS	For Office of Finance Use Only	Yes
* 80	BG	Buildings and Grounds Facilities	No
81	M	Federal-Aid Urban System (FAUS)	Yes
82	MG	FAUS - 100% Federal Funds	Yes
83	ADC, ETC	For Office of Finance Use Only	Yes
84	CS	City Streets	No
85	CS-TSF	Combination of 84 and 92	No
86	STP-A	Iowa Clean Air Attainment Program (ICAAP)	Yes

* Indicates State Non-Construction categories. For all other categories in Range 5, funding including match-funding is provided by local units of government (county or city).

Alpha-Numeric System Prefix	System Prefix Letter Code	Description	Federal-Aid Highway
RANGE 6:		RISE PROGRAM (LOCALLY FUNDED) AND RECREATIONAL TRAILS	
9A	RC	RISE Projects on Local County Roads	No
9B	RCX	Combination of 9A with any or all of 16, 54 or 9D	No
9D	RM	RISE Projects on City Streets	No
9E	RMX	Combination of 9D with any or all of 16, 54 or 9A	No
9F	RM-M	Combination of 9D and 81	Yes
9G	NRT	National Recreational Trails	Yes
9H	RT	Recreational Trails	No
RANGE 7:		NON-HIGHWAY PROJECTS	
9I	ADCJ	Airport Development--Crack & Joint Repair--100% State Funding	No
9J	TR	Visual Track Inspection and Inspection Training	No
9L	FHWA-N	FHWA Grants - National	No
9M	CG	FTA Capital Grants, Section 16-B2	No
9N	NHTSA	NHTSA 402 Safety Projects	No
9P	ADA	Americans with Disabilities Act--Constructing Curb Ramps on City Streets	No
9R	RFA	Railway Finance Authority Assistance	No
9T	RAP	Rail Assistance Program	No
90	ADM	Administrative Project Assignments	No
91	ADPM	Airport Development--Pavement Markings--70% State Funding, 30% Local Funding	No
92	TSF	Traffic Safety Fund Improvements	No
93	RPT	Rural Public Transportation - Nonurbanized Area Public Transportation Program	No
94	CAPCITY	FTA Section 3	No
95	CRP	Comprehensive Railroad Planning	No
98	TS	FTA Technical Studies, Section 8 and 9	No

Appendix D

GLOSSARY OF TERMS & ACRONYMS

Term	*Definition or Meaning*
AME	Area Maintenance Engineer
AMM	Area Maintenance Manager
Archive	A procedure for transferring information from an on-line storage disk or memory area to an off-line storage medium. Archive also refers to long term storage for legal protection of the "state of the data" at specific points in time.
EDMS	Electronic Document Management System, or Engineering Drawing Management System
FHWA	Federal Highway Administration
Foldering	Storing documents in logical "folders." These folders are created by the system users to organize the documents in an RMS into meaningful groups for search and retrieval purposes
LAN	Local Area Network. A network designed to move data between stations within a campus.
LPA	Local Public Agency
LS	Local Systems Office
LTD	Live Test Demonstration
OfficeVision	Software product from IBM, OfficeVision/VM (OV/VM) provides a comprehensive set of office functions for the VM/ESA operating system. Provides users with electronic mail functions, document processing, calendar services, library services, and decision support tools.
Pilot Project Implementation Team	A group of Iowa DOT staff assembled for each pilot and tasked with managing the testing installation and implementation of a particular pilot project. The team will be composed of members of the RMT and Department personnel from areas affected by the pilot. The team will work in conjunction with the RMS Lab and Pilot Coordinator to represent the Department when dealing with the vendor to execute the pilot project. The team will have a Technical Support Team Member to assist in the performance of any technical task or oversight function.
RCE	Resident Construction Engineer
RE	Resident Engineer

Term	*Definition or Meaning*
RMS	Records Management System
RMT	Records Management Team
ROW	Right of Way
SME	Staff Maintenance Engineer
STIP	(Iowa) Statewide Transportation Improvement Program
TC	Transportation Center
TCCE	Transportation Center Construction Engineer
TCDE	Transportation Center Design Engineer
TCME	Transportation Center Maintenance Engineer
Version	One of a sequence of documents having the same general form and specific subject and purpose. The sequence often reflects successive changes to a document.
Version Control	A feature whereby multiple versions of a document (which can be created after repeated check-ins) are managed.
WAN	Wide Area Network. This is a network that spans a large geographic area relative to the office and campus environment of a LAN.
Windows 95	Windows 95, previously known as Windows 4.0 and code-named Chicago, is a 32-bit OS that integrates DOS and Windows.
Windows NT	Microsoft's New Technology is the company's 32-bit, multitasking operating system that includes peer-to-peer file sharing. Windows NT Server provides high-end networking services.