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Minnesota Intelligent Transportation Systems

Statewide Intelligent Transportation Systems As-Is Agency Reports for Minnesota

Volume 6
City of St. Paul

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Appendices

1. INTRODUCTION

The purpose of the Polaris Project is to define an Intelligent Transportation Systems (ITS) architecture for the state of Minnesota. An architecture is a framework that defines a complex system, in terms of a set of smaller, more manageable systems which are fully defined in terms of their individual boundaries, functions, physical components, and interfaces. They illustrate how each of the systems interrelate and contribute to the overall ITS objectives and requirements.

A well defined architecture provides many benefits for a complex system. It defines and optimizes the location of system functions. It identifies critical interfaces, and illustrates how associated systems can be integrated to share resources and information. It establishes standards for communications and physical components so that inter-operability can be maintained as the system evolves to incorporate new capabilities and technologies.

The Minnesota Statewide ITS Architecture is a tailored version of the National ITS Architecture. Tailoring incorporates the prioritized wants and needs of the state's transportation users and stakeholders, as well as its existing ITS infrastructure. The functional architecture, physical architecture, system requirements and implementation plan are fully documented in the following project deliverables:

ITS Traveler Wants/ Needs - Information obtained from Minnesota residents in ten end user sessions held across the state. Used to establish and prioritize end-user requirements.

ITS Transportation Wants/ Needs - Information obtained from ITS stakeholder institutions. Used to establish and prioritize ITS service provider requirements.

ITS Wants/ Needs Analysis - Final results and recommendations of the wants and needs research.

Statewide ITS As-Is Agency Reports for Minnesota - Information about existing transportation systems that establish the starting point for the Architecture Implementation Plan.

ITS System Specification - Incorporates the results of the functional and physical architectures into specification format. The specification will clearly identify ITS system level requirements for the identified Minnesota ITS services.

ITS Component Specification - Incorporates the results of the functional to physical allocation in specification format. The specification will clearly identify the Minnesota ITS component systems requirements.

ITS Architecture Implementation Plan - A recommended ITS deployment strategy for future state initiatives.

2. SCOPE

This document, *Statewide ITS As-Is Agency Reports for Minnesota*, consists of a collection of individual system survey reports related to transportation systems. The Polaris Project will use the survey information collected to derive the existing architectural framework. After the existing architectural framework is derived, this information will be used as the baseline for developing the Minnesota Statewide ITS Architecture.

Agencies identified and contributed to this document were:

- Minnesota Department of Transportation Office of Advanced Transportation Systems
- Minnesota Department of Transportation Traffic Management Center
- Minnesota Department of Transportation Metropolitan Division
- Minnesota Department of Transportation Electrical Services Section
- St. Paul Department of Public Works
- Minneapolis Department of Public Works
- Hennepin County Department of Public Works
- Ramsey County Department of Public Works
- Minnesota State Patrol
- Hennepin County Medical Center
- Metropolitan Council Transit Operations
- Metropolitan Airports Commission
- Gopher State One Call
- Minnesota Office of Tourism

2.1 Document Overview

This document presents the methods, assumptions and procedures used to collect the baseline information. The documentation of systems that were inventoried is presented in Section 3.

2.2 Methods, Assumptions, and Procedures

2.2.1 System Identification

Agency and system candidates were based upon several factors prior to survey. Through market research, the highest wants and needs priorities for traveler and transportation related agencies identified the functional areas to be improved (i.e. Travel Conditions). The Polaris Project took the functional wants and needs and associated the wants and needs functions to current Minnesota Agencies. Another factor that contributed to identifying the candidate agencies was the presence of existing Intelligent Transportation Systems infrastructure that has been deployed to support integrating open systems for travelers, inter-agency and intra-agency needs.

One hundred twenty one pre-survey candidate systems identified by the process described previously, are listed in Appendix A. The pre-survey candidate list represents systems that were known by members of the Polaris Architecture working team, Mn/DOT Guidestar, and SRF Consulting Group, Inc. Of the 121 candidate systems, 38 system surveys were performed and

included in this document. The 38 systems were selected as Abest representatives@ of the 121 pre-survey candidates and provided a diverse base of information to use for developing the Minnesota Statewide ITS Architecture.

2.2.2 Data Collection Guide

The survey of systems required that a standard data collection approach be applied for the *Statewide ITS As-Is Agency Reports for Minnesota*. A data collection guide was prepared to help this effort.

The data collection guide was developed to provide interviewers with an overview of relevant information that needed to be collected during the survey for each system. The data collection effort focused on the following:

- A block diagram of the system and interfaces to external users and systems.
- All hardware elements that are interconnected to form the bounds of the system.
- All software components used by the hardware elements.
- All system interfaces that connect hardware components together and external systems to the system.
- All personnel using the system.

The Data Collection Guide is presented in Appendix B.

2.2.3 Field Data Collection

The survey collection activities were completed by two teams of interviewers. Prior to an on-site interview, an agency or system contact person was briefed as to the nature of the survey. In some cases, generally where agencies knew little of the Polaris project, a follow-up letter was sent to further outline the desired level of information.

The on-site interview was generally a free format discussion of the specific system elements. The data collection guide was only used to ensure all components where discussed. The interviewers recorded the audio portion of the interview in order to help with the documentation of the system. Where possible, the actual system components were also recorded on videotape, again, to help with the system documentation. In some cases, written documentation from the agency was reviewed to help describe the system.

A report of the surveyed system followed a standard format and consisted of two basic parts: 1) a system block diagram and 2) a data collection template. The block diagram is intended to depict the system components and interfaces while the template thoroughly describes the system configuration. The template is organized to step through the system related personnel, hardware, software and interfaces. All systems documented for the project used this standardized approach. The system documentation was separated by agencies into eight volumes.

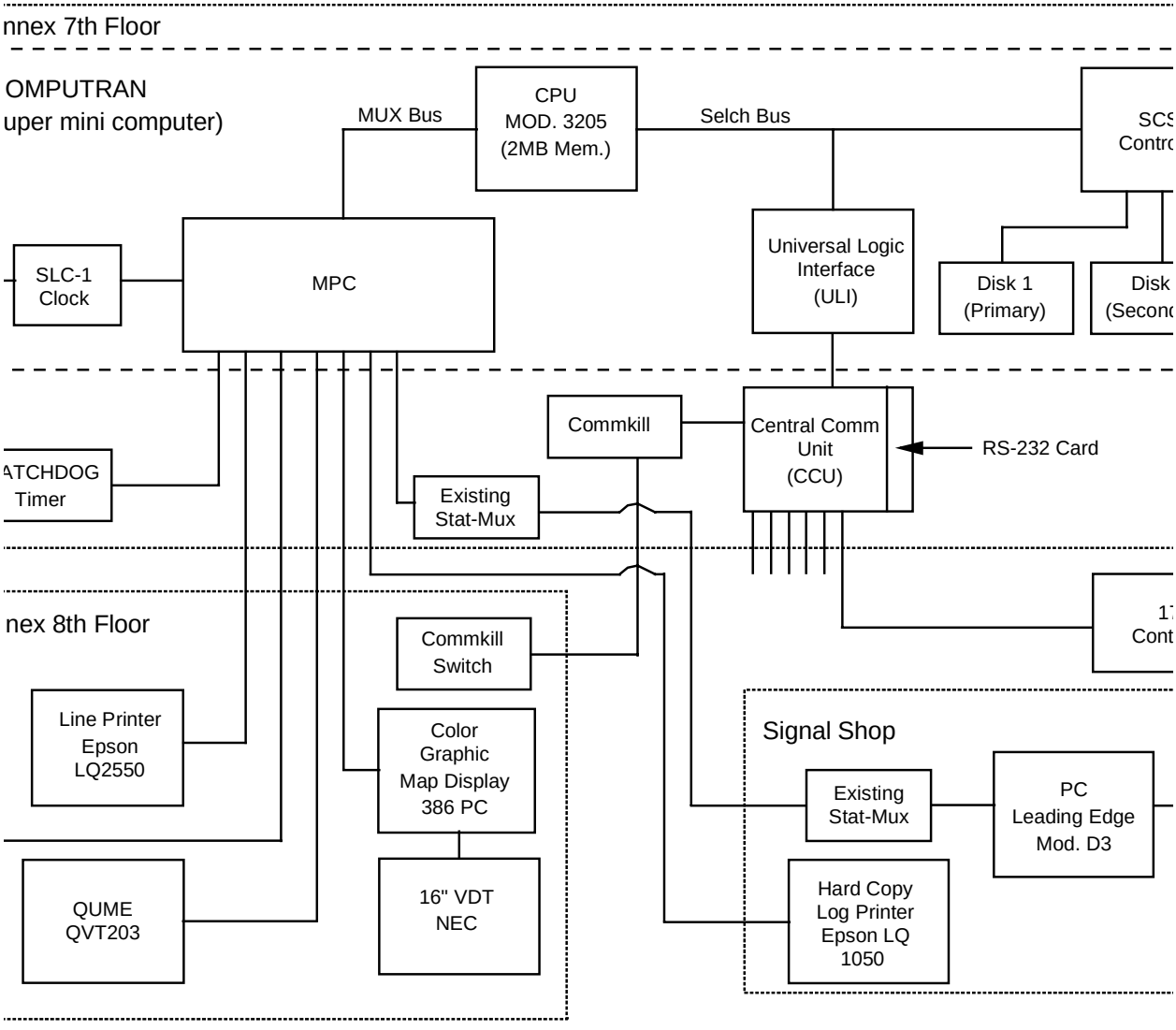
The system reports contained in this volume follow in Section 3.

3. AS-IS BASELINE SYSTEM DOCUMENTATION

3.6 CITY OF ST. PAUL

3.6.1 CITY OF ST. PAUL COMPUTRAN TRAFFIC SIGNAL CONTROL SYSTEM

ıseline Data Collection
ɔmputran Traffic Signal Control System



een 7th and 8th floor equipment are 125' RS-232 shielded cable

AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY ACITY OF SAINT PAUL@

- Agency Type	Department of Public Works/Traffic Division
- Agency Functions	Manage Traffic Operations and Data
- Agency Location(s)	Traffic Division 800 City Hall Annex 25 West Fourth Street Saint Paul, MN 55102-1660 Traffic signal lighting and sign maintenance office 899 North Dale Street Saint Paul, MN
- Contacts	Paul T. Kurtz, P.E. Ph (612) 266-6203 Fax (612) 298-4559

2.0 SYSTEM ACOMPUTRAN TRAFFIC SIGNAL CONTROL SYSTEM@

- Date of As-Is Data Collection	1/25/96
- Purpose	Provide central management of traffic control signal systems.
- Hours of Operation	24 hours/day - 2 intersections go to flash during late night hours.
- Geographic Coverage	Downtown St. Paul 115 traffic signals systems, 62 system vehicle loop detectors are controlled by the Computran system. A majority of the signals in the system are located in the downtown St. Paul area bordered by Kellogg Boulevard, John Ireland Boulevard, University Avenue, Wall Avenue, and Shepard Road. The system also controls signal systems on radial arterial streets from St. Paul Central Business District (CBD) including 7th Street on the east and west and Kellogg Boulevard. This system provides management control of the signals on city streets in the St. Paul CBD. The signal systems are partitioned into 7 sections of coordinated signal sub systems and 15 communication lines (maximum of 25 lines possible).
- Contacts	Paul Kurtz, City of St. Paul, Department of Public Works-Traffic Division, Field Engineering & Permits.
- Status	Existing
- Policies	The Dale St. shop has complete functional redundancy of the Computran management system.
- Constraints	1) Computran system limited to 250 intersections and 200 system vehicle loop detectors. 2) System is not very flexible or adaptable to integrate with new systems.

- Issues	Significant yearly maintenance agreement on Computran hardware and software (approximately $4500/yr.)
- Recommended Improvements	City will replace current Computran management computer system with a PC based system within one year. City will have the majority of the 350 total signal systems in the city under control of this new system. New system specifications are based on the system developed by Advanced Computing Technology (contact : Steve Fontaine) of Colorado Springs. New system will eliminate annual maintenance costs. New system may have some restrictions on access to source code, restrictions not known at this time because system has not been purchased. City to provide PC hardware. The new traffic control application software will use either Windows 95 or Windows NT operating system. The new application should provide better integration to other transportation-related systems and be more flexible. Plans for system installation to be completed by year end 1996.
- Block Diagram	See attached
- Typical Operational Scenario	(1) System monitors intersections for Emergency Vehicle Preemption events, communication failures, controller failures, system coordination errors. Operator can update/monitor intersection status from annex and maintenance facility. (2) System stores 4 timing plans used (AM peak, midday, PM peak, overnight) in all controllers. (3) System allows the City Traffic Engineer to create and store timing plans in the system.
- Other	Volume and occupancy data from the system vehicle loop detectors are not used for real time traffic responsive operation of the signal systems. The count data is used mainly for analysis and planning. There are 62 system loop detectors currently installed in the system. There are a total of 350 signalized intersections in all of St. Paul. The City also operates several closed loop signal system.

2.1 PERSONNEL ASYSTEM TRAFFIC ENGINEER@

- Personnel Function	Oversee operations and maintenance of downtown signal system, signal timing plans, operational tests, and other related duties.
- Quantity	1
- Location	City of Saint Paul, Department of Public Works, City Hall Annex
- Workload	40 hours/week - only part of time dedicated to Computran system. Workload depends on number of problems with system, the need to change or revise timing plans and the addition of any new intersections to system.
- Working Hours	7:00am-4:00pm
- Status	Existing
- Policies	All existing signal timing plans are done by St. Paul Department of Public Works. New signal systems design and timing plans are developed by consultants with Department of Public Works supervision.
- Contact	Paul T. Kurtz, P.E.

2.2 PERSONNEL ATECHNICIAN@

- Personnel Function	High level engineering technician. Assists in operating Computran system and performing analysis on collected data. This is likely a person with a technical degree and many years of experience with St. Paul signal systems and not a traffic engineer.
- Quantity	2
- Location	City of Saint Paul, Department of Public Works, City Hall Annex
- Workload	40 hours/week Only part of time dedicated to Computran system. Workload depends on number of problems with system, the need to change or revise timing plans and the addition of any new intersections to system.
- Working Hours	8:00am-5:00pm
- Status	Existing

2.3 PERSONNEL ATECHNICIAN@

- Personnel Function	High level engineering technician, will assist existing personnel with operation of new ITS systems, DIVERT and Advanced Parking Information System.
- Quantity	2
- Location	City of Saint Paul, Department of Public Works, City Hall Annex
- Workload	Will probably not work with Computran system, but will use DIVERT system and Advanced Parking Information System
- Working Hours	6:00am-6:30pm
- Status	Future employees, funded for 2 years, for ITS support.

3.1 HARDWARE ACOMPUTRAN@

- Hardware Type	Model 3205 (2MB mem) Super mini computer by Concurrent Computer Corporation
- Functions	Runs Computran traffic signal control software application.
- Location	City of St. Paul Annex
- Data Name/Contents	Signal timing plans(including min/max green time, walk time, clearance times, coordination parameters), counts(volume and occupancy).
- Data Type	Data
- Status	Existing
- Other	Can download new timing plans to 170 controller via Computran.

3.1.1 SOFTWARE ACOMPUTRAN@

- Software Type	Transportation software application
- Software Standards	Urban Traffic Control System (UTCS) was modified and called Modified Traffic Control System (MTCS).
- Functions	(1) Commands intersection controllers to use one of four previously downloaded signal timing plans. (2) Collects and stores volume and occupancy data from the 62 existing loop detectors via communication with 170 traffic controllers. (3) Monitors 170 traffic controller status for failures of timing plans, controllers, and communications. (4) Prints and displays reports. (5) Allows traffic engineer to create and store timing plans.
- Status	Existing
- Issues	Proprietary software. Expansion and flexibility limited for integrating with other systems.

3.1.2 SOFTWARE ACONCURRENT 3200 OPERATING SYSTEM@

- Software Type	Operating system
- Software Standards	Other
- Functions	Control Model 3205 CPU 1) Run software applications, manages disk space and memory. 2) Perform data backups. 3) Control hardware resources, printers, displays, and controllers.
- Status	Existing
- Policies	None

3.2 HARDWARE ACENTRAL COMMUNICATIONS UNIT (CCU) - Winkomatic@

- Hardware Type	Type 202 Modem
- Functions	Sends and receives data from intersection controllers.
- Location	St. Paul City Hall Annex-7th floor
- Data Name/Contents	Timing plans, traffic counts, and controller events.
- Data Type	Data
- Status	Existing
- Constraints	Each modem can connect to 10 intersection modems (250 intersection capacity of system).
- Contact	Paul T. Kurtz, P.E.
- Other	There are 25 Type 202 modems.

3.3 HARDWARE ASTATISTICAL MULTIPLEXERS@

- Hardware Type	Multiplexers
- Functions	Pre-determined sampling sequence of data from each intersection controller.
- Location	St. Paul City Hall Annex - 7th floor
- Data Name/Contents	Timing plans
- Data Type	Data
- Status	Existing
- Other	There are six multiplexers

3.4 HARDWARE ASLC-1 TIME CLOCK@

- Hardware Type	Clock
- Functions	Send time data to CPU. Centralized timing for all 170 traffic controllers to remain in coordination. NOTE: Safetran is a manufacturer of Type 170 controllers that the City of St. Paul uses.
- Location	St. Paul City Hall Annex - 7th floor
- Data Name/Contents	Time
- Data Type	Data
- Status	Existing
- Issues	Clock currently loses approximately 3 minutes of time per week and requires manual reset.
- Other	Clock has a battery backup.

3.5 HARDWARE AMODEL 6312 CONSOLE CRT@

- Hardware Type	Terminal/Workstation
- Functions	1) Displays system information. 2) Reports system events
- Location	St. Paul City Hall Annex - 7th floor
- Data Name/Contents	System information
- Data Type	Data
- Status	Improve

3.6 HARDWARE ACOMMKILL@

- Hardware Type	Communications Interrupter Device
- Functions	Disconnects all communications to Type 170 traffic controllers from Super mini computer when data is corrupted.
- Location	St. Paul City Hall Annex - 7th floor
- Data Name/Contents	None
- Data Type	None
- Status	Existing
- Other	The Commkill switch has never been used.

3.7 HARDWARE AWATCHDOG TIMER@

- Hardware Type	Timer/Clock
- Functions	Provides battery back-up time information.
- Location	St. Paul City Hall Annex - 7th floor
- Data Name/Contents	Time information.
- Data Type	Data
- Status	Existing
- Other	Provides time information after power failure and/or reboot.

3.8 HARDWARE AQUME QVT203 & CRT@

- Hardware Type	Terminal/Workstation
- Functions	1) Displays collected count and event information. 2) Displays current timing plans. 3) Receives input for creating timing plans. 4) May be used as a workstation to control operating system.
- Location	St. Paul City Hall Annex - 8th floor
- Data Name/Contents	System information (existing timing plans, event logs, traffic counts)
- Data Type	Data
- Status	Existing

3.9 HARDWARE ACOLOR GRAPHICS MAP DISPLAY UNIT@

- Hardware Type	PC 386 Leading Edge with 16@ VDT NEC
- Functions	Graphically displays intersection status in map format
- Location	St. Paul City Hall Annex - 8th floor
- Data Name/Contents	Real time intersection status: 1) Green status 2) Communication status 3) Preemption status 4) Detector status
- Data Type	Data
- Status	Existing

3.10 HARDWARE AEPSON PRINTER LQ 2550@

- Hardware Type	Printer
- Functions	Prints data
- Location	St. Paul City Hall Annex - 8th floor
- Data Name/Contents	Intersection Controller/traffic count data
- Data Type	Data
- Status	Existing

3.11 HARDWARE AO/S LOG PRINTER@

- Hardware Type	Printer
- Functions	Prints data
- Location	St. Paul City Hall Annex - 8th floor
- Data Name/Contents	System event/error data which include: 1) Communication errors 2) Controller failures 3) Emergency vehicle preemption events 4) Coordination errors (when timing plans don=t match-Computran versus 170 controller)
- Data Type	Data
- Status	Existing

3.12 HARDWARE AREMOTE COMMKILL SWITCH@

- Hardware Type	Switch
- Functions	Enables communication interrupter device which disconnects all communications to Type 170 traffic controllers from Super mini computer when data is corrupted
- Location	St. Paul City Hall Annex - 8th floor
- Data Name/Contents	None
- Data Type	None
- Status	Existing
- Other	The Commkill switch has never been used

3.13 HARDWARE APC: LEADING EDGE MODEL D3@

- Hardware Type	PC
- Functions	1) Displays collected count and event information. 2) Displays current timing plans. 3) Receives input for creating timing plans. 4) May be used as a workstation to control operating system.
- Location	City of St. Paul Signal Shop
- Data Name/Contents	System operation/status data
- Data Type	Data
- Status	Existing

3.14 HARDWARE AEPSON PRINTER LQ 1050@

- Hardware Type	Printer
- Functions	Prints data
- Location	City of St. Paul Signal Shop
- Data Name/Contents	Intersection Controller/traffic count data
- Data Type	Data
- Status	Existing

3.15 HARDWARE ALOG PRINTER EPSON LQ 1050@

- Hardware Type	Printer
- Functions	Prints data
- Location	City of St. Paul Signal Shop
- Data Name/Contents	System event/error data which include: 1) Communication errors 2) Controller failures 3) Emergency vehicle preemption events 4) Coordination errors (when timing plans don=t match-Computran versus 170 controller)
- Data Type	Data
- Status	Existing

4.1 INTERFACE	CPU
- Connects to ...	QUME - QVT 203 CRT Traffic system
- Interface location	St. Paul City Hall Annex - 7th/8th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	System data
- Information Direction	Both
- Information Frequency	Continuous

4.2 INTERFACE	CPU
- Connects to ...	QUME - QVT 203 terminal
- Interface location	St. Paul City Hall Annex - 7th/8th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	System data System information (existing timing plans, event logs, traffic counts).
- Information Direction	Both

- Information Frequency	Continuous

4.3 INTERFACE	CPU
- Connects to ...	Line printer LQ -2550
- Interface location	St. Paul City Hall Annex - 7th/8th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	Database of timing plans and traffic counts
- Information Direction	Output
- Information Frequency	On demand

4.4 INTERFACE	Model 6312 Console CRT
- Connects to ...	O/S Log printer (not specified)
- Interface location	St. Paul City Hall Annex - 7th/8th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	Event reports, system errors
- Information Direction	Output
- Information Frequency	On event occurrence

4.5 INTERFACE	CPU
- Connects to ...	386 PC Leading Edge-Color graphics display
- Interface location	St. Paul City Hall Annex - 7th/8th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	System status
- Information Direction	Both
- Information Frequency	Continuous

4.6 INTERFACE	SLC-1 Clock
- Connects to ...	Model 6312 Console CRT
- Interface location	St. Paul City Hall Annex - 7th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	System event/error data which include: 1) Communication errors 2) Controller failures 3) Emergency vehicle preemption events 4) Coordination errors (when timing plans don=t match-Computran versus 170 controller)
- Information Direction	Both
- Information Frequency	Continuous

4.7 INTERFACE	Central Communications Unit (CCU)
- Connects to ...	Type 170 intersection controller
- Interface location	St. Paul City Hall Annex - 7th floor to each intersection (in field)
- Interface Type	Data
- Interface Direction	Both
- Interface Component	Type 200 Modem at CCU / Type 400 Modem at Type 170 controller connected with twisted pair cable
- Protocol/Standard	RS-232
- Information Type/Content	Information to/from intersection controller/loops (signal timing data, intersection status, event information, detector count information)
- Information Direction	Both
- Information Frequency	Continuous

4.8 INTERFACE	CPU
- Connects to ...	Epson Log Printer LQ 1050
- Interface location	St. Paul City Hall Annex / Signal Shop
- Interface Type	Data
- Interface Direction	Output
- Interface Component	Twisted pair
- Information Type/Content	Event reports, system errors
- Information Direction	Output
- Information Frequency	On event occurrence

4.9 INTERFACE	CPU
- Connects to ...	Existing Statistical Multiplexor
- Interface location	St. Paul City Hall Annex - 7th floor
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232
- Information Type/Content	System information
- Information Direction	Both
- Information Frequency	Continuous

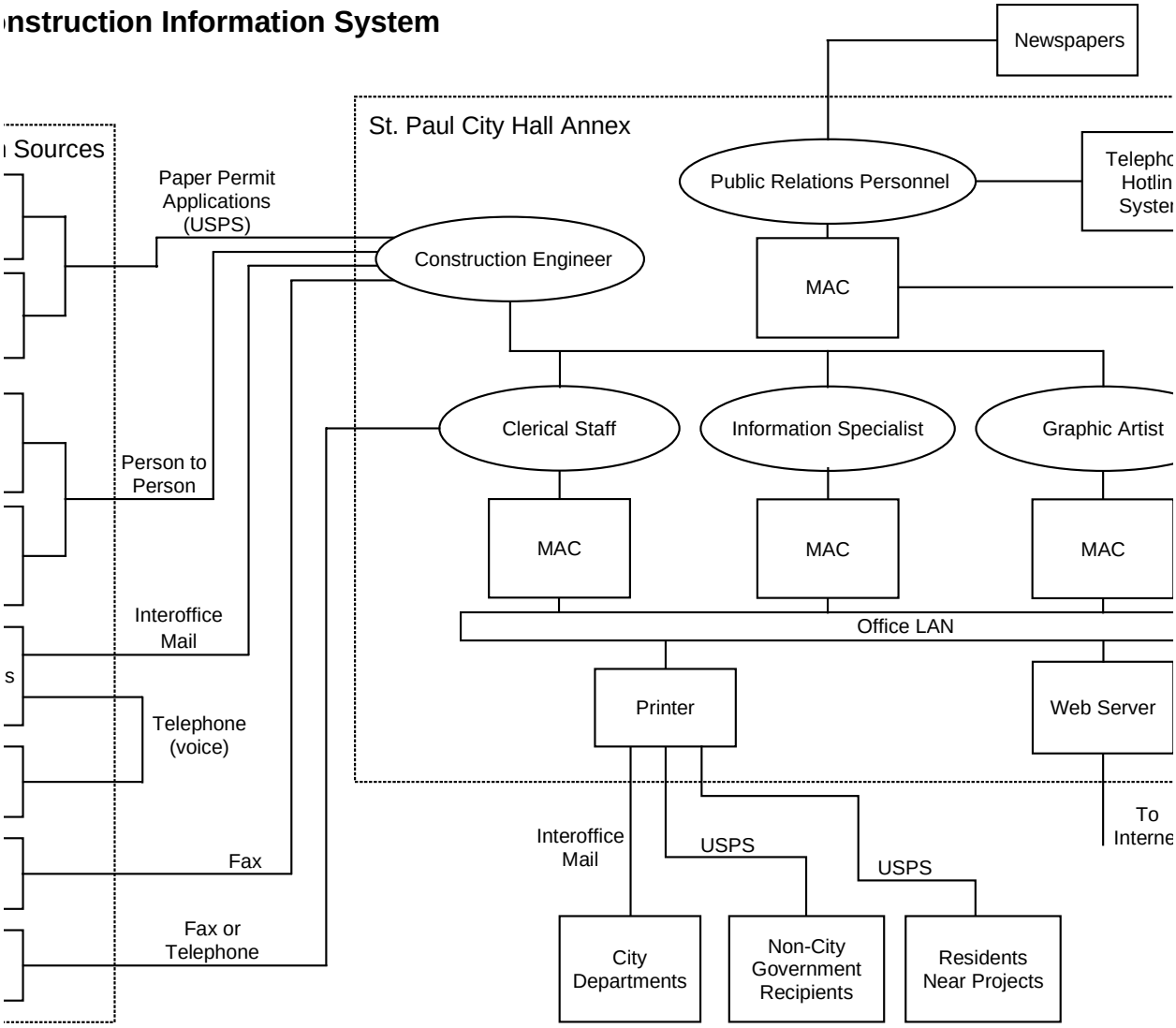
4.10 INTERFACE	Existing statistical multiplexor - Annex
- Connects to ...	Existing Statistical Multiplexor - Signal Shop
- Interface location	St. Paul City Hall Annex
- Interface Type	Data
- Interface Direction	Both
- Interface Component	Twisted pair
- Information Type/Content	System information
- Information Direction	Both
- Information Frequency	Continuous

4.11 INTERFACE	Existing Statistical Multiplexor
- Connects to ...	PC Leading Edge Model D3
- Interface location	City of St. Paul Signal Shop
- Interface Type	Data
- Interface Direction	Both
- Interface Component	RS-232 Serial
- Information Type/Content	System information
- Information Direction	Both
- Information Frequency	Continuous

4.13 INTERFACE	PC Leading Edge Model D3
- Connects to ...	Epson printer LQ 1050
- Interface location	City of St. Paul Signal Shop
- Interface Type	Data
- Interface Direction	Output
- Interface Component	Parallel cable
- Information Type/Content	Database of timing plans and traffic counts
- Information Direction	Output
- Information Frequency	On demand

3.6.2 CITY OF ST. PAUL CONSTRUCTION INFORMATION SYSTEM

seline Data Collection
nstruction Information System



AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY ACITY OF ST. PAUL@

- Agency Type	City Government (Public Works Division)
- Agency Location(s)	Office of Director 600 City Hall Annex 25 West Fourth Street St. Paul, MN

2.0 SYSTEM AST. PAUL CONSTRUCTION INFORMATION SYSTEM@

- Date of As-Is Data Collection	February 5, 1996
- Purpose	Collect information regarding construction within City of St. Paul Limits and provide that information to various entities.
- Geographic Coverage	St. Paul City Limits
- Contacts	Larry H. Lueth (612) 266-6083 (voice) (612) 292-6315 (fax)
- Status	Existing
- Block Diagram	See attached
- Typical Operational Scenario	Information regarding the location (avenue A from street B to street C), approximate date, and, in some cases, the nature of the construction taking place is gathered and incorporated into maps that indicated the area of the project (see attached). These maps are distributed to all city government departments, offices of all city council representatives, local newspapers, and residents who live in areas near the construction project. The annual maps are also made available through the City of St. Paul=s Home Page on the World Wide Web (http://www.stpaul.gov/). During the summer construction season, the individual projects are regularly inspected by city personnel and reports are made to Construction Division clerical staff who format the information into a weekly report which is sent to City Departments, Ramsey County, and to a Public Relations staff person, who asses the impact of construction and includes the most significant ones on a road construction hotline service. Information for these reports is also obtained through interoffice mail from the Traffic Control Division, from attendance at project specific preconstruction meetings by Construction Division Engineers, and from reviews of construction permit applications from utilities.

2.1 PERSONNEL ACONSTRUCTION ENGINEER@

- Personnel Function	Contract administration, attend preconstruction meetings, communicate with other City Departments.
- Quantity	1
- Location	City Hall Annex, 9th Floor
- Status	Existing
- Contact	Larry Lueth

2.2 PERSONNEL APUBLIC RELATIONS PERSONNEL@

- Personnel Function	Analyze Weekly Construction Updates and record outgoing messages for inclusion on Road Construction Hotline, input information for WWW availability.
- Quantity	1
- Location	City Hall Annex, 6th Floor
- Workload	Unknown, but not full time on this system
- Status	Existing
- Contact	Joanne Puankers 266-6147

2.3 PERSONNEL ACLERICAL STAFF@

- Personnel Function	Receive information from field inspectors and Construction Engineer; Format information into Weekly Report form; Distribute report according to distribution list
- Quantity	1-2
- Location	City Hall Annex, 9th Floor
- Workload	Unknown, but not full time on this system. This appears to be a relatively small portion of the clerical staff-s responsibility.

2.4 PERSONNEL AINFORMATION SPECIALIST@

- Personnel Function	Insert Annual maps into appropriate web pages.
- Quantity	1
- Location	City Hall Annex, 6th Floor
- Workload	Unknown, but not full time on this system.

2.5 PERSONNEL AGRAPHIC ARTIST@

- Personnel Function	Creates annual maps for inclusion on web pages from a stock base map and information provided by Construction Engineer
- Quantity	1
- Location	City Hall Annex, 9th Floor
- Workload	Unknown, but not full time on this system.

3.1 HARDWARE AAPPLE MACINTOSH@

- Hardware Type	Desktop Personal Computer
- Functions	Used to update information on WWW Server for Construction Home Page
- Location	City Hall Annex
- Data Name/Contents	Locations (as street addresses), dates and descriptions of construction projects. Maps showing the location of projects.
- Data Type	Data
- Status	Existing

3.1.1 SOFTWARE AHTML EDITOR@

- Software Type	Hypertext markup language editor used to create and update the information on the World Wide Web server. No other information was available

3.1.2 SOFTWARE AMAC OS@

- Software Type	Operating System

3.2 HARDWARE ATELEPHONE HOTLINE SYSTEM (266-ROAD)@

- Hardware Type	Automated telephone answering system with single outgoing message
- Functions	Supplies callers with a brief summary of selected construction projects and suggested alternate routes
- Location	City Hall Annex
- Data Name/Contents	Locations of major construction projects given as street names, approximate status (i.e. nearing completion), and suggested alternate routes.
- Data Type	Outgoing voice message (no interaction)
- Status	Existing

3.3 HARDWARE AAPPLE MACINTOSH@

- Hardware Type	Desktop Computer
- Functions	Word processing to create weekly construction update reports in a standard format.
- Location	City Hall Annex
- Data Name/Contents	See attached example
- Data Type	Text
- Status	Existing

3.4 HARDWARE AAPPLE MACINTOSH@

- Hardware Type	Desktop Computer
- Functions	Access to St. Paul web server to allow map updates.
- Location	City Hall Annex
- Data Name/Contents	See attached example
- Data Type	Text
- Status	Existing

3.5 HARDWARE AAPPLE MACINTOSH@

- Hardware Type	Desktop Computer
- Functions	Create computer generated graphics
- Location	City Hall Annex
- Data Name/Contents	See attached example Maps are created by cropping a standard base map that has been created by the City of St. Paul and overlaying it with project info.
- Data Type	Graphics
- Status	Existing
- Other	This is a graphic, not a live piece of data (i.e. Arc/Info or AUTOCAD database)

3.7 HARDWARE ALASER PRINTER@

- Hardware Type	Laser printer output device
- Functions	Create hard copy of weekly reports for distribution to through interoffice and USPS mail
- Location	City Hall Annex
- Data Name/Contents	See attached example
- Data Type	Text
- Status	Existing

3.8 HARDWARE AWEB SERVER@

- Hardware Type	Workstation-Class micro-computer
- Functions	Serve HTML requests from Internet
- Location	City Hall Annex, 7th floor
- Data Name/Contents	See page at URL listed below
- Data Type	HTML/Graphics
- Status	Existing/on-line
- Contact	Domain Name: STPAUL.GOV Administrative Contact: Grittner, Dennis (DG41) dennis.grittner@STPAUL.GOV (612) 266-6095 Technical Contact, Zone Contact: Terveer, Derek (DT71) derek.terveer@STPAUL.GOV (612) 266-6092 Record last updated on 26-Aug-94. Record created on 27-Oct-86. Domain servers in listed order: BAMBI.STPAUL.GOV 199.86.16.38 NS.UU.NET 137.39.1.3
- Other	See http://www.stpaul.gov/public/works/ construction/1996/ projects/

4.1 INTERFACE	UTILITIES AND COMMUNICATIONS SERVICE PROVIDERS
- Connects to ...	Construction Engineer
- Interface location	N/A
- Interface Type	Paper Plan Sheets
- Interface Direction	Output
- Interface Component	USPS Mail
- Protocol/Standard	City of St. Paul Format (Covers borders and layout)
- Information Type/Content	Construction type, location (as street
- Information Direction	Output
- Information Frequency	As Needed

4.2 INTERFACE	PRECONSTRUCTION MEETINGS (ANNUAL AND PROJECT)
- Connects to ...	Construction Engineer
- Interface location	N/A
- Interface Type	Voice, text as notes
- Interface Direction	Output
- Interface Component	Person to person
- Protocol/Standard	N/A
- Information Type/Content	Construction type, location (as street
- Information Direction	Output
- Information Frequency	As Needed

4.3 INTERFACE	MN/DOT (THROUGH TRAFFIC CONTROL DIVISION)
- Connects to ...	Construction Engineer
- Interface location	City Hall Annex
- Interface Type	Hard copy text as memo
- Interface Direction	Output
- Interface Component	Interoffice Mail
- Protocol/Standard	N/A
- Information Type/Content	Construction type, location (as street
- Information Direction	Output
- Information Frequency	As Needed
- Other	This interface is generally used as a successor to a telephone between MN/DOT and the City of St. Paul Traffic Control Division. MN/DOT will communicate a need for traffic control in a project area, the Construction Division will be notified by Traffic Control.

4.4 INTERFACE	RAMSEY COUNTY
- Connects to ...	Construction Engineer
- Interface location	N/A
- Interface Type	Paper (Fax)
- Interface Direction	Output
- Interface Component	US West telephone service
- Protocol/Standard	N/A
- Information Type/Content	Second Season Construction Bulletin. Produced weekly by Ramsey County. See Ramsey County Construction

	Information Report
- Information Direction	Output
- Information Frequency	Weekly (Friday pm)
4.5 INTERFACE	FIELD INSPECTORS
- Connects to ...	Clerical Staff
- Interface location	N/A
- Interface Type	Voice as telephone call or text as fax
- Interface Direction	Output
- Interface Component	US West Telephone Service
- Protocol/Standard	N/A
- Information Type/Content	Updates on progress of specific construction projects.
- Information Direction	Output
- Information Frequency	Weekly
4.6 INTERFACE	INTEROFFICE PERSONAL COMMUNICATION
- Connects to ...	Construction Engineer, Public Relations Personnel, Clerical Staff, Information Specialist, Graphic Artist
- Interface location	City Hall Annex
- Interface Type	Person to Person communication as voice or hand-delivered hard copy
- Interface Direction	Both
- Interface Component	Person to Person
- Protocol/Standard	N/A
- Information Type/Content	Varies. In the case of communication between PR Personnel and Construction Engineer it is usually a voice communication to call attention to a specific project for inclusion in the telephone message system. Between Construction Engineer and Clerical Staff, it can take the form of either voice or hard copy notes to indicate information to be put into the weekly update document. Communication between the Construction Engineer and the Information Specialist is only on an as-needed basis and is not generally part of the weekly document creation process. This is also true for communication between the Construction Engineer and the Graphic Artist.
- Information Direction	Both
- Information Frequency	As needed

4.7 INTERFACE	OFFICE LAN
- Connects to ...	All computers in City Hall Annex
- Interface location	City Hall Annex
- Interface Type	Data
- Interface Direction	Both
- Interface Component	Twisted Pair Cable
- Protocol/Standard	Ethernet
- Information Type/Content	Text and graphics describing the location, status and type of projects to be included on the weekly update and hotline.
- Information Direction	Both
- Information Frequency	As Needed

4.8 INTERFACE	Public Relations Personnel
- Connects to ...	Newspaper (St. Paul Pioneer Press)
- Interface location	City Hall Annex
- Interface Type	Voice
- Interface Direction	Both
- Interface Component	Telephone (US West)
- Information Type/Content	Information regarding projects, both upcoming and in-progress, also other information such as suggested alternate routes.
- Information Direction	Output
- Information Frequency	As Needed

4.9 INTERFACE	Public Relations Personnel
- Connects to ...	Telephone Message System
- Interface location	City Hall Annex
- Interface Type	Voice recorder
- Interface Direction	Output
- Interface Component	US West Telephone Service
- Information Type/Content	Updates on progress of specific construction projects, locations of projects as street names, suggested alternate routes
- Information Direction	Output
- Information Frequency	As Needed
- Other	The Hotline (266-ROAD) system contains information about any projects, regardless of which entity (State,

	County, City) is responsible for them as long as they impact St. Paul Traffic. General the 10 or 12 most significant projects are included in the Hotline report
4.10 INTERFACE	Telephone Message System
- Connects to ...	End Users
- Interface location	City Hall Annex
- Interface Type	Voice as pre-recorded message
- Interface Direction	Output
- Interface Component	US West Telephone Service (266-ROAD)
- Protocol/Standard	N/A
- Information Type/Content	Updates on progress of specific construction projects, locations of projects as street names, suggested alternate routes
- Information Direction	Output
- Information Frequency	On Demand/As Needed
- Other	See INTERFACE 4.9 entry
4.11 INTERFACE	CLERICAL STAFF MACINTOSH
- Connects to ...	Laser Printer
- Interface location	City Hall Annex
- Interface Type	Data
- Interface Direction	Output
- Interface Component	Apple Serial Printer Connection (RS-422?)
- Protocol/Standard	RS-422
- Information Type/Content	Weekly Project Report. See attached example.
- Information Direction	Output
- Information Frequency	On Demand/As Needed
4.12 INTERFACE	LASER PRINTER
- Connects to ...	City Department/ Council Members(See Attached List)
- Interface location	City Hall Annex
- Interface Type	Text hard copy
- Interface Direction	Output
- Interface Component	Interoffice mail
- Protocol/Standard	N/A
- Information Type/Content	Updates on progress of specific construction projects,

	locations of projects as street names, suggested alternate routes (see attached example)
- Information Direction	Output
- Information Frequency	Weekly
- Other	See attached distribution list

4.13 INTERFACE	LASER PRINTER
- Connects to ...	Non-City Government Recipients
- Interface location	City Hall Annex
- Interface Type	Text Hard copy
- Interface Direction	Output
- Interface Component	USPS
- Protocol/Standard	N/A
- Information Type/Content	Updates on progress of specific construction projects, locations of projects as street names, suggested alternate routes.
- Information Direction	Output
- Information Frequency	Weekly
- Other	See attached distribution list

4.14 INTERFACE	LASER PRINTER
- Connects to ...	Residents in project area
- Interface location	City Hall Annex
- Interface Type	Text Hard copy
- Interface Direction	Output
- Interface Component	USPS
- Protocol/Standard	N/A
- Information Type/Content	Letters and maps describing upcoming projects sent to affected residents
- Information Direction	Output
- Information Frequency	Weekly
- Other	See attached example

4.15 INTERFACE	Web Server
- Connects to ...	Internet
- Interface location	City Hall Annex
- Interface Direction	Both
- Information Type/Content	See URL http//www.stpaul.gov/publicworks/ construction/1996/projects/
- Information Direction	Both
- Information Frequency	As Needed/On Demand
- Other	See contacts listed for HARDWARE 3.8

APPENDIX A

As-Is Agency Reports
Pre-Survey Candidate Systems List

PRE-SURVEY CANDIDATE SYSTEMS

Traffic Signal Control Systems
- City of St. Paul Computran traffic signal control system
- City of St. Paul traffic signal intersection hardware (field equipment)
- City of Minneapolis Fortran traffic signal control system
- Mn/DOT Metro Division/District traffic office closed loop traffic signal system(s)
- County closed loop traffic signal systems (Hennepin, Ramsey, etc.)
- City closed loop traffic signal systems
- Video detection/control of signal system (T.H. 65 & 53rd, Lyndale and Franklin Ave)
- Pre-emption of traffic signals for emergency vehicles (EVP)
- Pre-emption of traffic signal at fire stations
- Pre-emption of traffic signals at railroad crossings (20 locations in Metro area)
- Minneapolis AUSCI operational test

Freeway Management System
- Mn/DOT TMC ramp meter system
- Mn/DOT TMC video surveillance system
- Mn/DOT TMC CMS control system
- KBEM radio broadcast system
- Mn/DOT TMC cable TV information system - (Triple Vision system)
- Mn/DOT Metro Division/District portable changeable message signs
- TMC traffic history database (volume and occupancy data)
- TMC incident log database
- U of M Autoscope incident detection system
- Genesis operational test
- Trilogy operational test
- Mn/DOT workzone traffic management system operational test

Transit Management Systems
- MCTO "Trapeze" scheduling/planning system (creates bus/driver schedules)
- MCTO "radio" system (computer assisted radio system, 7 channels)
- MCTO automatic passenger counters (on some buses)
- MCTO electronic fare collection boxes (on all buses)
- MCTO TIC BusLine system (voice responses system, customer service system)
- MCTO customer service system for route/schedule planning (live telephone operators)
- MCTO transportation section (provides construction information to MCTO)
- MCTO bus stop database (contains the attributes of each bus stop)
- MCTO Police crime/incident tracking system
- MCTO Opticom emitters (EVP on 80 buses)
- MCTO speed light system (ramp meter pre-emption on selected ramps)
- MCTO Route-O-Matic system - vectors around incidents and congestion
- Metropolitan Council Rideshare system (Mn dial-a-ride)
- MCTO funded paratransit systems
- Metropolitan Council Metro Mobility passenger registration system
- Metropolitan Council Metro Mobility passenger reservation system
- U of M transit management
- Southwest Transit
- Minnesota Valley Transit
- Plymouth Metrolink
- School bus dispatch systems

Incident Management Program
- Mn/DOT TMC Highway Helper program (including AVL system)
- Private tow contracts
- U of M police incident management
- St. Paul DIVERT operational test

Electronic Fare Payment Systems
- City of Minneapolis Parking fare collection (smart card)
- City of Minneapolis electronic parking meter maid system
- Smart Darts operational test

PRE-SURVEY CANDIDATE SYSTEMS (CONTINUED)

Electronic Toll Collection Systems
- Toll road proposals (5 proposals in MN)
- Congestion Pricing Study
- Mileage based tax study

Multi modal Traveler Information Systems
- Travlink operational test

Administrative Systems
- Mn/DOT Electrical Services maintenance management system
- Mn/DOT Electrical Service gopher state one-call access system
- Mn/DOT TIS
- Mn/DOT automatic traffic recorder system
- Mn/DOT ISTEA management systems
- Mn/DOT CVO administrative systems
- DPS CVO administrative systems
- City of Minneapolis sign database

Other Information Systems
- Airline flight arrival/departure information - NW
- Airport rental car kiosk - Hertz
- MN Office of Tourism travel information center kiosks
- Mn/DOT TMC road weather information system access
- Mn/DOT Metro Division weather information access
- Mn/DOT Aeronautics weather information system
- Mn/DOT statewide road weather information telephone information
- Mn/DOT Pavement Condition and Weather Reporting System - future
- Internal distribution system Distribution of TMC loop data via the Internet
- RWIS - Mn/DOT future Road/Weather Information System

Emergency Response Systems
- Motorist call box system
- Mobile Data Terminals (MDT) in all State Patrol cars
- Laptop PC's in State Patrol cars to replace MDT's - pilot project in 1996
- Emergency 911 log system at State Patrol
- State Patrol information desk
- State Patrol South St. Paul information desk
- State Patrol access to drivers license information. via 911 center
- Mn/DOT Mayday operational test
- Demand response dispatch systems - numerous standalone systems

Parking Management Systems
- Metropolitan airports commission parking management
- City of Minneapolis parking management systems
- U of M parking management
- St. Paul Advanced Parking Information System operational test

Miscellaneous
- Mn/DOT portable traffic management system
- City of Minneapolis police special event management
- City of St. Paul special event management
- U of M special event management
- Mn/DOT pilot differential GPS broadcast base station
- Mn/DOT maintenance vehicle AVL
- Mn/DOT Metro Division/District maintenance dispatch
- Hennepin County Medical Center emergency vehicle dispatch
- MN Pollution Control Agency air quality monitoring sites
- Met. Council Forecasting models - uses data from Mn/DOT TIS database
- U of M traffic management system proposal

Interagency Systems
- ICTM - Integrated Corridor Traffic Management System operational test (includes Autoscope)
- ARCTIC - operational test in Virginia, MN

PRE-SURVEY CANDIDATE SYSTEMS (CONTINUED)

CVO Systems
- List of systems from MN Guidestar
- CVO call-in number
- State Patrol toll free Information number

Construction Information/Notification Systems
- Gopher State One Call system for utility locations
- Mn/DOT construction information dissemination
- Counties' systems (Hennepin County)
- Counties' systems (Ramsey County)
- City system (Minneapolis)
- City system (St. Paul)
- Utilities' systems

Communications Systems
- Mn/DOT TMC Fiber optic data communications system
- Mn/DOT Microwave Communication System
- Mn/DOT T1 system
- Mn/DOT Wide Area Network
- MNET (STARS)
- Voice radio - State Patrol, Mn/DOT Maintenance, DNR
- 800 MHZ Trunked Radio system (Metro area)
- Internet Communications
- Traffic Signal Interconnect systems
- RBDS - Radio Broadcast Data Systems
- Mn/DOT Video Conferencing

APPENDIX B

As-Is Agency Reports
Data Collection Guide

APPENDIX C

As-Is Agency Reports
System Documentation Attachments