

**Minnesota Statewide Regional ITS Architecture  
and Systems Engineering Checklist for CLASS A:  
STANDARD ITS APPLICATION - TRAFFIC SIGNALS  
FHWA Final Rule 940 and FTA National ITS Architecture Policy**

For all ITS projects or projects with an ITS component, a Systems Engineering Checklist shall be completed and submitted with the Project Submittal Form. For questions regarding the completion of this checklist contact Rashmi Brewer, P.E. – MnDOT Office of Connected & Automated Vehicles (CAV-X) at 651-234-7063 or e-mail at [Rashmi.Brewer@state.mn.us](mailto:Rashmi.Brewer@state.mn.us).

**Fiber Optic Signal Interconnect, CCTV Camera, and Flashing Yellow Arrow  
Upgrades**

*(see Class B-2 Checklist for Fiber Optic Signal Interconnect and CCTV Cameras)*

**SECTION 1 – Project Information**

**1.1 CONTACT PERSON (e.g. PROJECT MANAGER)**

Name/Title: Kristi Sebastian, Traffic Engineer

Agency: Dakota County Transportatic

Signature: 

Date: 3-5-19

Email: kristi.sebastian@co.dakota.mn.us

Phone: (952) 891-7178

**1.2 PROJECT LIMITS, SIGNAL SYSTEM ID AND DESCRIPTION** *(List all. Attach additional sheet if needed)*

CSAH 26 from CSAH 31 to Neil Armstrong Boulevard:

- CSAH 26 & CSAH 31
- CSAH 26 & Eagandale Boulevard
- CSAH 26 & I-35E West Ramp
- CSAH 26 & I-35E East Ramp
- CSAH 26 & CSAH 43
- CSAH 26 & Neil Armstrong Boulevard

CSAH 28 from Blue Cross Road to CSAH 43

- CSAH 28 & Blue Cross Road / Heritage Lane
- CSAH 28 & Coachman Road
- CSAH 28 & Federal Drive / Central Parkway
- CSAH 28 & Washington Drive
- CSAH 28 & CSAH 31
- CSAH 28 & I-35E West Ramp
- CSAH 28 & Denmark Avenue
- CSAH 28 & Promenade Avenue

**1.3 PROJECT NUMBER**

1.3A Federal Project Number: CMAQ 1919(155)

1.3B State/Local Project or Permit Number:

CP 26-56 (SP 019-030-008)

- CSAH 28 & CSAH 43

CSAH 31 from CSAH 30 to CSAH 26

- CSAH 31 & CSAH 30
- CSAH 31 & Deerwood Drive
- CSAH 31 & Wescott Road
- CSAH 31 & Duckwood Drive
- CSAH 31 & I-35E South Ramp
- CSAH 31 & I-35E North Ramp
- CSAH 31 & CSAH 28
- CSAH 31 & Central Parkway / Northwood Parkway
- CSAH 31 & CSAH 26

CSAH 43 from Wescott to CSAH 26

- CSAH 43 & Wescott Road
- CSAH 43 & Duckwood Drive
- CSAH 43 & CSAH 28
- CSAH 43 & Northwood Parkway
- CSAH 43 & Clubview Drive
- CSAH 43 & CSAH 26

Status:  New  Replace

#### 1.4 PROJECT SCHEDULE

Letting Date: August 6, 2019

Anticipated Start Date: September 17, 2019

#### 1.5 NATURE OF WORK (Check all that apply)

- |  |  |   |   |
|--|--|---|---|
| <input type="checkbox"/> Scoping                 | <input type="checkbox"/> Design                        | <input type="checkbox"/> Software/Integration | <input checked="" type="checkbox"/> Construction          |
| <input type="checkbox"/> Operations & Management | <input type="checkbox"/> Evaluations                   | <input type="checkbox"/> Planning             | <input checked="" type="checkbox"/> Equipment Replacement |
| <input type="checkbox"/> Research & Development  | <input type="checkbox"/> Others (Please Specify) _____ |   |   |

#### 1.6 PROJECT FEATURES AND ITS APPLICATIONS (Check all that apply)

Traffic Signal Features for Project Site(s):

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Basic Traffic Signal                  | <input checked="" type="checkbox"/> Flashing Yellow Arrow       | <input type="checkbox"/> Advanced Warning Flasher   |
| <input type="checkbox"/> Railroad Preemption                   | <input type="checkbox"/> Emergency Vehicle Preemption*          | <input type="checkbox"/> Transit Signal Priority*   |
| <input type="checkbox"/> Pedestrian Countdown Signal           | <input type="checkbox"/> Accessible Pedestrian Signal           | <input type="checkbox"/> Vehicle Presence Detection |
| <input type="checkbox"/> Enforcement Lights (e.g. Blue Lights) | <input checked="" type="checkbox"/> Traffic Signal Interconnect |   |

*Note: High Resolution (e.g. Smart Signal) is not covered by this standard application. Please use Class B-2: Arterial Traffic Management or Class C: Large Scale/Complex ITS Projects Checklist.*

*\* This checklist applies to emergency vehicle preemption (EVP) and transit signal priority (TSP) that is controlled at an intersection level without traffic control center oversight. For systems with traffic control center oversight, please use Class B-2: Arterial Traffic Management Checklist.*

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### 1.7 SYSTEMS ENGINEERING DOCUMENTATION

A programmatic Systems Engineering analysis has been developed for this application. A Concept of Operations and a Functional Requirements document are available as references and **shall be reviewed for consistency** at <http://www.dot.state.mn.us/its/projects/2006-2010/systemsengforstandarditsapplications.html>.

Standard Traffic Signal Systems Engineering documents (i.e. Concept of Operations and Functional Requirements) have been reviewed, and the project is consistent with these documents.

Or,

If the project is not entirely consistent with the standard Systems Engineering documents, a project specific concept of operations and/or functional requirements will be developed using the standard Systems Engineering documents as a base. Contact the MnDOT Office of Connected & Automated Vehicles (CAV-X) contact person listed at top of page 1 for guidance and assistance.

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### 1.8 RELATIONSHIP TO OTHER PROJECTS AND PHASES

Please list any construction and tied projects.

**Project Title**

**Project Number**

N/A

N/A

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## SECTION 2 – Regional Architecture Assessment

### 2.1 PROJECT IS INCLUDED IN THE MINNESOTA STATEWIDE REGIONAL ARCHITECTURE

(Refer to *ITS Initiatives and Project Concepts for Implementation, Sections 4.3 and 4.4 of the Implementation Volume, Minnesota Statewide Regional ITS Architecture, 2018*, <http://www.dot.state.mn.us/its/projects/2006-2010/mnitsarchitecture/>)

Yes  No

If "No", please list additional ITS devices, features, and/or functions that are not listed in **1.6** and send a copy of the complete checklist via email to the MnDOT Office of Connected & Automated Vehicles (CAV-X) contact person listed at top of page 1.

\_\_\_\_\_

If "Yes", Project ID (from *ITS Implementation Projects*): S07, S14

Is the project consistent with the description in the Architecture?  Yes  No

If "No", please summarize the differences below and send a copy of the complete checklist via email to the MnDOT Office of Connected & Automated Vehicles (CAV-X) contact person listed at top of page 1.

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### 2.2 TRAFFIC SIGNAL DATA COLLECTION AND SHARING

Please use the table below to provide the following information:

- (1) Operational data obtained from the system
- (2) Frequency of obtaining the data (e.g. every 5 minutes, daily, weekly, monthly, etc.)
- (3) Purpose(s) of obtaining the data,
- (4) Is the data archived, and
- (5) Who do you share the data with? (e.g. MnDOT RTMC, U of M Traffic Observatory, etc.)

The list below is not a complete list. Please add additional data and rows to the list as appropriate.

<b>Data Obtained</b>	<b>Frequency of Obtaining Data</b>	<b>Purposes (Check all that apply)</b>	<b>Is Data Archived?</b>	<b>Data Sharing Partners</b>
Controller Status (for example, mode of operation, timing plan changes, timing verification, faults, malfunctions, failures, conflicts, maintenance calls, event logs, alarms)	<input checked="" type="checkbox"/> ≤ 5 min <input type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Monitoring and Control <input checked="" type="checkbox"/> Operational Analysis <input checked="" type="checkbox"/> Planning Analysis <input checked="" type="checkbox"/> Performance Reporting <input type="checkbox"/> Other (please specify):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	MnDOT Signals
Timing Plan Data (for example, cycle length, phasing, splits, offsets, Ped. times)	<input checked="" type="checkbox"/> ≤ 5 min <input type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Monitoring and Control <input checked="" type="checkbox"/> Operational Analysis <input checked="" type="checkbox"/> Planning Analysis <input checked="" type="checkbox"/> Performance Reporting <input type="checkbox"/> Other (please specify):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	MnDOT Signals
Detector Data (other than presence detection. For example, traffic counts, vehicle classifications)	<input checked="" type="checkbox"/> ≤ 5 min <input type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Monitoring and Control <input type="checkbox"/> Operational Analysis <input type="checkbox"/> Planning Analysis <input type="checkbox"/> Performance Reporting <input type="checkbox"/> Other (please specify):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

### 2.3 ITS STANDARDS *(For information only)*

Applicable ITS Standards for traffic signal projects may include:

- ITE TMDD 3.1: Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)
- NTCIP Center-to-Field Group
- NTCIP 1201: Global Object Definitions
- NTCIP 1202: Object Definitions for Actuated Traffic Signal Controller (ASC) Units
- NTCIP 1206: Object Definitions for Data Collection and Monitoring (DCM) Devices
- NTCIP 1209: Data Element Definitions for Transportation Sensor Systems (TSS)
- NTCIP 1210: Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters
- NTCIP 1211: Object Definitions for Signal Control and Prioritization (SCP)
- ASTM E2468-05: Object Definitions for Signal Control and Prioritization (SCP)
- ASTM E2665-08: Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data
- IEEE 1570-2002: Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection

General information on ITS Standards can be found at <http://www.standards.its.dot.gov/>.

\*Minnesota Standards are listed in Section 10 of Volume 13, *Minnesota Statewide Regional ITS Architecture, 2018* as generated by RAD-IT.

### SECTION 3 – Procurement

#### 3.1 PROCUREMENT METHODS *(Check all that apply)*

- Construction Contract
- Professional Technical Services Contract/Agreement
- Joint Powers Contract/Agreement
- Interagency Contract/Agreement
- Work Order Contract/Agreement
- Commodities Contract
- Purchase Order (State/Local Furnish)
- Other \_\_\_\_\_

Comments:

### SECTION 4 – Operations and Management Commitment

#### 4.1 ESTIMATED ANNUAL OPERATIONS AND MANAGEMENT COSTS

*(O&M cost for each traffic signal is approximately \$1,700 to \$2,100 per year (in 2015 dollars). Source: USDOT ITS Joint Program Office Costs Database, <https://www.itscosts.its.dot.gov/its/benecost.nsf/CostHome>)*

##### DAKOTA COUNTY SIGNALS

\$1,650 per signal per year X 21 signals = \$64,650 per year

##### MNDOT SIGNALS

\$1,650 per signal per year X 5 signals = \$8,250 per year

Note: All signals are existing signal systems that are being upgraded which already have resources dedicated to management, operations, and maintenance.

### SECTION 5 - Approval

#### **APPROVAL (Refer to page 7 of the HPDP ITS Systems Engineering Requirement for a list of approval agencies)**

I certify that to the best of my knowledge all of the information on this checklist is accurate. I acknowledge that I am aware of the requirements set forth in the HPDP – ITS Systems Engineering for this project.

Name/Title: Jacob Folkeringa, Project Manager

Signature: 

Email: jfolkeringa@srfconsulting.com

Agency: SRF Consulting Group

Date: 3/5/2019

Phone: (763) 452-4730

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**REVIEWED FOR COMPLIANCE WITH STATE AND FEDERAL RULES/POLICY, AND APPROVED FOR FEDERAL AID FUNDING**

Name/Title: Cathy Huebsch,  
District Federal Aid Engineer

Agency: MnDOT - Metro District

Signature: 

Date: 3/7/2019

Telephone: 651-234-7766

Email: cathy.huebsch@state.mn.us

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