

**Minnesota Statewide Regional ITS Architecture  
and Systems Engineering Checklist for  
CLASS B-2: ARTERIAL TRAFFIC MANAGEMENT  
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 Traffic, Safety and Technology at 651-234-7063 or e-mail at [Rashmi.Brewer@state.mn.us](mailto:Rashmi.Brewer@state.mn.us).

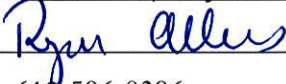
**Advanced Traffic Management System  
on CSAH's 17, 61, 81, 130 and 152  
(Enter project name or type)**

**SECTION 1 – Project Information**

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

Name/Title: Ryan Allers, Project Manager

Agency: Hennepin County Public Works

Signature: 

Date: 7/5/2017

Telephone: 612-596-0396

Email: ryan.allers@hennepin.us

**1.2 PROJECT LOCATION (list all)**

**CSAH 17: from CSAH 1 to TH 62  
(21 intersections)**

**CSAH 61: from Sherwood Place to CSAH 130  
(26 intersections)**

**CSAH 81: from Abbott Avenue to 63<sup>rd</sup> Avenue  
(12 intersections)**

**CSAH 130: from CSAH 30 to CSAH 81  
(18 intersections)**

**CSAH 152: from CSAH 81 to Kentucky Avenue  
(4 intersections)**

**1.3 PROJECT NUMBER**

1.3A Federal Project Number: Minn. Proj. No. HSIP 2717 (156)

1.3B State/Local Project Number: SP 027-030-040/County Project 1546

**1.4 PROJECT SCHEDULE**

Anticipated Start Date: Fall 2017

Expected Completion Date: Summer 2018

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

- Scoping    Design    Software/Integration    Construction    Operations & Management  
 Evaluations    Planning    Equipment Replacement    Research & Development  
 Others (Please Specify) Equipment Procurement

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**1.6 PROJECT FEATURES AND TYPES OF ITS APPLICATIONS** *(Check all that apply)***Arterial Traffic Management Features for Project Site(s):****Observation and Detection**

- Visual Surveillance (e.g. CCTV)
- Traffic Detectors (excluding presence detectors at intersections for signal control)
- Condition Reporting System

**Local Area Traffic Control and Traveler Alerts**

- Dynamic Speed Display Signs
- Emergency Vehicle Preemption with or without control center oversight
- Red Light Running System
- Transit Signal Priority with or without control center oversight

**Information Sharing**

- Dynamic Message Sign (DMS)
- Web Pages for Construction and Traveler Information
- 511 Phone

**Data Processing and Response Formulation**

- TMC Software / Central Traffic Signal Control Software
- Data Extract Tool

**Infrastructure Support Tool**

- Landline Communication (Fiber, Copper, Telephone Lines, DSL Lines)
- Wireless Communication (Point-to-Point and Cellular)
- Power

**Corridor-wide Traffic Control**

- Traffic Signal Control System

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**1.7 NEEDS ASSESSMENT**

*Please describe the problem statement, goals and objectives of the project.*

It is essential and critical to provide safe and efficient travel for commuters by reducing delays and maximizing capacity of the highway systems through effective traffic management. The existing central traffic signal control software (CTSCS) at the Hennepin County Traffic Management Center (TMC) is outdated and no longer supported by the vendor. In addition, the dial-up modem based communication infrastructure has limited automated traffic signal operations and management and does not meet the needs of performing reliable and effective real-time signal control operations and traffic management. This project is replacing the existing CTSCS with a new cutting edge CTSCS system and deploy a fiber-optic based communication network for better traffic management at the TMC. This will allow Hennepin County to drastically modernize traffic operations within the county, enhance mobility and safety throughout county roadways, and provide better quality of life for county residents.

*How were these needs identified? (Check all that apply)*

- Internal Assessment       Stakeholder Involvement       Regional ITS Architecture (Volume 9)
- Arterial Traffic Management Systems Engineering Concept of Operations/High Level Functional Requirements
- Other ITS Planning or Technical Documents (Please Specify) \_\_\_\_\_
- Design Documents (Please Specify) \_\_\_\_\_

**1.8 SYSTEMS ENGINEERING DOCUMENTATION**

	Existing	Existing To Be Modified	To Be Developed	Not Applicable	Document Reference (file number, name, or web link)/Comments
Alternatives Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Concept of Operations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	File is located at the following link: <a href="#">HCO ATMS</a>
Requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	File is located at the following link: <a href="#">HCO ATMS</a>
Design	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	File is located at the following link: <a href="#">HCO ATMS</a>
System Test Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	File is located at the following link: <a href="#">HCO ATMS</a>
System Verification Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Test Plan
Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Others (Please Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Standard Systems Engineering/Concept of Operations/Functional Requirements have been reviewed (Refer to *ITS Concept of Operations for Arterial Traffic Management, June 2010*, <http://www.dot.state.mn.us/its/projects/2006-2010/itssystemsengarterialfreeway/arterialconops.pdf>):

Yes     No

**1.9 RELATIONSHIP TO OTHER PROJECTS AND PHASES**

Please list any construction and tied projects.

**Project Title**

ATMS 2018, 2019, and 2020

\_\_\_\_\_

\_\_\_\_\_

**Project Number**

County Project 1644

\_\_\_\_\_

\_\_\_\_\_

**SECTION 2 – Regional Architecture Assessment**

**2.1 PROJECT IS INCLUDED IN THE MINNESOTA STATEWIDE REGIONAL ITS ARCHITECTURE**

(Refer to Sections 4.3 and 4.4 of Volume 9: Initiative and Project Concepts for Implementation of Minnesota Statewide Regional ITS Architecture, January 2014,

<http://www.dot.state.mn.us/its/projects/2006-2010/mnitsarchitecture/its-volume-9.pdf>)

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 Traffic, Safety and Technology contact person listed at top of page 1.

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If "Yes", Project ID (from *Sections 4.3 and 4.4 of Volume 9*): S06, S07, S13, S18,

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 Traffic, Safety and Technology contact person listed at top of page 1.

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## 2.2 DOES THE DESIGN INCORPORATE NATIONAL ITS STANDARDS?

Yes  No

If "Yes", please specify what ITS Standards are being used:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> NTCIP 1201 Global Object Definitions  | <input type="checkbox"/> NTCIP 1209 Data Element Definitions for Transportation Sensor Systems                       | <input type="checkbox"/> ASTM WK7604 Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data |
| <input checked="" type="checkbox"/> NTCIP 1202 Object Definitions for Actuated Traffic Signal Controller Units | <input type="checkbox"/> NTCIP 1210 Field Management Stations – Part 1: Object Definitions for Signal System Masters | <input type="checkbox"/> NTCIP Center-to-Field Group   |
| <input type="checkbox"/> NTCIP 1203 Object Definitions for DMS   | <input type="checkbox"/> NTCIP 1211 Object Definitions for Signal Control and Prioritization (SCP)                   | <input type="checkbox"/> NTCIP Center-to-Center Group  |
| <input type="checkbox"/> NTCIP 1206 Object Definitions for Data Collection and Monitoring Devices              | <input type="checkbox"/> NTCIP 1210 Field Management Stations – Part 1: Object Definitions for Signal System Masters | <input type="checkbox"/> ITE TMDD 2.1 TMDD and MS/ETMCC  |
| <input checked="" type="checkbox"/> NTCIP 1208 Object Definitions for CCTV Switching                           | <input type="checkbox"/> ASTM E2468-05 Standard Practice for Metadata to Support Archived Data Management Systems    |  |
| <input type="checkbox"/> Other (Please Specify)  |  |  |

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

\*Minnesota Standards are listed in Section 10 of Volume 10 of the *Minnesota Statewide Regional ITS Architecture* document as generated by Turbo Architecture.

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## 2.3 IS AN INTERAGENCY AGREEMENT NEEDED FOR THIS PROJECT?

Existing  To be Developed  No

Please describe: (Agency name, agreement number, and nature of contract)

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## 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 STAFFING AND RESOURCES NEEDED FOR OPERATIONS AND MANAGEMENT**

(Staff hours covering, for example, device/system maintenance plus management. Estimate and specify per year and per site or for all sites in project)

20 HOURS PER INTERSECTION PER YEAR (81 INTERSECTIONS)

**4.2 ESTIMATED ANNUAL OPERATIONS AND MANAGEMENT COSTS**

(Question 4.1 staffing labor hours x average direct hourly rate, plus direct expenses)

20 HOURS X \$75 HOURLY RATE +\$500 SITE LICENSE AND MAINTENANCE FEE  
= \$2,000 PER INTERSECTION PER YEAR (81 INTERSECTIONS)

**SECTION 5 - Approval**

**APPROVAL (Refer to page 7 of the HPDP ITS Systems Engineering Requirements 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. I also certify that the required systems engineering analysis has been/will be performed and all of the requirements are/will be met.

Name/Title: James Grube, P.E. County Highway Engineer Agency: Hennepin County

Signature:  Date: 7/10/17

Telephone: 612-596-0307

Email: james.grube@hennepin.us