STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CERTIFICATION OF ELECTRONIC COMPONENTS

Traffic Operations Division

May 22, 2017

TO: **Paul Frost, P.E., Chief Roadway Design Engineer**

FROM: **Kevin A. Maxwell, P.E, Principal Signals, Lighting and ITS Engineer**

SUBJECT: **Recommendation for Certification of Electronic Components**

Based on review of the following described electronic traffic related item, the Traffic Operations Division recommends that it be certified for the procurement as a patented or proprietary item in Nevada as documented here in.

Manufacturer: Reno A&E

Name and Model: Model MMU-1600GE Malfunction Management Unit

Description of Device: Monitors the traffic signal field outputs and the traffic signal controller for faults and possible conflicts at signalized intersections, and sets the signal to flash if potentially unsafe faults are detected. Logs all faults and intersection power incidents. Allows remote monitoring of MMU's through vendor provided software to allow troubleshooting prior to dispatching technicians when the MMU places a signal in flash. The Reno MMU stores all programming information including communications settings on the removable card, so that swapping monitors can be accomplished quickly by copying the card into the new monitor, without manual reprogramming of the MMU in the field or using a laptop in the field to download the programming parameters. Monitors flashing yellow arrow indications using the yellow-separate method and monitors flashing yellow indications for failure to flash (steady on or off indication).

Description of Need:

MMU's are required by national standards for safe operation of traffic signals. Having all of the memory on the card when swapping monitors is needed to quickly swap monitors during annual preventative maintenance and during other maintenance responses without needing to provide all technicians with laptops and without needing to spend time programming a replacement MMU in the field. MMU's are swapped, tested and recertified once per year for approximately 600 intersections. Remote monitoring is needed to efficiently dispatch technicians with the knowledge and correct supplies they will need in responding to signal faults. Monitors that monitor flashing yellow arrow signals for failure to flash are needed to increase the safety of the traffic signals for the public in case of failure of the flashing yellow arrow indications. Monitors that use the yellow separate method of monitoring flashing yellow arrow are needed to allow efficient switching between protected-only, flashing yellow arrow, or protected-permissive left turn phasing in the field during construction projects without extensive changes to the cabinet field wiring like would be needed for green-separate method, to allow contractors to modify heads without the City needing to be present to install new MMU's and controllers and change the field wiring in the cabinet. One central software system is needed to avoid having to use and maintain multiple software packages from different vendors.

Economic/Cost Analysis:

Having to manually reprogram MMU's or reprogram them with a laptop when changing a monitor would increase costs in time and equipment when performing maintenance, and take longer to remove signals from flash which would increase safety and travel delay costs to the public. Remote access decreases signal down time by making troubleshooting and repair of signals more efficient which impacts public safety and travel delay. The City has a large investment in MMU-1600GE units and in training staff to use them. Maintaining multiple systems would increase time and training costs for employees.

Jurisdiction/Extent: City of Las Vegas

Limitations/Conditions: The MMU-1600GE is the only MMU that will communicate remotely with the City's vendor provided RAECOM system software. It's the only MMU available that contains all the programming in the memory on the card. For intersections with flashing yellow arrow signals it monitors the flashing yellow indication for failure to flash which some other monitors available do not. It uses the yellow-separate method for monitoring flashing yellow arrow signals which some monitors do not.

Request for Certification other than the standard 2 years: 5 years

Justification for Certification other than standard 2 years: The life of the system is expected to be longer than 5 years.

Justification for Certification: Necessary for saving all programming on the card so that reprogramming isn't needed in the field when changing monitors. This is the only monitor available that has this capability. Necessary to tie into one central software system to avoid the inefficiency of maintaining and using multiple systems to remotely monitor MMU's. The only monitor available that meets all City requirements including saving all memory including com settings on the card, easy copying of the card into a new monitor, remote monitoring capabilities over IP with one easily searchable database that lists all intersections by intersection name, monitoring flashing yellow arrow indications for failure to flash, and using the yellow-separate method for monitoring flashing yellow arrow indications.

Synchronization ☒

Function ☒   **Aesthetics** ☐   **Logistics** ☐

The Nevada Department of Transportation Chief Roadway Design does hereby certify that in accordance with the requirements of 23 CFR 635.411(a)(2), that this patented or proprietary item is essential for synchronization with existing facilities

DocuSigned by:

Paul Frost

Chief Roadway Design Engineer

5/23/2017

Date

NDOT USE ONLY

Date of Certification: May 24, 2017

Certification Expiration: May 24, 2022