I would recommend use of the Signal Retrofit benefits analysis for this project. Detection replacement will typically fall under Signal Rehab, however, because the application stated how the proposed detection will be used specifically to extend green time, we will use the minor safety improvements as part of this project type to capture those benefits.

Project Benefits - Signal Retrofit

Procure and install monotubes, procure and install flashing yellow arrows, safety improvements not requiring major construction and adaptive signal systems.

Region: 
Proposed Project Name: 
Requested By: 

1. What is the anticipated cost of the project? 

2. What is the primary improvement type? 

   Minor Safety Improvements

3. If minor safety improvements or other, provide a brief description of the proposed improvements.

4. Using each of the following Needs Analysis Tool presets, provide the anticipated level of need in the vicinity of the proposed project:

   Default TIP
   Safety
   Mobility (Present)
   Mobility (Future)
   Service
   Freight Performance

   Needs Tool.

5. Indicate the type of benefit(s) that are expected as a result of this project?

   Safety
   Mobility (Reduction of Travel Time Delay or Variability / Increased Throughput)
   Productivity (Improved Maintenance)

   Base responses on the application. Likely, yes for all.

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Needs Tool. Consider each of the segments at the intersection within the influence area (in 99% of the cases, this will just be one segment intersecting at the intersection). Guidance varies, but generally recommends using 50 to 100 feet.

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Benefits

S1. Is it anticipated that the proposed improvements will increase safety such that an average crash rate at this intersection will be expected? 

   yes.

S2. How many crashes, by type, occurred in the past year at this intersection?

   - Fatal Crashes
   - Incapacitating Injury Crashes
   - Non-incapacitating Injury Crashes
   - Possible Injury Crashes
   - Property Damage Only Crashes

S3. What is the average number of vehicles entering the intersection per year?

   Million Entering Vehicles

Needs Tool. Sum the AADT for each entering segment.
Estimated Safety Benefit: N/A

Mobility Benefits

| M1. What is the estimated ADT for all vehicles entering the intersection (the Needs Analysis Tool can be used to add the traffic entering the intersection)? | vehicles per day |
| M2. What is the average Relative Need at this intersection according to the Needs Analysis Tool - Service preset? | |
| Estimated Annual Mobility Benefit | N/A |

Productivity Benefits

| P1. It is assumed that productivity benefits will be realized through reduced maintenance efforts. Estimate for how long maintenance efforts have been increasing at this intersection. |
| P2. How many Cartegraph tickets have been required at this location over the length of time indicated above in P1? |
| P3. What was the total cost of these tickets? |
| P4. What is the anticipated percent reduction of maintenance tickets due to the proposed project? |
| Estimated Annual Productivity Benefit | #VALUE! |

Energy and Environment Benefits

| E1. Energy and Environment benefits are determined based on average travel time reduction. |
| Estimated Annual Energy and Environment Benefit | N/A |

| Estimated Annual Benefit | #VALUE! |
| Estimated Benefit/Cost Ratio | #VALUE! |