### HIGH EFFICIENCY PRESENCE DETECTION SAFETY SCHEME

<table>
<thead>
<tr>
<th>TRAFFIC CONTROL AND SAFETY LIGHTS</th>
<th>OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY: 45 RPM [25 RPM OPERATIONAL])</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPICAL (500)</td>
<td>1</td>
</tr>
<tr>
<td><strong>NORMAL</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>OFF</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>SOLID</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>FLASHING</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>ALTERNATING</strong></td>
<td>-</td>
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<tr>
<td><strong>CONTINUOUS</strong></td>
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</tbody>
</table>

#### WARNING SIGNS

- **DO NOT ENTER** BLANK WHITE LIGHT
- **DO NOT ENTER** ILLUMINATED

#### TRAFFIC LIGHTS

- **SOLID GREEN** NORMAL OPERATIONS
- **SOLID GREEN** NORMAL SIGNALS
- **SOLID YELLOW** NORMAL OPERATIONS
- **SOLID RED** NORMAL OPERATIONS
- **FLASHING** NORMAL OPERATIONS
- **CONTINUOUS** NORMAL OPERATIONS

#### WARNING ARM

- **NORMAL OPERATIONS** DEPLOYED (DOWN/CLOSED)
- **DEPLOYED** (DOWN/CLOSED)
- **DEPLOYED** (DOWN/CLOSED)
- **DEPLOYED** (DOWN/CLOSED)

#### OVERSPEED

- **OVERSPEED & WRONG WAY WARNING ANNUNCIATOR**

#### OVERSPEED WARNING

- **WRONG WAY OVERSPEED**

PROVIDE 1/4" HIGH-BRIGHT LETTERING ON A BRILLIANT RED OR ORANGE FIELD. THIS LETTERING MUST BE INFERRED AT NIGHT. THE OVERSPEED WARNING MUST BE DEPLOYED WHEN THE UNIT DEPARTS THE HIGHWAY, A LIMITING speed WILL BE AT THE END OF THE OVERSPEED AREA.

**NOTE:**

1. AT THE END OF 7 SECONDS IT INCLUDES 3 SECOND REACTION TIME ALL SAFETY LIGHTS ARE TO BE FULLY DEPLOYED.
2. THE HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 10 SECONDS AFTER THE STOP IS PULLED AND THEY TURN OFF.
3. IVISIBILITY LIGHTS ARE TO BE REQUIRED FOR THE ACTIVITY VEHICLES. BARBERSHOPS SHALL NOT HAVE BARRIERS LIGHTS. IF PROCEEDING, THE LIGHTS AND ONLY ON WHEN THE TRAFFIC SIGNAL IS RED.
4. ACTIVELY VEHICLE BARRIERS LIGHTS ACTIVATE WHEN THE BARRIERS ARE FULLY DOWN/GATED.
5. PROVIDE AT THE 1/2 CHECK CANOPY A WARNING OF ONE FOR TWO LINES MOUNTED ON COLUMN NEAR ENTRANCE TO CHECK AREA. IT IS OPTION TO HAVE ONE MOUNTED IN THE SEAT AREA.
## Hybrid Beacon (Signs and Signals) Safety Scheme

### Operational Scheme

**Operational Scheme per Second on Safety - Highway 25 MPH (Design Speed)**

<table>
<thead>
<tr>
<th>Time (Sec)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>5</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Traffic Control</th>
<th>Normal GTS</th>
<th>Warning/Flash</th>
<th>React On Time</th>
<th>Threat Contained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hybrid Beacon</strong></td>
<td>Dark Off</td>
<td>Alternating Flashing Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Signs</strong></td>
<td>Dark Off</td>
<td>Flashing Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lights</strong></td>
<td>Dark Off</td>
<td>Flashing Red</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hybrid Beacon Safety Scheme
- **Warning Sign:** Alternating Flashing Yellow
- **Do Not Enter** Flashing Red
- **Silent:** Flashing Red
- **Active Vehicle** Flashing Red
- **Lights:** Flashing Red

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## Stop Control Safety Scheme

### Operational Scheme

**Operational Scheme per Second on Safety - Highway 25 MPH (Design Speed)**

<table>
<thead>
<tr>
<th>Time (Sec)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Traffic Control</th>
<th>Normal GTS</th>
<th>Warning/Flash</th>
<th>React On Time</th>
<th>Threat Contained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warning Sign</strong></td>
<td>Dark Off</td>
<td>Alternating Flashing Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Do Not Enter</strong> Flashing Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Red</strong> Flashing Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lights</strong></td>
<td>Dark Off</td>
<td>Flashing Red</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Stop Control Safety Scheme
- **Warning Sign:** Alternating Flashing Yellow
- **Do Not Enter** Flashing Red
- **Red** Flashing Red
- **Silent:** Flashing Red
- **Active Vehicle** Flashing Red
- **Lights:** Flashing Red

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### General Notes
1. **Hybrid Beacon:** At the end of 7 seconds, it includes a 2-second reaction time. All barriers are to be fully deployed.
2. **Stop Control:** At the end of 9 seconds, include a 3-second reaction time. All barriers are to be fully deployed.
3. **Do Not Enter Sign:** Flashing Red is required with stop control. The signal may or may not be required with hybrid beacon.
4. **120-VB Warning:** The horn shall be adjustable. Horns to sound for 10 seconds after the stop is pulled and then turn off.
5. **Active Vehicle Lights:** are only required if the active vehicle barrier does not have barrier lights. If provisions, these lights are only ON when the signal is RED.
6. **Warning Beacons:** Activate when the barrier is not fully deployed.
7. **Presence at the ID Check Canopy:** A minimum of one per two lanes mounted on column near entrance to ID Check area. It is optional to have one mounted in the divided area.
### STOP CONTROL SAFETY SCHEME

<table>
<thead>
<tr>
<th>TIMEFRAME</th>
<th>OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY: 45 MPH) (MIN SPEED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAFFIC</td>
<td>CONTROL</td>
</tr>
<tr>
<td>WARNING</td>
<td>SIGNALS</td>
</tr>
<tr>
<td>DO NOT ENTER</td>
<td>BLANK OUT</td>
</tr>
<tr>
<td>HORN</td>
<td>SILENT</td>
</tr>
<tr>
<td>BARRIERS</td>
<td>DOWN/UP</td>
</tr>
<tr>
<td>LIGHTS</td>
<td>DARKOFF</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

1. AT THE END OF 3 SECONDS TO INCLUDE 3 SECOND REACTION TIME, ALL BARRIERS ARE TO BE FULLY DEPLOYED.
2. THE HORN SHALL BE ADJUSTABLE. HORN IS TO SOUND FOR 3 SECONDS AFTER THE SOS IS PULLED AND THEN TURN OFF.
3. IN CASEMENT LIGHTS AND ONLY REQUIRED IF THE ACTIVE VEHICLE BARREN EFFECTS NOT HAVE BARRIERS.
4. IF PROPPING, THE LIGHTS ARE ONLY ON WHEN THE SIGNAL IS RED.
5. ACTIVE VEHICLE BARRIERS LIGHTS ACTIVATE WHEN THE BARRIER IS NOT FULLY DEPLOYED.
6. PROVIDE THE HOE CHECK CANOPY - A WARNING OF ONE PER TWO LANES MOUNTED ON COLUMN NEAR ENTRANCE TO HOE CHECK AREA. IT IS OPTIMAL TO HAVE ONE MOUNTED IN THE SEARCH AREA.

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**Wrong Way Overspeed**

- **OVERSPEED & WRONG WAY MINIATICATOR**

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**OVERSPEED & WRONG WAY WARNING ANNUNCIATOR**

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**OVERSPEED & WRONG WAY WARNING ANNUNCIATOR**
TYPICAL EMBEDDED CONDUIT STUB UP DETAIL

GENERAL NOTES:
1. PLAN IS FOR EXISTING INFRASTRUCTURE LE, EXISTING CONDUIT LAYOUT OR ISLANDS. THE PLAN SHOWS PLACEMENT OF CONDUITS FOR AUTOMATED INSTALLATION ENTRY AND EQUIPMENT DETAIL. 2 SHOWN SUGGESTED METHOD OF CONDUIT PLACEMENT IN THE CONCRETE, BUT OTHER METHODS ARE ALLOWED.
2. PROVIDE NO MORE THAN 1" SPACING BETWEEN CONDUITS.
3. CONDUIT STUBUPS TO A DEVICE OR EQUIPMENT SHALL BE GROUPED TO HAVE A MAXIMUM OF 1' SEPARATION.
4. NIC IS NOT IN CONTRACT.
5. CONDUIT AND CAMERAS ARE TO BE INSTALLED IN CONCRETE.
6. AT LEAST 10' IS REQUIRED TO BE MAINTAINED AROUND THE GUARD BOOTH. THIS INCLUDES THE DISTANCE IS MAINTAINED FROM THE GUARD BOOTH MECHANICAL UNIT.
8. EXISTING ISLANDS THAT ARE TOO SHORT TO FIT THE彼ら TAG CAMERA ON THE ISLAND MEDIAN AT THE MAXIMUM DIMENSION WILL BE REVEALED. A LAY IN THE CASE DUE TO PROVIDE INFORMATION ON A PROPOSED LOCATION. THE CAMERA IS TO BE PROTECTED FROM VEHICLE IMPACT ACCORDING TO AMERICAN ROADWAY STANDARD.
9. 10" GUARD BOOTH IS SHOWN TO BE 10' X 4' X 10'. WHERE POSSIBLE ENSURE THE CONDUIT PLACEMENT WILL WORK IN THE FUTURE FOR A 10' X 10' GUARD BOOTH. TYPICALLY ADJUST THE TRAFFIC ARM SIGNAL AND TRAFFIC ARM CONDUIT PLACEMENT FOR A 10' X 10' BOOTH BEING INSTALLED IN THE FUTURE.

ISLAND TYPICAL PLAN

SCALE: 1" = 1'-0"

ISLAND ELEVATION

SCALE: 1" = 1'-0"

KEYED NOTES:
1. P IS FOR POWER (208Y OR LESS) MANHOLE, S IS FOR SIGNAL (CONTROL CABLES) MANHOLE.
2. 3" PVC OR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 7" BELOW SURFACE OF ROAD AND EXTENDS A DISTANCE OF 12" FROM CURB FACE.
3. 3" PVC OR LOOP DETECTORS. (NIC) CONDUIT SHALL BE PLACED 7" BELOW SURFACE OF ROAD AND EXTENDS A DISTANCE OF 12" FROM CURB FACE.
4. EXISTING INFRASTRUCTURE IS ALLOWED TO HAVE 1" FOR THE SIGNAL. NEED AT LEAST ONE CONDUIT FOR POWER AND ONE FOR SIGNAL.
5. CONDUIT REQUIREMENTS FOR AS ONLY WHEN GOING FROM DATAHOUSE/HUT OR OTHER LOCATION TO FIRST MANHOLE. POWER ONE 4" OR TWO 2" SIGNAL ONE 4".

KEYED NOTES CONTINUED:
6. IF THE TRAFFIC ARM AND TRAFFIC ARM SIGNAL ARE ALL COLOLECTED. THEN ONLY A 2" SIGNAL AND 1" POWERS IS REQUIRED.
1. See design criteria for lighting level requirements.
2. See design criteria for descriptions of requirements for communications devices alarms, intrusion detection systems, speed detection, microwave detectors, vehicle presence detectors, and active vehicle barrier controls.
3. See conductors for maximum voltage drop and minimum ampacity.
4. Specify curb type luminaries to reduce glare and light trespass.
5. Luminaires should be located perpendicular to roadway parapets unless roadway Otherwise.
6. Locate poles 0.6m (2') clear of curb or at back edge of sidewalk or 1.5m (5') from edge of pavement or shoulder.
7. For any unprotected poles located inside the anchor clear zone provide isolation with roadway bases.
8. For any poles located behind guardrail, provide clearance for the required active guardrail deflection.
9. Specify junction boxes sized for sufficient space to make required cable connections. Provide concrete junction boxes with taped cover to minimize marks.
10. Specify nonmetallic, nonflammable, non Burnable, non-dischargeable connector caps for spaces in junction boxes.
11. Transition lighting is required anywhere where there is a change of light level. Required transition lighting needs to extend out the end of the transition zone to the local street light level.
12. Access control/remote zone luminaries plus those luminaries located near the ends of the area need to be on emergency backup.
# High Efficiency Presence Detection Safety Scheme

<table>
<thead>
<tr>
<th>Traffic Control and Safety Scheme</th>
<th>Operational Sequence Per Second</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traffic Control</strong></td>
<td>Normal</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Traffic Control Options</strong></td>
<td></td>
<td>Normal</td>
<td>Alternating Flashing Yellow</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Traffic Control Options</strong></td>
<td></td>
<td>Solid Red</td>
<td>DO NOT ENTER Illuminated</td>
<td></td>
<td></td>
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<tr>
<td><strong>Traffic Control Options</strong></td>
<td></td>
<td>Solid Green</td>
<td>Normal Operations</td>
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<tr>
<td><strong>Traffic Control Options</strong></td>
<td></td>
<td>Solid Yellow</td>
<td>Normal Operations</td>
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<tr>
<td><strong>Traffic Control Options</strong></td>
<td></td>
<td>Solid Red</td>
<td>Normal Operations</td>
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</tr>
<tr>
<td><strong>Barriers</strong></td>
<td>Deployed (Down Closed)</td>
<td>Deployed (Down Closed)</td>
<td>Deployed (Down Closed)</td>
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</tbody>
</table>

**Wrong Way**

Overspeed

- Provide 2 x 4 high-visibility, lettering in 1/2-inch-high letters, with 1/4-inch stroke width and 1/4-inch spacing. The letters shall be painted red on yellow, with the word “OVERSPEED” on the lower line of the volume and “OVERSPEED & WRONG WAY” on the upper line. See Note E.

**Note E:**
ISLAND TYPICAL PLAN

ISLAND ELEVATION

KEYED NOTES:
1. P is for power (red or less hazardous), S is for signal control (greenless hazardous). Suggested riser for each is 6/0.5" x 0.5" x 0.2" x 0.2" x 0.1". The signal ISOLATION must be a solid bottom.
2. 3/4" for loop detectors, and conduct shall be placed 1" below the surface of the road and extend out a distance of 2" from the curb face.
3. 1.2/22 for loop detectors, NIC conduct shall be placed 3" below the surface of the road and extending out a distance of 1.2" from the curb face.
4. Conduit requirements for AE only when doing from gatehouse/well or other location to first-manhole and then between islands.
5. Overhead and underground annunciation panel, provide a horn with adjustable volume control.
6. CCTV camera camera 1.
7. Ground both traffic control panel, run circuit to lane opening light.

GENERAL NOTES:
1. Plans for new construction, the plan shows placement of conduits required for automated installation entry and equipment details. Two conduits suggested method of conduit placement in the concrete, but other methods are allowed.
2. Provide no more than 1" spacing between conductors.
3. Conduit stub-ups to a device or equipment shall be grouped to have a maximum of 1" separation.
4. NIC is not in contract.
5. Conduit and cameras are to be installed in concrete.
6. At least 2" is required to be maintained around the guard booth. This includes ensuring the distance is maintained from the guard booth mechanical unit, when it is not in use.
7. Traffic arm and traffic arm signal are shown combined. However, the traffic arm and traffic arm signal can be separated pieces of equipment.
8. For reference, the AE cabinet located at the gatehouse or other location is typically a 3" x 15" x 22" x 0.1".
NOTE:

1. SEE DESIGN CHECKLIST FOR EXAMINATION LEVEL REQUIREMENTS.
2. SEE DESIGN CHECKLIST FOR DESCRIPTIONS OF REQUIREMENTS FOR COMMUNICATIONS CENTERS ALARMS, INTRUSION DETECTION SENSORS, SPEED DETECTION, MICRO-WAVE DETECTORS, VEHICLE PRESENCE DETECTORS, AND ACTIVE VEHICLE BARRIER CONTROLS.
3. SEE CONDUCTORS FOR MAXIMUM VOLTAGE DROP AND AMMETER AMPLITUDE.
4. SPECIFY CURTAIN TYPE ELEMENTS TO REDUCE EMI AND LIGHT IMMISSION.
5. LAMINATES SHOULD BE LOCATED PERPENDICULAR TO ROADWAY PARALLELY TO LINES ALONG THE PARALLEL.[E]
6. LOCATE PILES 0.6 M (2 FEET) CLEARANCE OR AT BACK OF SCARF OR 1.5 M (5) FROM EDGE OF PLANTING OR SHRUB.
7. FOR ANY UNPROTECTED PILES LOCATED MORE THAN CLEAR ZONE PROVIDE PILES WITH INDEPENDENT BASES.
8. FOR ANY UNPROTECTED PILES LOCATED DESIGNER ALARMS PROVIDE CLEARANCE FOR THE REQUIRED DESIGNER ALARMS.
9. SPECIFY JUNCTION BOXES WITH SUFFICIENT SPACE TO MAKE REQUIRED CABLE CONNECTIONS. PROVIDE CONCRETE JUNCTION BOXES WITH TAPES PROPERLY MANUFACTURED.
10. SPECIFY WIREWAYS, SUBMERSIBLE, NON-VISIBLE, INCREDIBLE, DISCONNECTABLE, CONNECTABLE CONDUCTOR BOXES FOR SPACES IN JUNCTION BOXES.
11. TRANSITION LAMINATE IS REQUIRED ANYWHERE WHERE THE VERTICAL LIMITATION TRANSITION LAMINATE TWICE TO EXTEND THE END OF THE PREVIOUS ZONE TO THE LOCAL STREET LEVEL.
12. TRANSITION LAMINATES PLUS THREE LAMINATES LOCATED BOTH BEFORE AND AFTER ARE TO BE ON GENERATOR BACKUP.