FLORIDA DEPARTMENT OF TRANSPORTATION
APPLICATION FOR TRANSPORTATION ALTERNATIVES PROJECTS

Date: 2/20/13

Project Title: Newberry SR 26 Crosswalks Improvements Project

Project Sponsor (name of city, county, state, federal agency, or MPO):

City of Newberry

Contact Wendy V. Kinser Title City Planner/Grants Agency Newberry Planning Dept.

Address PO Box 369, Newberry, FL 32669

Phone (352) 472-3927, ext. 128 Email Wendy.Kinser@ci.newberry.fl.us

Priority (relative to other applications submitted by the Project Sponsor) #1TAP(in addit.to sep.#1 SRTS ap

Name of Applicant (If other than contact person) _____

1. Qualifying Transportation Alternatives Activities:
Check the Transportation Alternatives activity that the proposed project will address. **(Check all that apply).**

- ☐ Provision of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, or transportation projects to achieve compliance with the Americans with Disabilities Act.
- ☑ The provision of safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs.
- ☐ Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other non-motorized transportation users.
- ☐ Construction of turnouts, overlooks, and viewing areas.
- ☐ Inventory, control, or removal of outdoor advertising.
- ☐ Historic preservation and rehabilitation of historic transportation structures.
- ☐ Vegetation management in transportation rights-of-way to improve roadway safety, prevent against invasive species, and provide erosion control.
- ☐ Environmental mitigation activity to address stormwater management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff.
- ☐ Reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats.
- ☐ Safe Routes to School Project - A separate SRTS application must be filled out and submitted with this application. Because of the extensive nature of the SRTS application, an additional year may be needed before an SRTS project can be programmed.

2. Project Description:

Use additional sheets as necessary to respond to the following:

(a) Provide a clear and concise detailed description of the Transportation Alternatives project. For sidewalks and multiuse paths, include the preferred construction material, (ie. concrete or asphalt surface). Describe where the project is located, the beginning and ending termini and approximate length. For sidewalks and bike paths that parallel roads, include which side of the road it is proposed and any unique or special features such as boardwalks or bridges. Include a location map if possible.

The safety of Newberry's citizens and visitors is at the forefront of the City's priorities. To help ensure that pedestrians have a safe way to cross SR 26 within its downtown area, the City of Newberry is requesting improvement of existing crosswalks known for ongoing safety issues, located on SR 26 within the City's downtown area. Since the lights only flash when activated by the pedestrian, the motorist receives real-time information indicating that a pedestrian is in the vicinity of the crosswalk. The State Road SR 26 (Newberry Road), an arterial roadway, runs through the heart of downtown Newberry– an area of active pedestrian use that includes frequent crossings throughout the day and evening hours. It is along this strip that pedestrians routinely cross SR 26 numerous times on a daily basis to access the many services provided by the City's offices, municipal building, and Visitor Information Tourism Center, and the various restaurants, shops, doctors' offices, and other facilities.

The City believes it is essential to provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs. (The City has initiated discussions with FDOT regarding the situation.) The City's primary concern is safety. Both ACSO and local residents, as well as City employees have witnessed/ documented close calls between pedestrians and higher speed vehicular traffic on S.R. 26 at the City's existing crosswalks. Examining each crosswalk from both the pedestrian and driver points of view is important to understanding the safety issues encountered at these crosswalks. And doing such investigation multiple times and at different times during the day and week confirms the need for crosswalk improvements. The City of Newberry is requesting FDOT fund the planning and design for placement of in-road "Pedestrian Crossing" signs and installation of in-ground LED lights/PRFB lights at the City's existing crosswalks on SR 26. Current locations of crosswalks identified as problematic include:

• Existing crosswalk on SR 26 located on the west side of the SR 26 and SW 254th Street intersection (reference landmark: Backyard BBQ is on SW corner) [see map location A]

• Existing crosswalk on SR 26 located at east side of the SR 26 and SW 255th Street intersection (reference landmark: City Hall is on NE corner) [see map location B]

These crosswalks urgently need improvement as they each have a history of accidents/incidents, high pedestrian traffic usage (soon to increase significantly upon opening of Newberry's Nations Baseball Park in March, adding hundreds of children and adults at a time to the area), posted speed limit of 30mph, close proximity of residential neighborhoods and schools, and vulnerable users (children, seniors, persons with disabilities). These are all known as typical factors contributing to crosswalk safety issues. The addition of illumination to crosswalk signage and adding high-visibility ladder style crosswalk markings will greatly increase pedestrian visibility, designated crosswalk usage, and thereby the safety of those crossing the roadway. The positive effect of such high visibility crosswalks has been statistically supported by DOT findings, including their study in Clearwater, FL evaluating the effect of this type of crosswalk treatment on driver and pedestrian behavior. The study stated that:

A significant 30% to 40% increase in daytime driver yielding behavior was found. A smaller (8%) and statistically insignificant increase in nighttime driver yielding behavior was observed. A large (35%) increase in crosswalk usage by pedestrians was noted along with no change in pedestrian overconfidence, running, or conflicts.

It is important to note that the City does not have the authority to improve existing crosswalks on State Roads, nor does it have the financial resources if it could. However, information garnered from staff's research and meetings over the past two years has revealed ongoing safety issues at these SR 26 crosswalks, the need to provide improvements, and the very real possible consequences of not doing so.

(b) What project phases are proposed to be funded with Transportation Alternatives funds? (Do not include work that is already complete or will be funded by other means. Check all that apply)

- [x] Planning Studies and Activities
- [x] Project Development and Environmental Studies
- [x] Engineering and Final Plans Preparation Work
- [ ] Right of Way Acquisition
- [x] Construction
- [x] Construction Engineering and Inspection Activities

(c) Describe any related project work phases that are already complete or currently underway, such as planning studies, master plans, PD&E studies, engineering, surveying or plans preparation. Provide copies of this information if available

City and FDOT staff have been discussing the City's safety concerns regarding existing pedestrian crossings on SR 26.

(d) Describe the project's existing right of way ownerships. This description shall identify who owns the right of way, when the right of way was acquired (if known) and how ownership is documented (i.e. plats, deeds, prescriptions, certified surveys). Also describe if any additional right of way is required, and who will acquire and retain ownership of proposed right of way.

SR 26 crosswalk project involves only publicly owned ROWs.

(e) Summarize any special characteristics of the project and provide any other specific project information that should be considered.

The project "construction" line item for this project is used to account for "pedestrian crossing" signage and LED lighted crosswalk installation See attachments: location map, lighted crosswalk info, fact sheet, Traffic Safety Corp info as example.

3. Project Implementation Information (attach extra sheets if needed):

(a) Describe the proposed method of performing (i.e. contract or in-house) and administering (i.e. Local Agency or FDOT) each work phase of the project. If it is proposed that the project be administered by a governmental entity other than the Department of Transportation, the agency must be certified to administer Federal Aid projects in accordance with the department's ***Local Agency Program Manual*** (topic no. 525-010-300).

Implementation and administration of the project would be done through FDOT.

(b) Describe any public support of the proposed project. (Examples include: written endorsement, formal declaration, resolution, financial donations or other appropriate means).

Examples of Newberry public support for the proposed project include public and commission comments, 2012 City Commission recorded meetings; written safety concerns; City and local business endorsements; documented meeting discussions.

(c) Describe the proposed ownership and maintenance for the project when it is completed.

FDOT would have ownership; the City would provide maintenance as may be required by FDOT.

(d) Matching local funds are not required, but if matching local funds are to be used, describe source of matching funds and any restrictions on availability.

N/A

(e) Other specific implementation information that should be considered.

4. Project Cost:

What is the total estimated cost of the work requested to be funded as an Transportation Alternatives project through this application?

Planning Activities.	$ 2,500.00
Project Development and Environmental Studies.	$ 1,500.00
Engineering and Final Plans Preparation Work.	$ 1,500.00
Right of Way Acquisition.	$ 0.00
Construction.	$ 25,000.00
Construction Engineering and Inspection Activities.	$ 2,000.00
Other. (Describe)	$ 0.00
TOTAL:	$ 32,500.00

If local matching funds are proposed,
how much will be funded by FDOT and how much by local funds?

FDOT Alternatives Funds $ 32,500.00 + Local Funds $ 0.00 = Total $ 32,500.00

CERTIFICATION OF PROJECT SPONSOR

I hereby certify that the proposed project herein described is supported by City of Newberry, Florida, (municipal, county, state, federal agency, or MPO) and that said entity will:

1. enter into a maintenance agreement with the Florida Department of Transportation;
2. comply with the Federal Uniform Relocation Assistance and Acquisition Policies Act for any Right of Way actions required for the project, and
3. support other actions necessary to fully implement the proposed project.

I further certify that the estimated costs included herein are reasonable and understand that significant increases in these costs could cause the project to be removed from the Florida Department of Transportation work program.

This project will be administered by (check **only** one):

- ☐ The applicant or sponsor using the department's Local Agency Program, or
- ☑ The Florida Department of Transportation

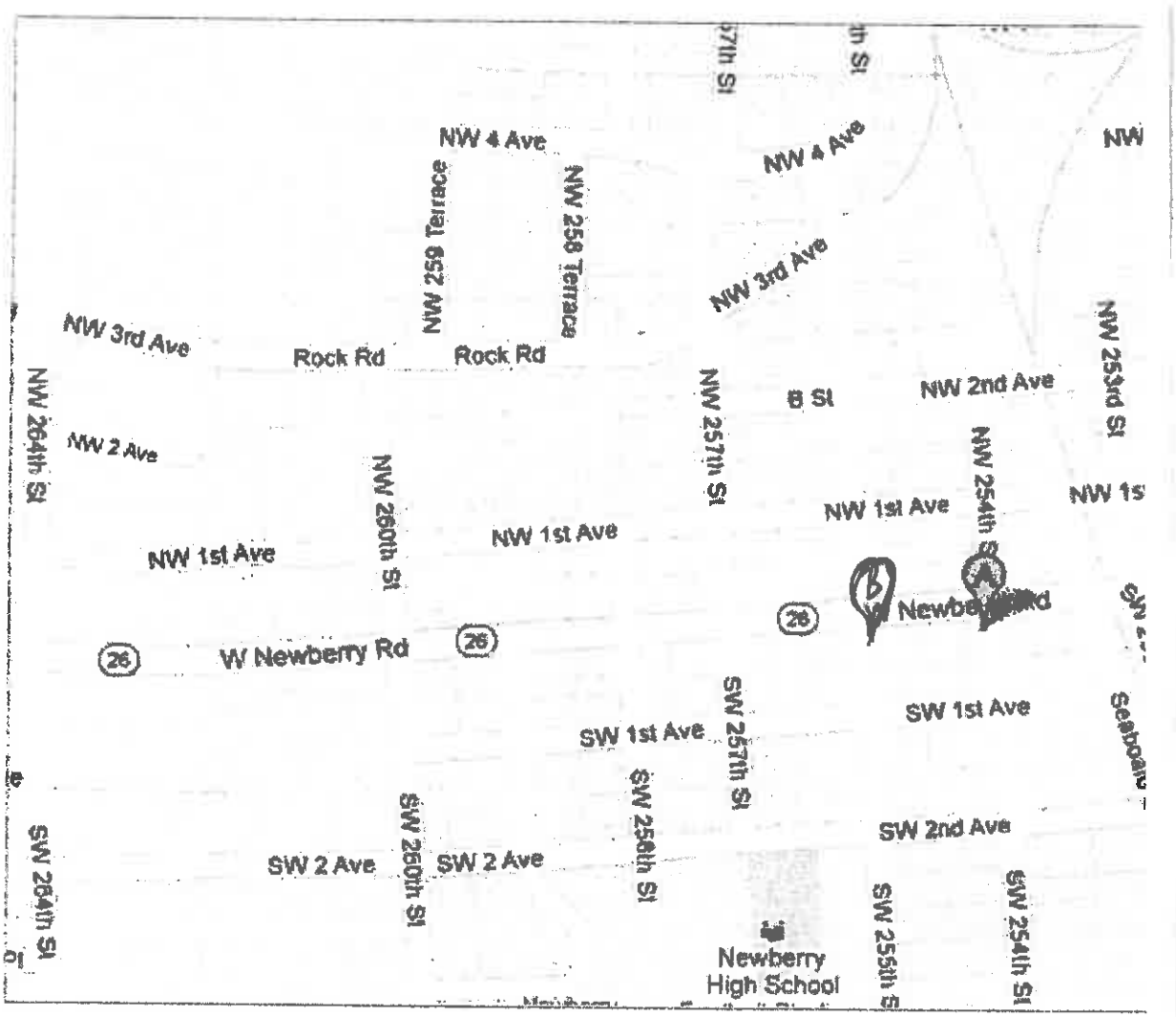
Wendy V. Kinser	City Planner/Grants Coordinator
Name (please type or print)	Title
Wendy V. Kinser	2/20/13
Signature	Date

CITY OF NEWBERRY

SR 26 EXISTING CROSSWALK LOCATIONS PROPOSED FOR IMPROVEMENT

Map Location A -- Existing crosswalk on SR 26 located on the west side of the SR 26 and SW 254th Street intersection (reference landmark: Backyard BBQ is on SW corner)

Map Location B -- Existing crosswalk on SR 26 located at east side of the SR 26 and SW 255th Street intersection (reference landmark: City Hall is on NE corner)



"In-Pavement Lighted Crosswalks"

In-pavement lights are being used at crosswalks to alert motorists to the presence of a pedestrian crossing or preparing to cross the street. The amber lights are embedded in the pavement on both sides of the crosswalk and oriented to face oncoming traffic. When the pedestrian activates the system, either by using a push-button or through detection from an automated device, the lights begin to flash at a constant rate, warning the motorist that a pedestrian is in the vicinity of the crosswalk ahead.

The amber LED lights flash in unison at a rate designed for maximum motorist recognition and are visible during the daylight as well as at night. The flashing lights are only activated when a pedestrian wants to cross and are automatically shut off after a set period of time, i.e., the time required for a pedestrian to safely cross the street. If installed in conjunction with the means to detect the presence of pedestrians while in the crosswalk, the crossing interval can be extended, in which case the lights would continue to flash and allow slower pedestrians to safely cross.

Such in-pavement crosswalk warning light systems are installed and successfully functioning in many Florida communities.

Resource: USDOT - ITS Technologies
www.walkinginfo.org

Crosswalk Warning Light Systems: Fact Sheet

In-roadway warning light systems are an effective method of improving crosswalk safety.

• At crosswalks that feature in-roadway warning light systems, "the number of reported accidents is about 80% less than might be expected from uncontrolled marked crosswalks with 'average' crosswalk treatments." (Miller, Rock "In-Pavement Flashing Crosswalks: State of the Art")

• Adding an in-roadway warning light system to a clearly striped crosswalk reduces the mean speed at which vehicles approach the crosswalk and reduces the mean number of vehicles that drive through the crosswalk while a pedestrian is crossing. (Lighting Research Center "Pedestrian Crosswalk Safety: Evaluating In-pavement Flashing Warning Lights")

• In-roadway warning light systems improve drivers' awareness of crosswalks and pedestrians. After installation, drivers' yield behavior increases and speed near crosswalks decreases. (Miller, Sheryl, Gabriel Rousseau and Ann Do. "Seeing Crosswalks in a New Light." FHWA "Public Roads" Jan/Feb 2004)

• In 2000, the FHWA (Federal Highway Administration) approved the application of in-roadway warning lights at marked crosswalks that are not controlled by traffic signals. Guidance is available in the MUTCD (Manual on Uniform Traffic Control Devices) in Chapter 4N.

Pedestrian Accident Rates

• 5,000 pedestrians were killed in the United States in 2002.

• In 2002, 71% of pedestrian accidents that occurred in the U.S. occurred in urban areas, 89% took place in normal weather, and 65% happened at night. (DOT HS Traffic Safety Facts 2002)

• 71,000 pedestrians were injured in accidents in the U.S. in 2002; that's one pedestrian accident every 7 minutes. (DOT HS Traffic Safety Facts 2002)

• Children and seniors accounted for 38% of the 76,000 total pedestrian accidents that occurred in the U.S. in 2002 (DOT HS Traffic Safety Facts 2002)

Factors That Contribute to Pedestrian Accidents

• Higher vehicle speeds increase fatality rates. When hit by a car traveling 40 mph, a pedestrian has only a 15% chance of survival. At 20 mph, this survival rate increases to 85%. (UK Dept. of Transportation "Killing Speed and Saving Lives")

• Potential for accidents increases when drivers can't see pedestrians because of
  - Traffic (moving or stopped vehicles can hide pedestrians)
  - Parked cars
  - Weather conditions
  - Foliage, curves in the road, etc.
  - Other visual obstructions.

In-Roadway Warning Light Systems

Overview, Evaluation, Installation and Investment Considerations

Traffic Safety Corp
www.xwalk.com
888-446-9255

IMSA
Vancouver, WA
June 5, 2012

In-Roadway Warning Light Systems

Traffic Safety Headquarters
Sacramento, CA

In-Roadway Warning Light Systems

- **Agenda**
  - **Overview**
    - **Need for Safety Enhancements**
    - **Planning for Pedestrian Safety**
    - **Goals**
    - **Application Areas**
    - **MUTCD Standards/Recommendations/Guidelines**
    - **Crosswalk Configuration Examples**
  - **Evaluation**
    - Components
    - Criteria
    - System and Vendor Evaluation
    - Third Party Testing and Evaluation
  - **Installation**
    - Standard Site Survey
    - Solar Site Survey
    - AC vs. Solar Powered Systems
    - Installation Techniques
  - **Investment Considerations**
    - Installation Costs
    - Investment Considerations
  - **Open Discussion (Q & A)**

In-Roadway Warning Light Systems

Need for Safety Enhancements

National Highway Traffic Safety Administration Traffic Safety Facts

- Pedestrian Deaths in 2010: **4,280 - Approx. 12/Day**
- Pedestrian Injuries in 2010: **70,000 – Approx. 196/Day**
- Approximately **75%** of Pedestrian Fatalities Occur in Urban Areas
- Top Four States for Pedestrian Fatalities are **California, Florida, Texas, and New York**
- Approximately **70%** of all Pedestrian Fatalities Occur at Night (4 PM to 4 AM)
- In Urban Areas, **53%** of Pedestrian Deaths Occurred on Roads with Speed Limits of 40 mph, or less
- In Rural Areas **26%** of Deaths Occurred on such Roads

In-Roadway Warning Light Systems

Planning for Pedestrian Safety

- "Pedestrians must be included as a matter of course in the planning and design of roadway plans. This includes reconstruction, repaving, and retrofits of existing streets. Only by integrating pedestrian facilities wholesale will the transportation system work in totality."

- **Examples of Pedestrian Design Elements:**
  - Bicycle Lanes
  - Roadway Narrowing
  - Lane Reduction
  - Raised Medians
  - One-Way vs. Two-Way Streets
  - Roundabouts
  - Sidewalks and Walkways
  - Curb Ramps
  - Roadway Lighting Improvements
  - Street Furniture/Improving the Walking Environment

In-Roadway Warning Light Systems

Goals of In-Roadway Warning Light Systems

- **To Provide an Alternative to Signal Lights where the use of signal lights would cause …**
  - Excessive delay
  - Excessive disobedience of the signal indications
  - Increased use of less adequate routes as road users attempt to avoid the traffic control signals
  - Significant increases in the frequency of collisions (especially rear-end collisions)
- **To Create a Safer Environment for People by Reducing or Eliminating Accidents at Locations Prone to Accidents**

… "Pedestrian Safety is the Major Concern"

In-Roadway Warning Light Systems

Application Areas for IRWLS:

- **FHWA: MUTCD (2009 Edition), Section 4 (Highway Traffic Signals) , Part N (In-Roadway Lights)**
  - **In-Roadway Lights are used as an alternative to traffic lights where pedestrian safety is a concern**
  - **Typically Placed At:**
    - Midblock Crossings
    - Crosswalks on Uncontrolled Approaches
    - Crosswalks in Advance of a Roundabout
    - School Crosswalks
- **Private Applications (Colleges, Hospitals, Retail, Ports, Industrial Campuses, Etc.)**
  - **Where there is Heavy Traffic , Many Pedestrians or Both**
  - **Typically Placed At:**
    - Pathways around or leading to Facilities
    - Crosswalks between Parking and Facilities
    - Crosswalks between Facilities

In-Roadway Warning Light Systems

MUTCD Standards/Recommendations/Guidelines

- **MUTCD Specifies the Placement, Operating Characteristics, and Specifications of an In-Roadway Warning Light System**

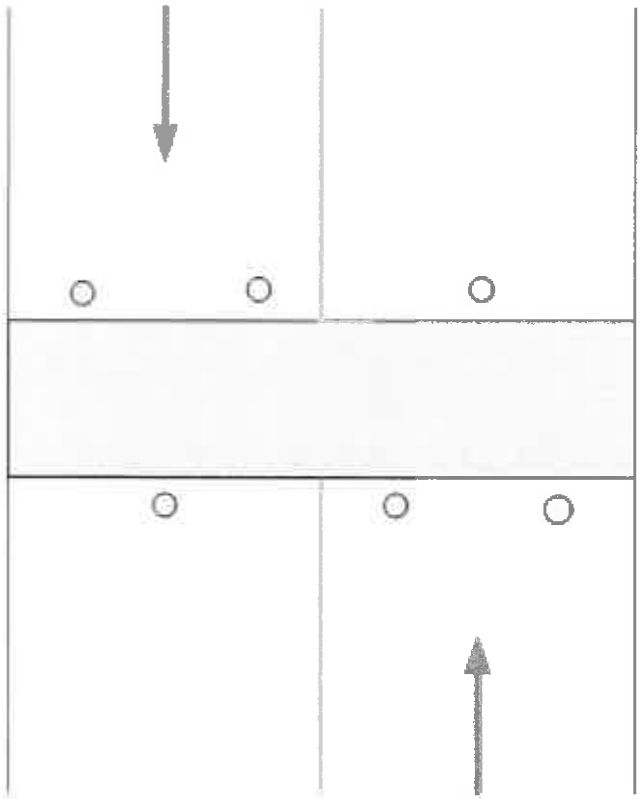
  - **Placement of Lights**
    - One Lane (2 on Approach Side), Two Lanes (3 per lane, 3 per side), Three or More Lanes (2 per Lane, one on each side)
    - Shall be Installed on Both Sides of the Crosswalk and Span its Entire Length
    - Placed Outside Crosswalk Lines and Within 10' from the Outside Edge of the Lines
    - Placed at the Center of Each Travel Lane, Center Line of the Roadway, or at the Edge of the Roadway or Parking Lanes

  - **Operating Characteristics**
    - Flash Rate: 50 to 60 FPM
    - No Steady Burn
    - Enhanced Flash Mode: May Flicker During Flash Period
    - Synchronous Flashing of all In-Roadway Lights

  - **Specifications**
    - Directionality: Unidirectional (one light) or Bidirectional Design (two lights)
    - Color: Yellow Light
    - Profile: Not to Exceed ¾" Above Roadway Surface
    - System Activation Duration: Minimum of one second/3.5 feet of Crosswalk Length

In-Roadway Warning Light Systems

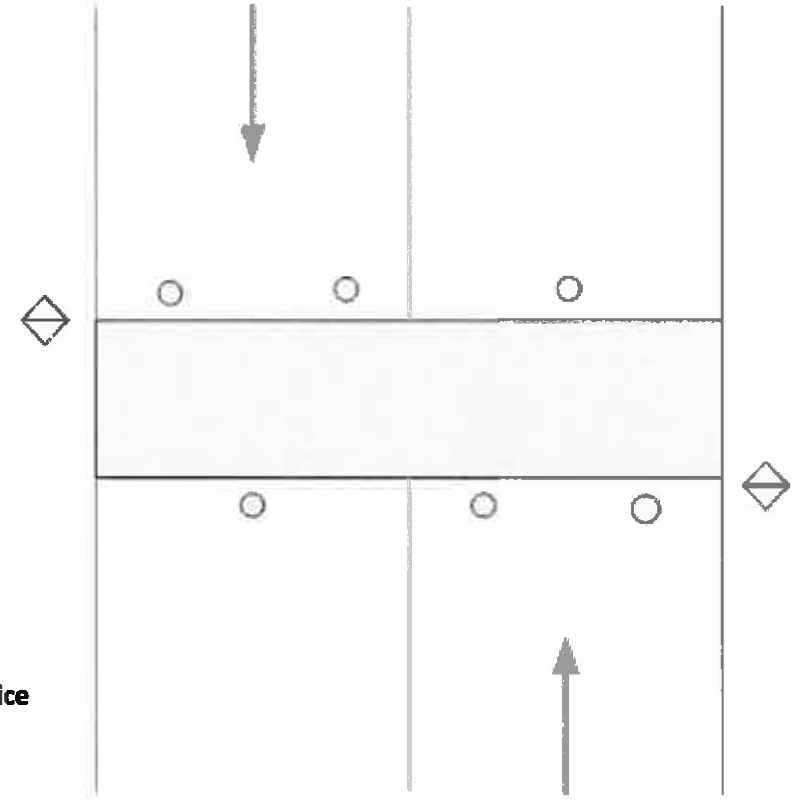
IRWLS Crosswalk Configuration Example
Core System (No Above Ground Warning Devices)



○ In-Roadway Light

In-Roadway Warning Light Systems

IRWLS Crosswalk Configuration Example
Core System with Local Above Ground Warning Device

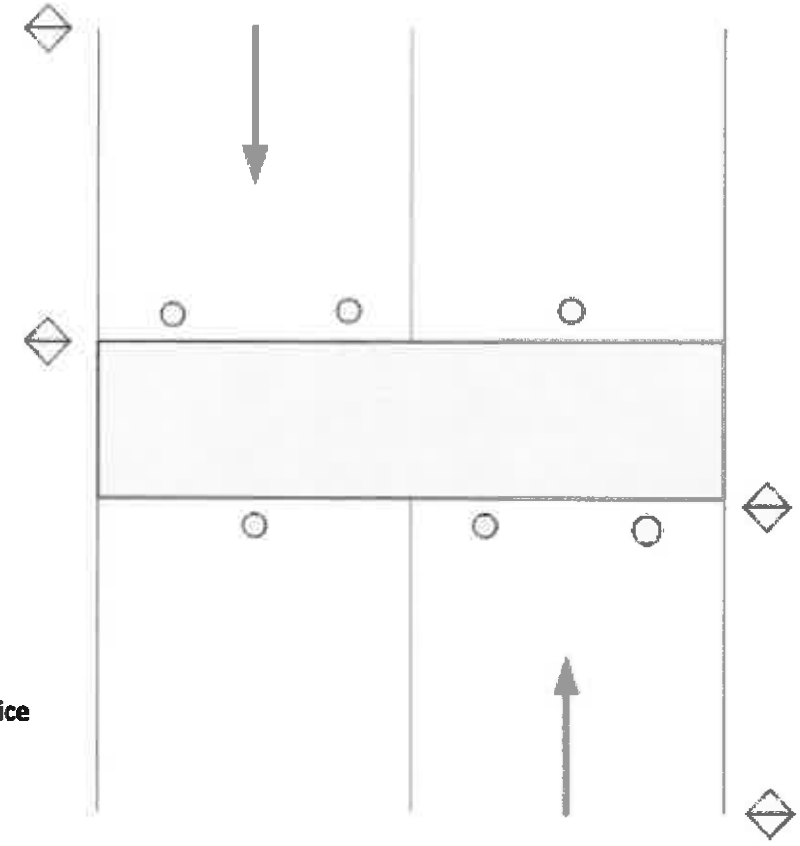


Above Ground Warning Device

In-Roadway Light

In-Roadway Warning Light Systems

IRWLS Crosswalk Configuration Example
Core System with both Local and Advance Above Ground Warning Devices



Above Ground Warning Device

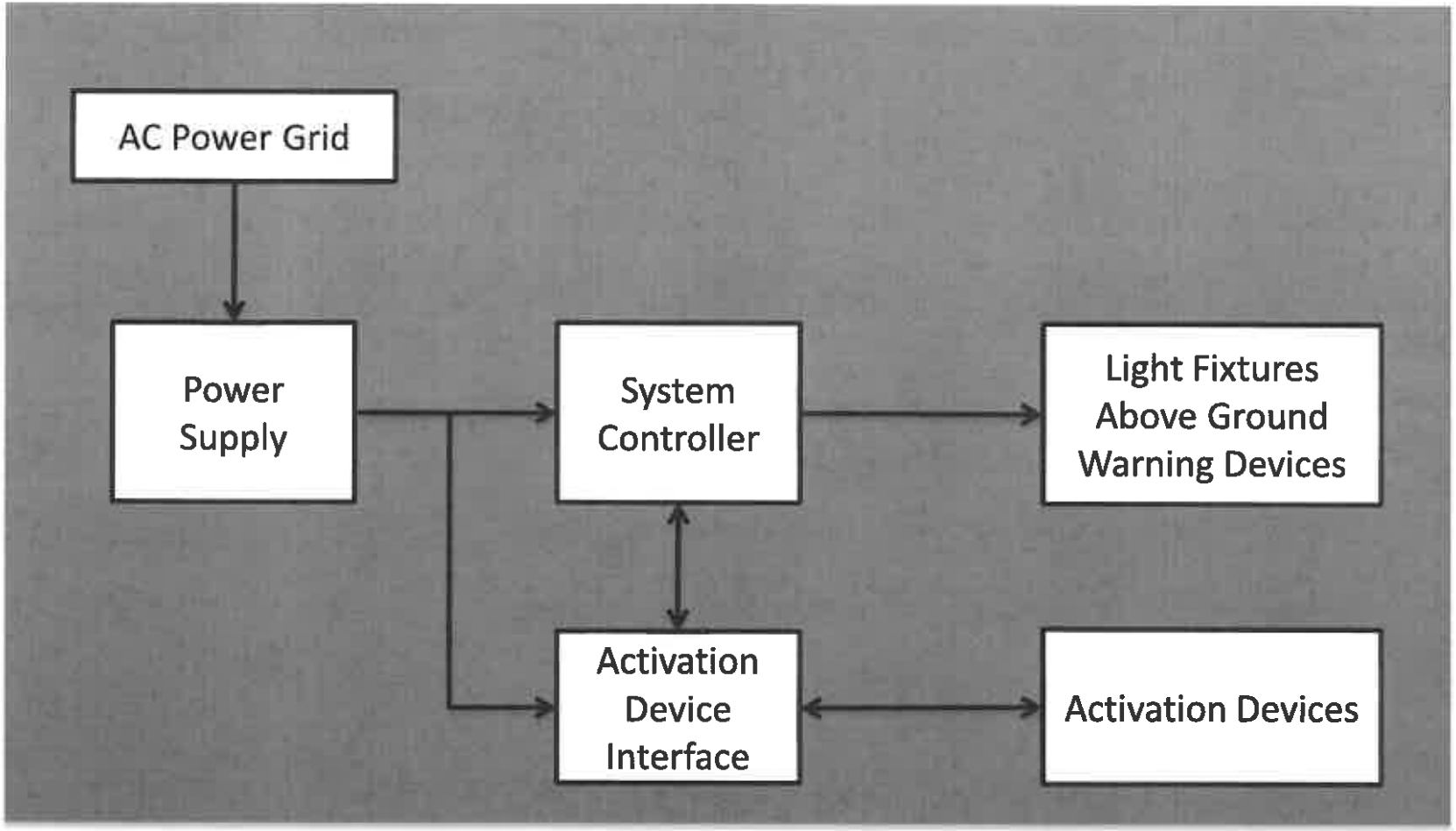
In-Roadway Light

In-Roadway Warning Light Systems

- **Agenda**
  - **Overview**
    - Need for Safety Enhancements
    - Planning for Pedestrian Safety
    - Goals
    - Application Areas
    - MUTCD Standards/Recommendations/Guidelines
    - Crosswalk Configuration Examples
  - **Evaluation**
    - **Components**
    - **Criteria**
    - **System and Vendor Evaluation**
    - **Third Party Testing and Evaluation**
  - **Installation**
    - Standard Site Survey
    - Solar Site Survey
    - AC vs. Solar Powered Systems
    - Installation Techniques
  - **Investment Considerations**
    - Installation Costs
    - Investment Considerations
  - **Open Discussion (Q & A)**

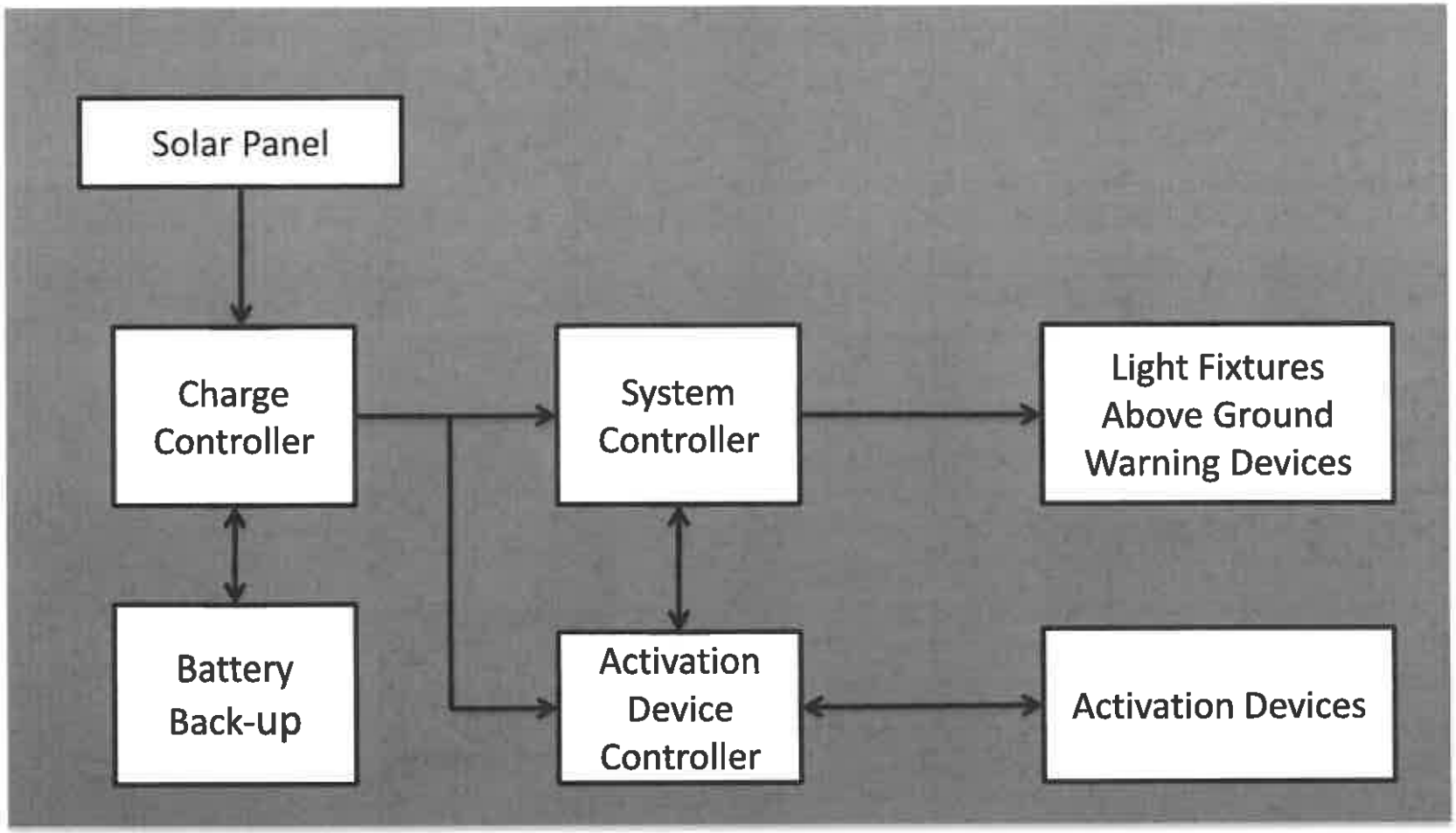
In-Roadway Warning Light Systems

System Components (AC Powered)



In-Roadway Warning Light Systems

System Components
(Solar Powered System)



In-Roadway Warning Light Systems

Evaluation Criteria – System and Vendor

- **Effectiveness**
  - Improve Driver's Awareness that the Crosswalk is in Use → Visibility
  - Improve Driver's Awareness of Pedestrians in Crosswalk at Night → Visibility
  - Versatility of System to fit the Site's Needs (Fixture Beam Widths, Activation Devices)

- **Quality**
  - **Reliability**
    - Low Failure Rate → Low Down Time and Repair Costs
    - Low Maintenance → Low Down Time and Maintenance Costs
  - **Durability (Expected Useful Life)**
    - Expected Useful Life of the System (How Quickly does the System Wear Out?)
    - Can the System's Useful Life be Extended → New Technology or Functional Upgrades
    - Design: Mounting Technique, Fixture Profile

- **Support**
  - **Pre-Sale:** Knowledgeable Staff, Site Survey and System Configuration Assistance
  - **Ordering:** System Submission and Warranty Acknowledgement Forms
  - **Production QC & QA:** System Integration, System Test, and Burn-in
  - **Pre-Installation:** Available Documentation, Installer Briefings
  - **Installation:** Support During Installation and Setup
  - **Post Installation:** Availability of Technical Support Center, System Warranty

- **Investment**
  - Initial Investment and Lifetime Costs → Does it Fit My Budge? Best Value?

In-Roadway Warning Light Systems

System Components and Company Evaluation

System	System Components				Company Support		
	Fixtures	**System Controller**	**Activation Device**	**Above Ground Device**	**Sales**	**Production**	**Technical Support**
Effectiveness	Visibility Directionality Beam Width	Enhanced Flash Patterns Auto-Sequencing Activation Flexibility	Match Device to the Application	Visibility	X	X	X
Reliability	Light Engine Self-Cleaning	Circuit Board Anti-Corrosive Treatments	Design	Design	X	Integration Test Burn-in	X
Durability	Materials Mounting Method	Enclosure Design and Materials	Materials	Materials	X	X	X
Support	Warranty	Warranty	Warranty	Warranty	Knowledge Site Survey Configuration	X	Pre-Installation Installation Tech Center

In-Roadway Warning Light Systems

Third Party Testing and Evaluation

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

February 27, 2012

Mr. Ted Vaeches
Traffic Safety Corp.
2708 47th Avenue
Sacramento, CA 95822

FEID # 94-3331652

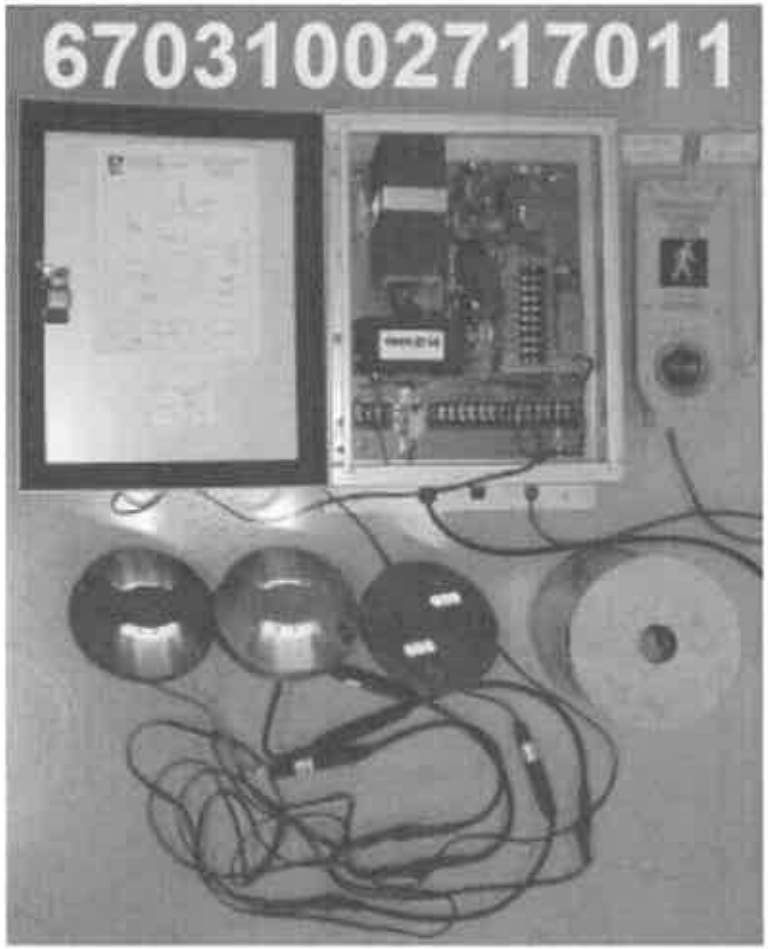
Dear Mr. Vaeches:

In compliance with Section 316.0745, Florida Statutes, the following products have been evaluated against FDOT specification A870, approved, and placed on the Florida Department of Transportation's Approved Product List (APL).

CERTIFICATION NUMBER	PRODUCT	DESCRIPTION
67031002717011	In-Roadway Lights Assembly	Model TS1100 Series Push Button Activation
67031002717021	In-Roadway Lights Assembly	Model TS1100 Series Push Button and Loop Detector Activation

In-Roadway Warning Light Systems

Third Party Testing and Evaluation



In-Roadway Warning Light Systems

- **Agenda**
  - **Overview**
    - Need for Safety Enhancements
    - Planning for Pedestrian Safety
    - Goals
    - Application Areas
    - MUTCD Standards/Recommendations/Guidelines
    - Crosswalk Configuration Examples
  - **Evaluation**
    - Components
    - Criteria
    - System and Vendor Evaluation
    - Third Party Testing and Evaluation
  - **Installation**
    - **Standard Site Survey**
    - **Solar Site Survey**
    - **AC vs. Solar Powered Systems**
    - **Installation Techniques**
  - **Investment Considerations**
    - Installation Costs
    - Investment Considerations
  - **Open Discussion (Q & A)**

In-Roadway Warning Light Systems

Standard Site Survey

- Recommend that a **complete site inspection** be conducted prior to system configuration, to ensure that all site variables have been taken into account in the design of the system

- Excessive **crowning**, steep up/down-hill **slopes** immediately following the crosswalk area, **uneven road surfaces**, and **curves** in the road should be evaluated to determine their affects of the system configuration and performance

- Conditions affecting **drainage**, such as road depressions and soil conditions, should be evaluated to determine the drainage requirements

- **Based on the site inspection, the system can be properly specified and configured for the intended site**

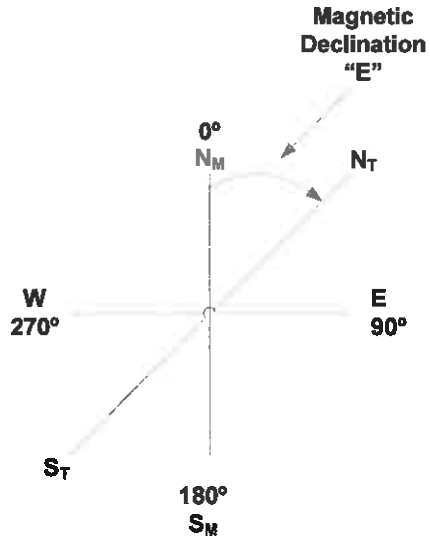
- An additional **solar site survey** is recommended for solar installations

In-Roadway Warning Light Systems

Solar Site Survey

- **Key Parameters for Solar Powered Systems:**
  - **Incoming Solar Energy - Insolation Measured in Sun Hours at a given Location and Solar Panel Size**
  - **Outgoing Electrical Energy - Determined by the System Load and Usage**

- **Solar Site Survey Determines how much of the Incoming Solar Energy is Received by the Solar Panel**
  - **First Determine True (Geographic) South**
    - Look Up the Magnetic Declination for the Location (Angle Between Magnetic North and True North)
    - Use the Magnetic Declination to Determine True South
      - » West (Subtract from Magnetic South (180°) to get True South
      - » East (Add to Magnetic South (180°) to get True South

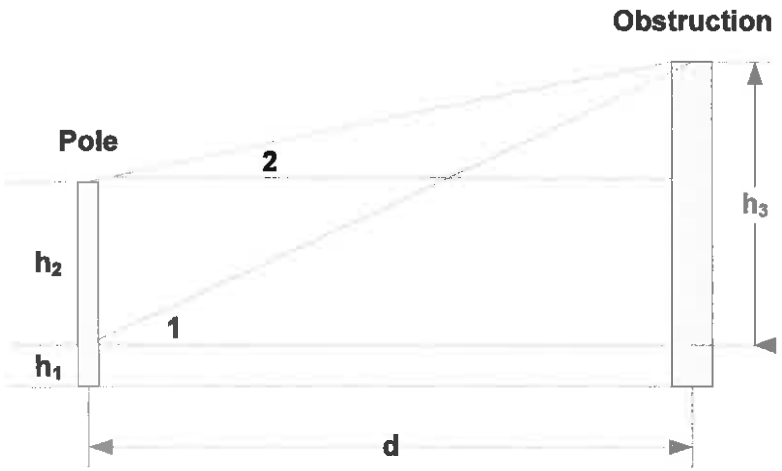


Magnetic Declination Correction

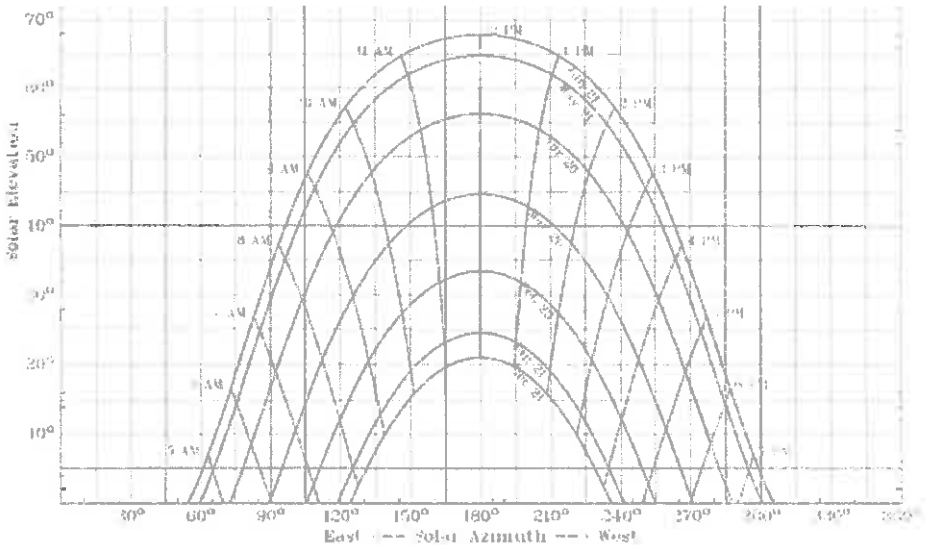
In-Roadway Warning Light Systems

Solar Site Survey

- **Solar Site Survey Determines how much of the Incoming Solar Energy is Received by the Solar Panel**
  - **Then Check for potential sources of shadows between 9am (270°) and 3 pm (90°), where True South is Set as 180°**
    - Starting from 90°, Adding 15° Increments, Ending at 270° Measure Angles (Altitude) from Pole Location to Top of Obstacles
    - Record Angle and Distance to Obstacles
- **Using Sun Plots for the Location, the Percentage of Insolation Available can be Estimated**



Altitude and Distance Measurements



Sun Plot

In-Roadway Warning Light Systems

AC Power Grid VS. Solar Powered Systems

- **AC Power Grid Powered Systems**
  - Easy Access to AC Grid (Generally)
  - However – If not, Trenching may be Necessary ($$$)
  - Hook-up must be Scheduled Well in Advance
  - In Some Cases – The Grid May not be Accessible

- **Solar Powered Systems**
  - Total Cost of Installation may be Lower than AC Grid
  - Faster Deployment
  - Lower Operating Costs
  - Site may not be Suitable for Solar due to Location, Panel Size Issues, or Shading and, or Wind Loading Issues
  - Solar Panel must be Mounted (Typically) on a Pole ($$$)

In-Roadway Warning Light Systems

Installation Techniques

- **Core Drill and Saw Cut**

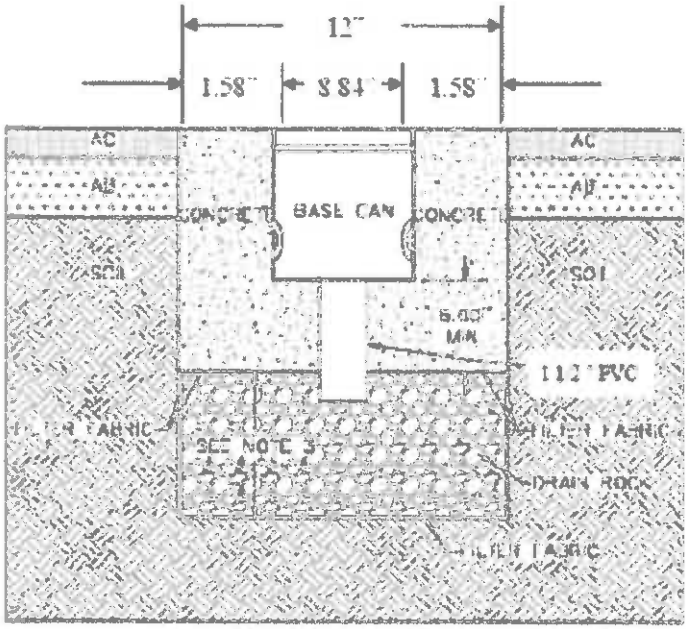
Core Drill

Saw Cut

In-Roadway Warning Light Systems

Installation Techniques

- Core Drill and Saw Cut



Drainage and Street Cable Routing

In-Roadway Warning Light Systems

Installation Techniques

- **Trench and Fill**

Trench

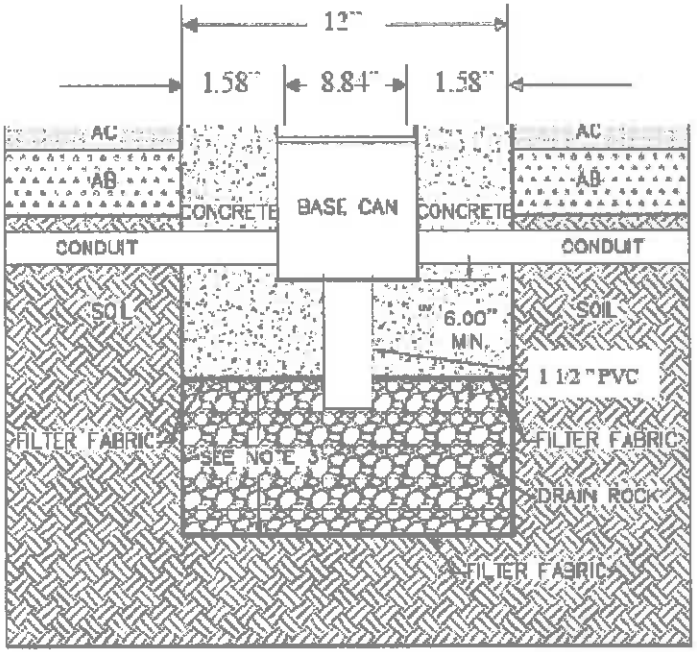
Fill

In-Roadway Warning Light Systems

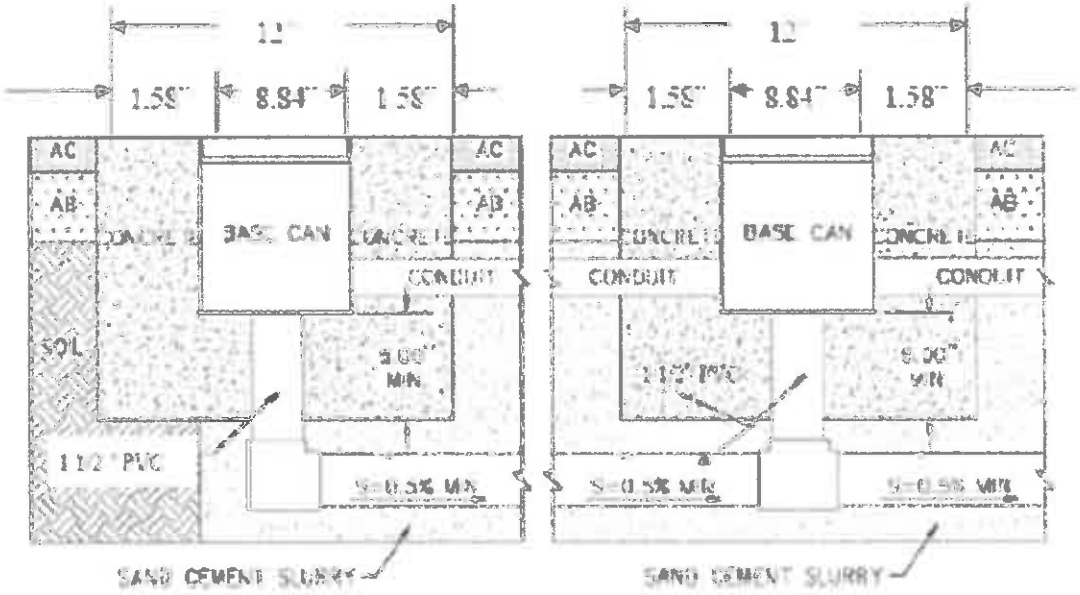
Installation Techniques

- Trench and Fill

Option 1



Option 2



Drainage and Street Cable Routing

In-Roadway Warning Light Systems

- **Agenda**
  - **Overview**
    - Need for Safety Enhancements
    - Planning for Pedestrian Safety
    - Goals
    - Application Areas
    - MUTCD Standards/Recommendations/Guidelines
    - Crosswalk Configuration Examples
  - **Evaluation**
    - Components
    - Criteria
    - System and Vendor Evaluation
    - Third Party Testing and Evaluation
  - **Installation**
    - Standard Site Survey
    - Solar Site Survey
    - AC vs. Solar Powered Systems
    - Installation Techniques
  - **Investment Considerations**
    - **Installation Costs**
    - **Investment Considerations**
  - **Open Discussion (Q & A)**

In-Roadway Warning Light Systems

Installation Costs

Area	Comments	Examples
IRWL System Components	50% Cost	Fixtures, Controller, Activation Devices
Installation Materials	10% Cost	Concrete, Wire, Asphalt
Equipment, Tools	10% Cost (Rent, 3rd Party)	Core Drill, Saw
Man Power	30% (Staff/Contractor)	2 Lane (50 Man Hours) 4-5 Lane (80 Man Hours)

Note: Overall Investment will Depend on the Quality of the System Components Used, the Type of the Installation Required, and Availability of Equipment and Staffing.

In-Roadway Warning Light Systems

Investment Considerations

Area	Short Term Perspective	Long Term Perspective
Initial Investment	**Lower**	Higher
Lifetime Cost	Higher	**Lower**
Maintenance Cost	Higher	**Lower**
Failure Rate	Higher	**Lower**
Down Time	Higher	**Lower**
Warranty	Shorter	**Longer**
Usable Life	Shorter	**Longer**
Expandability	More Difficult	**Easy**
Upgradability	More Difficult	**Easy**
Support	Limited	**Comprehensive**