



Town of Amherst

Regular Meeting of the Town Board

5583 Main Street
 Williamsville, NY 14221
www.amherst.ny.us

Minutes

Marjory Jaeger
 Town Clerk

Monday, May 6, 2013

7:00 PM

Amherst Municipal Building

In Memory

I. INVOCATION:

Councilmember Anderson

II. PLEDGE OF ALLEGIANCE:

Councilmember Anderson

III. ROLL CALL:

7:00 PM Meeting called to order on May 6, 2013 at Amherst Municipal Building, 5583 Main Street, Williamsville, NY.

| Attendee Name | Organization | Title | Status | Arrived |
|------------------------|-----------------|--------------------------|---------|---------|
| Barry A. Weinstein | Town of Amherst | Supervisor | Present | |
| Guy R. Marlette | Town of Amherst | Deputy Supervisor | Present | |
| Mark A. Manna | Town of Amherst | Councilmember | Present | |
| Richard "Jay" Anderson | Town of Amherst | Councilmember | Present | |
| Barbara S. Nuchereneno | Town of Amherst | Councilmember | Present | |
| Steven D. Sanders | Town of Amherst | Councilmember | Present | |
| Marjory Jaeger | Town of Amherst | Town Clerk | Present | |
| Kathleen Cooper | Town of Amherst | Deputy Town Clerk | Present | |
| E. Thomas Jones | Town of Amherst | Town Attorney | Present | |
| Patrick Kelly | Town of Amherst | Deputy Town Attorney | Present | |
| Darlene Carroll | Town of Amherst | Comptroller | Present | |
| Thomas Ketchum | Town of Amherst | Commissioner of Building | Present | |
| Eric Gillert | Town of Amherst | Planning Director | Present | |
| John Askey | Town of Amherst | Chief of Police | Present | |

| | | | | |
|----------------|-----------------|-----------------------------|---------|--|
| Gayle Thornton | Town of Amherst | Asst. Director Sr. Services | Present | |
| Marc Bellacose | Town of Amherst | Sr. Engineer Assistant | Present | |

IV. MINUTES APPROVAL

V. PROCLAMATIONS AND ANNOUNCEMENTS

Supervisor Weinstein presented a proclamation to Ayesha Nariman for serving on the Board of the Amherst IDA for seven years.

Deputy Supervisor Marlette presented a proclamation to Frank Barone, member of the Amherst Veterans Committee, recognizing May as *Military Appreciation Month*.

Deputy Supervisor Marlette presented a proclamation to Marjory Jaeger, Town Clerk, in observance of Town Clerks' Week.

Councilmember Richard "Jay" Anderson presented a proclamation to Paul A. Schmit, retired Lieutenant from the Amherst Police Department for his 33 years of service.

Councilmember Steven Sanders presented a proclamation to Gayle Thornton, Asst. Director of Senior Services, in observance of May as "Older Americans Month."

VI. PUBLIC HEARINGS:

Speakers will be limited to 3 minutes.

1. Resolution 2013-449

Public Hearing: Bond Resolution for Sheridan Drive and Transit Road Waterline Extension/Connection

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Resolution 2013-450

Public Hearing: Bond Resolution for Oakwood, Amherston, Bellingham Drive Drainage Improvements – Phase III 2013-2018

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

VII. PUBLIC EXPRESSION

This is an opportunity for residents to comment on matters involving Amherst other than those pertinent to Public Hearings that day. Speakers will be limited to 3 minutes at either Public Expression.

A motion to open Public Expression was made by Deputy Supervisor Marlette, seconded by Councilmember Sanders, unanimously approved 6-0. Public Expression was opened at 7:30 PM.

The following speakers addressed the Town Board:
Tom Frank, 225 Evans St.

The following individuals spoke in favor of Erin's Crossings (request for a crosswalk on Maple Road at Culpepper Road)
Susan Morris, 1485 Maple Road
Eileen Woloss, 15 Fieldstone
Shelby Seelbinder, 129 S. Forest Road
Katherine Simonian, 165 Culpepper Road
Ryan Osborne, 105 Clearfield Drive
Rachel Migliore, 153 Cottonwood
Mary Suszynski, 20 Culpepper Road
Justin Presutti, 162 Bridle Path
Gavin Petrie, 15 Culpepper Road
Rob Lederman, 253 Culpepper Road
Sarah Hanson, 32 Culpepper Road

There were no further speakers from the public, therefore Supervisor Weinstein moved to close Public Expression, seconded by Deputy Supervisor Marlette, approved 5-1 (Manna). Public Expression was closed at 8:03 PM.

VIII. CONSENT AGENDA:

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

IX. APPOINTMENTS TO BOARDS & COMMITTEES:

Board Appointments - Amherst Conservation Advisory Council, Board of Ethics, Deer Adaptive Management, Historic Preservation, IDA, Planning, Recreation, Solid Waste, Traffic Safety and the Zoning Board of Appeals.

NOTE - The number of vacancies is listed after the Committee name.

- 1. 9/11 Commemoration Committee**
Membership is unlimited.
- 2. Amherst Committee on Disabilities (8)**
- 3. Amherst Community Diversity Commission**
Membership is full.
- 4. Amherst Conservation Advisory Council (1)**
- 5. Amherst Industrial Development Agency**
Membership is full.
- 6. Amherst State Park Committee**
Membership is full.
- 7. Amherst Veterans Committee**
Membership is full.
- 8. Arts & Culture in Public Places Board (1)**
- 9. Board of Assessment Review (5)**
- 10. Board of Electrician Examiners**
Membership is full.
- 11. Board of Ethics**
Membership is full.
- 12. Board of Plumbing and Drainage Examiners (1)**
Vacancy for Town Board

- 13. Citizens Financial Advisory Committee**
Membership is full.
- 14. Code Commission (1)**
- 15. Commercial and Residential District Review Committee**
Membership is full.
- 16. Employee Suggestion Program Merit Award Board (1)**
Vacancy for Town Board
- 17. Employee Suggestion Review Committee**
Membership is full.
- 18. Energy Conservation Citizens Advisory Committee**
Membership is full.
- 19. Freedom of Information Law (FOIL) Board**
Membership is full.
- 20. Glen Park Joint Board**
Membership is full.
- 21. Government Study Committee**
Membership is full.
- 22. Historic Preservation Commission (1)**
- 23. Information Technology Advisory Committee (1)**
- 24. Library Board of Trustees**
Membership is full.
- 25. Minority / Woman Owned Business**
Membership is full.
- 26. Planning Board**
Membership is full.
- 27. Recreation Commission**
Membership is full.
- 28. Recycling and Waste Committee**
Membership is full.
- 29. Senior Services Advisory Board**
Membership is full.

30. Supervisor's Citizen Advisory Committee**31. Traffic Safety Board**

Membership is full.

32. War of 1812 Commemorative Committee

Membership is full.

33. Youth Board (4)**34. Zoning Board of Appeals**

Membership is full.

X. COUNCILMEMBER RESOLUTIONS**A. SUPERVISOR WEINSTEIN:****B. DEPUTY SUPERVISOR MARLETTE:****1. Resolution 2013-451**

Amherst Veterans' Memorial

| | |
|------------------|---|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nucherenno, Sanders |

C. SUSPENSION OF RULES

Deputy Supervisor Marlette moved to open Suspension of Rules, seconded by Councilmember Sanders and unanimously approved 6-0. Suspension of Rules was opened at 8:07 PM.

The five items listed below were brought forth under Suspension of Rules.

There being no further business requiring Suspension of Rules, Deputy Supervisor Marlette moved to close, seconded by Councilmember Sanders and unanimously approved 6-0. Suspension of Rules was closed at 8:10 PM.

1. Resolution 2013-474

Local Government Records Management Grant Acceptance - \$33,960.00

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Resolution 2013-475

Local Government Records Management Grant - Budget Amendment

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

3. Resolution 2013-476

Contract with Copier Fax Business Technologies Inc. for Scanning Funded by Local Records Management Grant.

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

4. Resolution 2013-477

Set Public Hearing Date – Fairways Boulevard and Barberry Lane Stop Sign

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

5. Resolution 2013-478

Home Rule Requests

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

D. COUNCILMEMBER MANNA:

E. COUNCILMEMBER ANDERSON:

1. Resolution 2013-452

Appointment to Amherst Veterans' Committee

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Richard "Jay" Anderson, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

F. **COUNCILMEMBER NUCHERENO:**

G. **COUNCILMEMBER SANDERS:**

XI. DEPARTMENT HEAD RESOLUTIONS AND REPORTS

A. **TOWN ATTORNEY:**

1. Resolution 2013-453

Sheridan Drive and Transit Road Waterline Extension/Connection 2013-2018 C.I.P. Project
Bond Resolution : \$106,000.00

| | |
|------------------|--|
| RESULT: | ROLL CALL VOTE (ADOPTED) [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Resolution 2013-454

Oakwood, Amherston, Bellingham Drive Drainage Improvements – Phase III 2013-2018
C.I.P. Project E-24 Town of Amherst Project No.: 2010.018B Bond Resolution : \$491,200.00

| | |
|------------------|--|
| RESULT: | ROLL CALL VOTE (ADOPTED) [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

B. **TOWN CLERK:**

1. Resolution 2013-455

New Firefighters: Getzville Fire Co.

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

C. **ASSESSOR:**

1. Resolution 2013-456

Amendment to RPTL Section 102(I)

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

D. BUILDING/BUILDING MAINTENANCE:

1. Resolution 2013-457

Lawn Care Treatments - Town Hall

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

E. CENTRAL ALARM:

F. COMPTROLLER:

1. Resolution 2013-458

Routine Transfers and Amendments

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Resolution 2013-459

REVISED Standard Work Day Resolution

| | |
|------------------|---|
| RESULT: | ADOPTED [5 TO 1] |
| MOVER: | Barry A. Weinstein, Supervisor |
| SECONDER: | Guy R. Marlette, Deputy Supervisor |
| AYES: | Weinstein, Marlette, Anderson, Nuchereno, Sanders |
| NAYS: | Mark A. Manna |

G. COURT:

1. Resolution 2013-460

Domestic Violence Grant (Reallocation of Funds). I Am Submitting This Contract from New York State, Which Has Already Been Approved by the Town Board and Signed by the Supervisor (On 3/1/13), to Get Approval for the Reallocation of Funds Within the Grant.

| | |
|----------------|----------------------------|
| RESULT: | ADOPTED [UNANIMOUS] |
|----------------|----------------------------|

MOVER: Steven D. Sanders, Councilmember
SECONDER: Mark A. Manna, Councilmember
AYES: Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders

H. EMERGENCY SERVICES:

I. ENGINEERING:

1. Resolution 2013-461

NYWEA 2013 Spring Tech Conference Travel Request

RESULT: **ADOPTED [UNANIMOUS]**
MOVER: Steven D. Sanders, Councilmember
SECONDER: Mark A. Manna, Councilmember
AYES: Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders

2. Resolution 2013-462

RE: Award Design Contract – WPCF Arc Flash Phase II Ferguson Electric Service
 Co., Inc. Town of Amherst Project No. 2011.0020

RESULT: **ADOPTED [UNANIMOUS]**
MOVER: Steven D. Sanders, Councilmember
SECONDER: Mark A. Manna, Councilmember
AYES: Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders

3. Resolution 2013-463

RE: One (1) 2013 Ford F150 Pickup from the NYSOGS Bid Contract # PC65855 Lot 1;
 Items 8 & 13 at a Cost of \$24,227.29 And Purchase of One (1) 2013 Ford F-450
 Stake Body Truck with Crane from the Chautauqua County Contract - E10-12 PFTH at a
 Cost of \$47,869.89 Town of Amherst Job No. 2013-001F Total Cost: \$72,097.18

RESULT: **ADOPTED [UNANIMOUS]**
MOVER: Steven D. Sanders, Councilmember
SECONDER: Mark A. Manna, Councilmember
AYES: Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders

4. Resolution 2013-464

RE: 2013-2018 Capital Improvement Program Amendment 2013 Waterline
 Replacements Countryside Lane/Court & Summerview Road E-17 Sheridan Drive and Transit
 Road Off-Ramp Connection

RESULT: **ADOPTED [UNANIMOUS]**
MOVER: Steven D. Sanders, Councilmember
SECONDER: Mark A. Manna, Councilmember
AYES: Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders

5. Resolution 2013-465

RE: Proposal for Professional Engineering Services Woodshire Court Waterline Replacement Town of Amherst Job No. 2013.015

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

J. HIGHWAY:**1. Resolution 2013-466**

Travel-2013 Highway School

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

K. HUMAN RESOURCES:**1. Resolution 2013-467**

Recreation Specialist - PT/Youth & Recreation

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

L. INFORMATION TECHNOLOGY:**M. PLANNING:****N. POLICE:****1. Resolution 2013-468**

The Pump Doctor, Inc. January 2013 to December 22, 2013 \$709.50

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

O. PURCHASING:**1. Resolution 2013-469**

Contract with Modern Portable Toilets, Inc.

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Resolution 2013-470

Award Bid #2013022

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

P. REFUSE:

Q. SENIOR SERVICES:

R. YOUTH AND RECREATION

1. Resolution 2013-471

Community Movie Night

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Resolution 2013-472

Summer Fitness Programs at Bassett Park

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

3. Resolution 2013-473

Software Support

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

XII. UNFINISHED BUSINESS:

XIII. COMMUNICATIONS:**1. Communication 2013-97**

Delmont James Boundy - Fencing of Property

| | |
|------------------|--|
| RESULT: | RECEIVED & FILED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

2. Communication 2013-98

Summons and Notice with Complaint: RBS Citizens, N.A. Vs Colleen E. Dinitto A/K/A Colleen Dinitto and Et Al.

| | |
|------------------|--|
| RESULT: | REFERRED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

3. Communication 2013-99

Verified Notice of Claim: Independent Health Assn. Inc., Vs Town of Amherst

| | |
|------------------|--|
| RESULT: | REFERRED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Mark A. Manna, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

XIV. PUBLIC IMPROVEMENT PERMITS:**XV. PUBLIC EXPRESSION**

This is an opportunity for residents to comment on matters involving Amherst other than those pertinent to Public Hearings that day. Speakers will be limited to 3 minutes at either Public Expression.

A motion to open Public Expression was made by Deputy Supervisor Marlette, seconded by Councilmember Anderson, unanimously approved 6-0. Public Expression was opened at 8:13 PM.

The following speakers addressed the Town Board:

Brianna Francois, 42 Belvoir, regarding Erin's Crossings

Lynn Seelbinder, 129 S. Forest, regarding Erin's Crossings

Jim Tricoli, Columbia Dr.

There were no additional speakers from the public, therefore Deputy Supervisor Marlette moved to close Public Expression, seconded by Councilmember Manna, unanimously approved 6-0. Public Expression was closed at 8:21 PM.

XVI. ADJOURNMENT:

There being no further business to come before the Town Board, Councilmember Manna moved to adjourn, seconded by Deputy Supervisor Marlette and unanimously approved 6-0. The Town Board meeting of May 6, 2013 was adjourned at 8:21 PM.



BARRY A. WEINSTEIN, M.D.
SUPERVISOR

May 24, 2013

Mr. Robert M. Graber
Clerk of the Legislature
Erie County
92 Franklin Street - 4th Floor
Buffalo, New York 14202

Bobby
Dear Mr. Graber:

Family and Friends of Erin Suszynski at the May 6, 2013, Amherst Town Board Meeting, requested the installation of a crosswalk on Maple Road across from the Maple East Elementary School playground. Several members of the community spoke in favor of this project. *Family and Friends of Erin Suszynski* advised that sufficient funds in excess of the cost of this project have been raised to fully fund the project.

Maple Road is an Erie County Road. Therefore, the Town of Amherst is forwarding to you the following items, which are enclosed:

- Communication #2013-63, dated April 8, 2013
- Minutes of the Town Board Meeting of May 6, 2013
- Audio-visual DVR of the Suspension of Rules from the May 6, 2013, Town Board Meeting
- Resolution #2013-480 dated May 20, 2013

The Town of Amherst respectfully requests that the County of Erie respond to the public's request and take appropriate action regarding a crosswalk and advise the public and the Amherst Town Board on the county's position regarding this request.

Regards,

Barry
Barry A. Weinstein, M.D.
Supervisor

BAW/sv
enc.

cc: Erie County Legislators
Erie County Executive Mark Poloncarz
John Loffredo, Commissioner of Public Works



Town of Amherst
5583 Main Street
Williamsville, NY 14221
www.amherst.ny.us

Marjory Jaeger
Town Clerk

Meeting: 05/20/13 07:00 PM
Department: Supervisor
DOC ID: 10165

RESOLUTION 2013-480

ADOPTED

Installation of Crosswalk on Maple Road at Culpepper

WHEREAS, *Family and Friends of Erin Suszynski* requested the installation of a crosswalk on Maple Road across from Maple East Elementary School playground at the Amherst Town Board meeting of May 6, 3013; and

WHEREAS, several members of the community spoke on the subject at the meeting, voicing their concern for this project and advising the Town Board that *Family and Friends of Erin Suszynski* has raised sufficient funds in excess of the costs of installation of a crosswalk and has agreed to fund the project; and

WHEREAS, Maple Road is an Erie County owned road and as such, the County of Erie has control over the maintenance and traffic signage of the road;

NOW, THEREFORE, BE IT RESOLVED that the Amherst Town Board hereby directs the Town Clerk to forward Communication 2013-63, dated April 8, 2013, minutes of the Town Board Meeting of May 6, 2013 and an audio-visual DVR of the Suspension of Rules from the May 6, 2013 Town Board meeting, wherein those members of the audience so eloquently stated their position on the crosswalk, to the following entities:

- Clerk of the Erie County Legislature
- Each individual Erie County Legislator
- County Executive
- Erie County Commissioner of Public Works

BE IT FURTHER RESOLVED that the Amherst Town Board respectfully requests that the County of Erie respond to the public’s request and take appropriate action regarding a crosswalk and advise the public and the Amherst Town Board on the County’s position regarding this request.

5/20/2013

Consent

FINANCIAL IMPACT:

None for resolution

| | |
|------------------|--|
| RESULT: | ADOPTED [UNANIMOUS] |
| MOVER: | Guy R. Marlette, Deputy Supervisor |
| SECONDER: | Steven D. Sanders, Councilmember |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |



Town of Amherst
5583 Main Street
Williamsville, NY 14221
www.amherst.ny.us

Marjory Jaeger
Town Clerk

Meeting: 04/08/13 07:00 PM
Department: Supervisor
DOC ID: 9957
SCHEDULED

COMMUNICATION 2013-63

Suszynski Family - Erin's Crossings

Letter of March 17, 2013, from Mary, Jerry, Tom, and Melissa Suszynski.

4/08/2013

Consent to refer to Town Attorney and Traffic Safety Board

| | |
|------------------|--|
| RESULT: | REFERRED [UNANIMOUS] |
| MOVER: | Steven D. Sanders, Councilmember |
| SECONDER: | Guy R. Marlette, Deputy Supervisor |
| AYES: | Weinstein, Marlette, Manna, Anderson, Nuchereno, Sanders |

March 17, 2013

Barry Weinstein
Town Supervisor
5583 Main St
Williamsville, NY 14221

Dear Supervisor Weinstein:

This letter is in response to the tragic accident at Maple and Culpepper Roads June 9th of 2012 that severely injured one child as well as taking the life of another, Erin Suszynski. The family has formed Erin's Crossings –dedicated to securing crosswalks adjacent to playgrounds in our community. To date, through fundraising, we have raised the funds to fully install several of these crosswalks. The first to be installed would be at the intersection of Maple and Culpepper Road. We have teamed up with LightGuard Systems, Inc., an established company out of California, to secure this crosswalk system. Such a system would provide a high-tech, solar powered, winterized, all weather crosswalk . This proven technology will ensure any further tragedies from occurring. Please find with this letter, the user manual and factory recommended guidelines from LightGuard Systems, Inc. A representative will also be available from LightGuard Systems to answer any questions and concerns regarding their product.

At this time, we are asking for your assistance to approach the Town of Amherst for a minimal amount of town land for the placement of the actual crosswalk at Maple and Culpepper Roads. Your assistance would also be invaluable in securing the permission of Erie County to install the portion of the crosswalk that would be located on Maple Road. For this particular crosswalk, we have a company that has generously donated the installation cost of this first system.

With the successful installation of this initial crosswalk, it is the family's intention to assist Erie County with additional installations of crosswalks. These would be installed in areas adjacent to playgrounds with heavy pedestrian foot traffic. In memory of Erin, we would like to have the system operational as soon as possible.

Your immediate attention in this endeavor is sincerely appreciated.

Sincerely,

Mary Suszynski Family
Mary, Jerry, Tom and Melissa Suszynski

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

LightGuard



Systems, Inc.

"Pursuing Safety Through Technology"

US Patent # 6,384,742

THE LIGHTGUARD SYSTEMS[®] INSTALLATION AND USER MANUAL & FACTORY RECOMMENDED GUIDELINES

Copyright © 1999 LightGuard Systems, Inc.

October 2012

LightGuard Systems, Inc.

2292 Airport Blvd.
Santa Rosa, CA 95403-1003
707-542-4547 Ph.
707-525-6333 Fax

www.crosswalks.com

Copyright © 1999 by LightGuard Systems, Inc. (LGS). All rights reserved. Printed in the United States of America. Except as permitted under the Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher. This information is provided for information purposes only. LGS disclaims all warranties whether express or implied and specifically disclaims all implied warranties of merchantability and fitness for a particular purpose. Failure to comply with recommendations or guidelines will result in a void of product warranty.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

TABLE OF CONTENTS

- 1 THE LIGHTGUARD SYSTEM® AND COMPONENTS..... 2**
 - 1.1 THE LIGHTGUARD SYSTEM®..... 2
 - 1.2 POWER SYSTEM..... 2
 - 1.3 IN-ROADWAY WARNING LIGHT (IRWL) SIGNAL HEAD..... 2
 - 1.4 SYSTEM ACTIVATION; AUTOMATIC/MANUAL/CONTINUOUS/PROGRAM..... 2
 - 1.5 LED "ENHANCED" PEDESTRIAN CROSSING SYMBOL SIGN..... 3
 - 1.6 LGS COMPONENTS NEEDED FOR A TYPICAL SMART CROSSWALK™..... 3
 - 1.7 SUGGESTED INSTALLATION EQUIPMENT, MATERIALS AND TOOLS..... 5
- 2 POWER SYSTEM AND COMPONENTS..... 6**
 - 2.1 POWER SYSTEM DESCRIPTION..... 6
 - 2.2 TYPICAL LIGHTGUARD SYSTEM® WIRING DIAGRAM..... 6
 - 2.3 AC SYSTEM..... 7
 - 2.4 SOLAR SYSTEM..... 9
 - 2.5 ECP SYSTEM (ECP-1 & ECP-2)..... 11
 - 2.6 ENCLOSURE POLE MOUNT DETAIL..... 13
 - 2.7 BACK PANEL ELECTRICAL CONNECTIONS..... 13
 - 2.8 POWER CONTROL UNIT (PCU) DESCRIPTION..... 15
- 3 IN-ROADWAY WARNING SIGNAL (IRWL)..... 21**
 - 3.1 GENERAL DESCRIPTION..... 21
 - 3.2 MAJOR CONSIDERATIONS FOR LIGHTGUARD SYSTEM IRWL INSTALLATION..... 21
 - 3.3 CONCRETE INSTALLATION PROCEDURE..... 24
 - 3.4 IRWL SIGNAL AND BASE PLATE INSTALLATION GUIDELINES..... 25
 - 3.5 IRWL SAW CUT CROSS-SECTION DIAGRAMS..... 26
 - 3.6 TYPICAL IRWL SIGNAL BASE PLATE WIRING DRAWING..... 27
 - 3.7 CONVERGENCE ZONES..... 29
- 4 AUTOMATIC ACTIVATION SYSTEM - SMART CROSSWALK™..... 31**
 - 4.1 AUTOMATIC BOLLARD DETECTION SYSTEM DESCRIPTION..... 31
 - 4.2 BOLLARD DRAWING..... 31
 - 4.3 BOLLARD INSTALLATION GUIDELINES..... 32
 - 4.4 BOLLARD SENSOR ADJUSTMENT..... 34
 - 4.5 BOLLARD ALIGNMENT..... 34
 - 4.6 BOLLARD DETECTION ZONE OPERATION..... 36
 - 4.7 UNI-BOLLARD / ISAD INSTALLATION OPTION..... 37
- 5 PUSH BUTTON ACTIVATION..... 40**
 - 5.1 MANUAL PUSH BUTTON ACTIVATION DESCRIPTION..... 40
 - 5.2 ILLUMINATED PUSH BUTTON ASSEMBLY..... 40
 - 5.3 SAMPLE PUSH BUTTON LAYOUT AND WIRING DIAGRAM..... 40
 - 5.4 PUSH BUTTON INSTALLATION DETAIL DRAWING..... 41
- 6 LED "ENHANCED" ILLUMINATED WARNING SIGNS..... 42**
 - 6.1 LED "ENHANCED" SIGN GENERAL DESCRIPTION..... 42
 - 6.2 LED "ENHANCED" PEDESTRIAN CROSSING SIGN DRAWING..... 42
- 7 LIGHTGUARD SYSTEMS SOLAR POWER OPTION..... 43**
 - 7.1 INSTALLATION STEPS..... 43
 - 7.2 SOLAR MODULE..... 43
 - 7.3 SOLAR SYSTEM BATTERIES..... 45
 - 7.4 CHARGE CONTROLER..... 46
- 8 TROUBLE SHOOTING / MAINTENANCE / AFTER INSTALLATION..... 47**
 - 8.1 TROUBLE SHOOTING GUIDE..... 47
 - 8.2 FIELD RELATED TOTAL PREVENTATIVE MAINTENANCE..... 48
 - 8.3 FIELD RELATED TOTAL PREVENTATIVE MAINTENANCE..... 48
 - 8.4 EQUIPMENT LIST..... 49
- 9 ADDENDUMS..... 50**

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

1 THE LIGHTGUARD SYSTEM® AND COMPONENTS

1.1 THE LIGHTGUARD SYSTEM®

The LightGuard System™ (the System) is designed for applications at mid-block or uncontrolled intersection crosswalks and other roadway crossings. It is entirely compliant with the MUTCD and in many cases, the MUTCD text was composed with the LightGuard Systems product development and testing in mind.

The System utilizes a series of light emitting diodes (LED's) in a durable housing embedded in the roadway which flashes, in a unidirectional manner, a warning to approaching motorists that a pedestrian is in or entering the crosswalk. The in-roadway LED warning signals are aimed down the motorist-viewing path of the approaching driver to allow the flashing lights to be easily seen by motorists along the full length of the un-obscured viewing approach path. The lights flash for a set period of time before automatically turning off. The System can be activated by a pedestrian pushing a button, or automatically when a pedestrian passes through an activation zone breaking an optical beam. It can be a stand-alone solar-powered System, or a conventional AC powered System with battery back up.

The LightGuard System™ comprises the following components and all components must work in unison.

1.2 POWER SYSTEM

A roadside, or pole mounted, cabinet contains all of the LED drive electronics and field wiring electrical interfaces. Both the AC & the ECP systems operate off a 12 VDC power supply from an AC line. The AC system can be energized from either 110V single phase or 220V two-phase power. The ECP can only be energized from 110V single phase. The Solar System operates off of 12 VDC battery power and is recharged during daylight hours from a Solar PV panel.

Based on a typical installation, power usage is approximately 18 - 20 watts depending on the type of activation mechanism. Total energy consumed (in KWH) is dependent upon the number of light fixtures, the cross time duration, and the number of activations. Circuit breakers protect internal circuitry and field wiring. The Power Control Unit (PCU) available in the AC & Solar Systems is based on a high speed 8 bit embedded microcontroller utilizing a compiled machine control language. LGS proprietary software program provides effective, reliable operation allowing the user simple operation adjustments with a keypad and display (LCD).

1.3 IN-ROADWAY WARNING LIGHT (IRWL) SIGNAL HEAD

The LightGuard System™ In-Roadway Warning Light signal heads are manufactured of high strength impact resistant materials. They are designed to be mounted onto a metal or composite base plate assembly that is permanently attached to the roadway. This allows for easy replacement of any IRWL that may become damaged, or inoperable, for any reason.

1.4 SYSTEM ACTIVATION; AUTOMATIC/MANUAL/CONTINUOUS/PROGRAM

1.4.1 AUTOMATIC - Bollards

For AUTOMATIC activation, the System uses state-of-the-art electronic and software driven technology. The Smart Crosswalk™ automatic system is a dual break-beam system utilizing modulated infrared sensors housed in decorative posts, or bollards, at each side of the

crosswalk. Direction of pedestrian travel is detected and allows activation of the System only upon entry, not when exiting. Custom designed bollards currently house the drive electronics for automatic activation. They can be positioned up to 50 ft. (15m) apart.

1.4.2 MANUAL - Push Button or optional Key Switch operation

A standard push button assembly (if installed) may be depressed if the pedestrian chooses to MANUALLY activate the System. Unlike existing signage, when the pedestrian pushes the button an "ON" response from the System is immediately visible via flashing LED lights above the words "CROSS WITH CAUTION". As an added benefit, the PCU automatically monitors frequency and direction of use. Other activation options include pre-set on-off times or Key Switch activation with a set "on" time operation. Keypad functions allow for up to three (3) automatic on-off times for each day of the week.

1.4.3 CONTINUOUS – CONSTANT ON

The illuminated crosswalk system can be set for continuous flashing 24/7. This is NOT recommended for solar powered systems due to the continuous power drain affecting battery recharge.

1.4.4 PROGRAMMABLE – Pre-set on/off timer

The illuminated crosswalk system can be programmed to activate for a predetermined duration with 3 different start stop times up to 7 days per week. Refer to section 2.8.4.11 for instructions.

1.5 LED "ENHANCED" PEDESTRIAN CROSSING SYMBOL SIGN

It is recommended that a new fluorescent-yellow-green color (FYG), diamond-shaped pedestrian crossing sign (W11A-2) with LED warning light modules at the "enhanced" flash rate, is installed with each System (FYG S2-1 or W66 type school symbol sign also available). The LED warning light modules are designed to flash in conjunction with activation of the System. This active LED pedestrian crossing sign enhances driver recognition of the System's presence, especially in adverse weather conditions, and contributes to educating the motorist as to the meaning of the flashing array of in-roadway warning signals. The new W11A-2 sign, with the LightGuard embedded LED warning light modules, replaces the standard W-54 sign typically placed at the crosswalk site.

1.6 LGS COMPONENTS NEEDED FOR A TYPICAL SMART CROSSWALK™

(Typical Four Lane Roadway Crossing)

| ITEM | QTY | SYSTEM DESCRIPTION |
|------|-----|--|
| 1) | 1 | <u>LightGuard Power Control Unit (PCU)</u> This PCU is based on a high speed 8 bit embedded microcontroller utilizing a compiled machine control language. A keypad and LCD display is provided to allow simple user adjustments to the System parameters. The PCU includes LGS's proprietary software program. |
| 2) | 1 | <u>Electronics Enclosure</u> The enclosure is sized to allow mounting of all components necessary to control the System. The enclosure's water-resistant design is based upon the United States National Electronic Manufacturer's Association (NEMA) specifications. |
| 3) | 18 | <u>LGS In-roadway Warning Signal Assemblies</u> The In-roadway Warning Signal assemblies are street-mounted to withstand normal vehicle traffic. The patent protected assemblies, including base plates, are a LGS proprietary design. |

LightGuard Systems® Installation & User Manual (all rights reserved)

- 4) 4 Automatic Activation System Bollards
Pedestrian detection bollards or posts for automatic activation of the Smart Crosswalk™ System are located at each crosswalk entrance zone. Optical beam interruption sensors are designed to activate the System automatically as the primary activation mechanism of the System.
- 5) 2 LED Enhanced Pedestrian Symbol Warning Sign
The fluorescent-yellow-green (FYG) color, diamond shaped pedestrian warning sign (W11A-2) is retrofitted with LED warning light modules. LED light modules are designed to flash at the same flash rate & in conjunction with activation of the LightGuard System™.
- 6) Lot Mount Assemblies
LGS approved standard mount assemblies are sized and configured appropriately to allow mounting of the enclosure, automatic activation sensors, active signs, and other any other equipment required to operate the System. Fasten hardware not included - tamper resistant hardware is recommended for sign attachment to mount assembly.
- 7) Lot Signal Head Spare Parts
Gel-plugs and O-ring.
- 8) Lot Cable/wiring
LGS approved multi-strand 8 conductor wiring (BELDEN 27601A), 18 AWG, can be provided to connect the activation assemblies to the System PCU. Stranded wire, 14 AWG, type RHW-2/USE-2/XLP (colors - BLK YEL & RED), **maximum OD 0.17"** (4.3 mm) can be provided to connect the In- Roadway Warning Signal assemblies to the System PCU.

OPTIONAL EQUIPMENT

- 9) Solar Power Assembly and Enclosure
Solar Power Assembly with modules includes; battery charge amp/load controller, sealed solar cell batteries, battery cable, wire, fusing, and T-blocks sized to adequately operate System.
- 10) ECP Assembly and Enclosure
ECP Assembly includes flashing unit controller and power supply
- 11) AC Beacon Interface
Modified PCU & DIN Rail connections for 2 separate 115VAC relays operating in either wig-wag or continuous mode
- 12) DC Beacon Interface
Modified PCU & DIN rail connections for 2 separate 12VDC relays operating in either wig-wag or continuous mode
- 13) Audible crosswalk Interface
Modified PCU and DIN rail connections for various audible systems (voice, chirp, tweet, etc.)
- 14) Dual Zone Upgrade Kit
Modified PCU & DIN rail connections for 2 independent cross walk zones (activates flashing at 2 separate crosswalks)

1.7 SUGGESTED INSTALLATION EQUIPMENT, MATERIALS AND TOOLS

The general list below may include all equipment, materials, or tools required for installation.

Typical electrical tools used in street lighting and signal work

- Inch pound torque wrench
- End wrenches & sockets
- Crescent wrenches
- Allen wrenches
- Hammers - 3 lb. (1.5kg) & claw
- Hack saw, File, & Knife
- Wire strippers
- Slip Joint Channel Lock Pliers
- Chisel
- 1/8" hex socket
- Taps & Dies
- 2 Putty knives x 4" (100mm) wide
- Cordless drill with assorted bits 0.250" (6.3mm) to 1" & hole saws 1" & 1½" (25mm & 38mm)
- Rotor hammer – 1" bit & 1½" bit
- Skill saw & blades
- Small hand held grinder
- Latex gloves – disposable
- AC DC meter
- Container and mixing tool for 2-part adhesive

-
- 100 ft (30m) measuring tape
 - Black & red electrical tape
 - **Grinding Core Drill:** Best Practice Custom "Flat Bottom" Core Drill: Best Practice Custom "Flat Bottom" Core Drill to eliminate the need for removing excess material from cored depression cut. *Contact LightGuard Systems for more information about availability.*
 - Duct Seal
 - Fish tape

-
- Air-blower (compressor)
 - Broom & dust pan
 - 1 Hose -garden type & fire hydrant adaptor
 - Wheelbarrow
 - Shovel – square point & round point
 - Rope

-
- Loop (saw cut) sealant
 - Conduit sealer
 - BONDO 7084 Adhesive (industrial 2-part epoxy) refer to section 3.2.7
 - 5-gallon (20L) pail of ¾" (19mm) rock for under traffic valve boxes
 - Generator, with extension cord, for auxiliary power
 - Cut-off, mixed fuel, & spare blades
 - Power driven asphalt (saw) cutter capable of cutting ½" (12mm) wide x 2" (50mm) deep
 - 6 sack mortar mix (base of poles & boxes)
 - 90lb (40kg) sack of sand

-
- 1¼" (32mm) *minimum* conduit as required by local agency (sizes can be determined by site engineer)
 - Reel wire holder ½" (12mm) diameter x 36" (1m) long on stand (optional)
-

- **ALL NECESSARY EQUIPMENT FOR IMPLEMENTING AN APPROVED TRAFFIC CONTROL PLAN**
-

2 POWER SYSTEM AND COMPONENTS

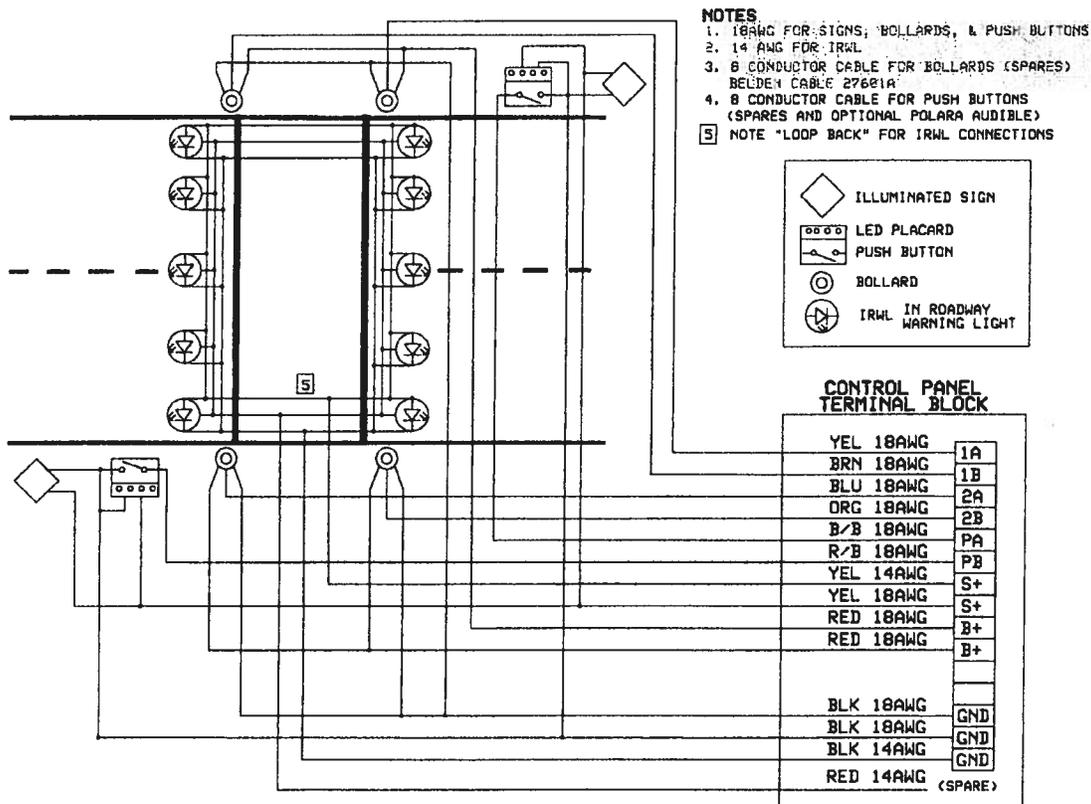
2.1 POWER SYSTEM DESCRIPTION

An AC powered system uses either 115VAC single phase or 230VAC two phase as an energy source. A DPST 5A circuit breaker protects the both the *Line and Neutral* for single phase OR *both Lines* for two phase input. The AC power is transformed to 13.5 VDC via a 150W power supply. The 5A DPST circuit breaker is marked by the factory for both *Line & Neutral*, with one pole of the 5A DPST circuit breaker labeled "hot black" and the other labeled "neutral white". For 2 phase operation, the label marked "neutral white" must be removed or otherwise placard over & the power supply switch must be reset to 230V prior to energizing the main 5A DPST circuit breaker on the back panel. The switch setting is normally factory configured for 115V & **MUST BE RESET** at time of installation for 2 phase 230V source. Refer to section 2.3.3 for switch location.

A Solar powered system uses a minimum 75W Photovoltaic array providing DC power to the internal batteries. All branch circuits have their own independent circuit protection in the Electronics Enclosure.

An ECP system uses 115VAC single phase as an energy source. A DPST 5A circuit breaker protects the both the Line and Neutral. The AC power is transformed to 13.5 VDC via a 150W power supply.

2.2 TYPICAL LIGHTGUARD SYSTEM® WIRING DIAGRAM



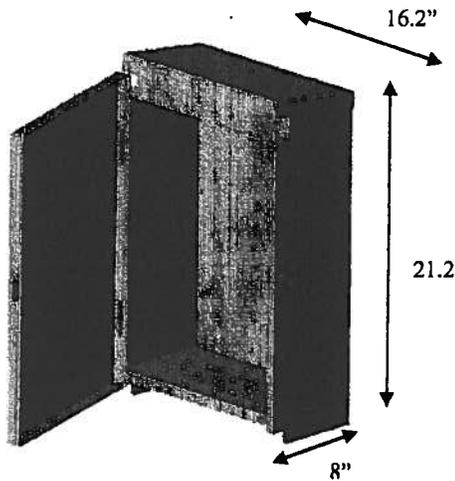
NOTE: This is a reference diagram only, connections shown are not applicable to all installations.

2.3 AC SYSTEM

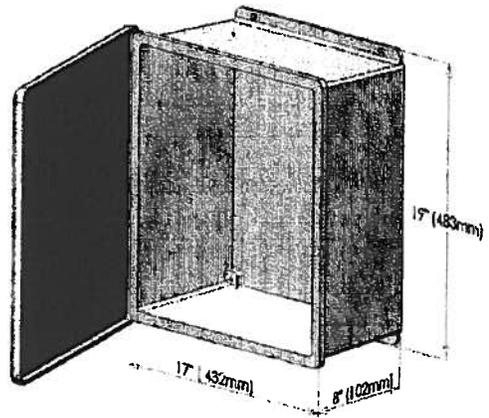
2.3.1 AC ENCLOSURE DESCRIPTION

The hasp latch locking enclosure is included with the LightGuard System®. The Aluminum enclosure (UL 50 standards and NEMA 3R) & Fiberglass Enclosure (NEMA 6) contains the control panel components and can be mounted to a pole or wall. Adjustable mounting brackets are provided with enclosure (mounting hardware not included, specific hardware to be supplied by installer). The all aluminum enclosure (*no longer stock item – special request only*) comes standard with a white powder coat finish & contain knock-outs on the rear for 1/2" NPT connectors (refer to sections 2.3.2 & 2.4.2)

2.3.2 AC ENCLOSURE OUTLINE DRAWING

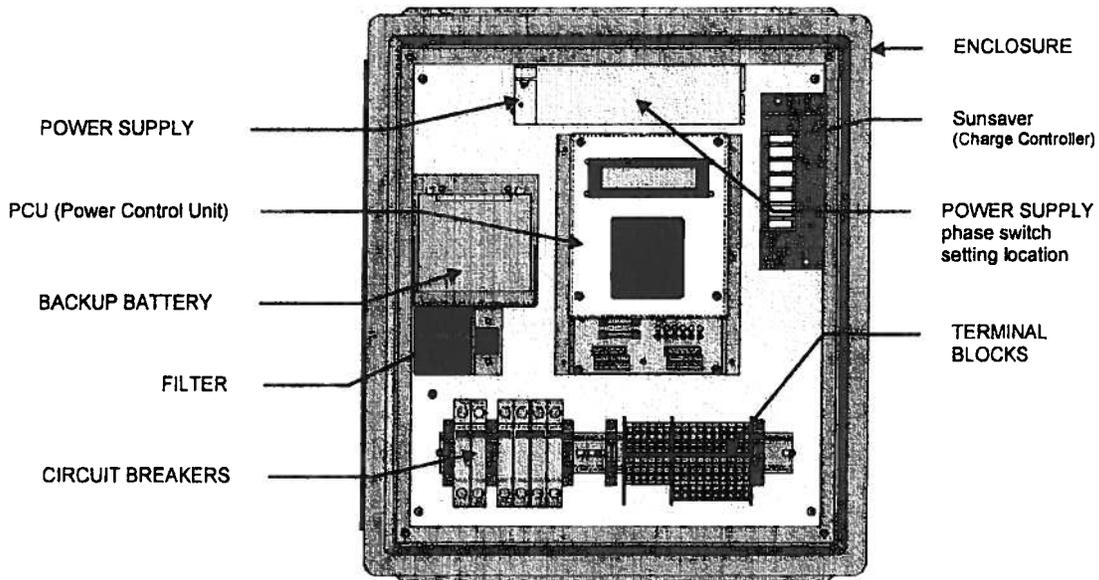


NEMA 3R Aluminum Enclosure
(Special Request Only)



NEMA 6x Fiberglass Enclosure
(Standard Model)

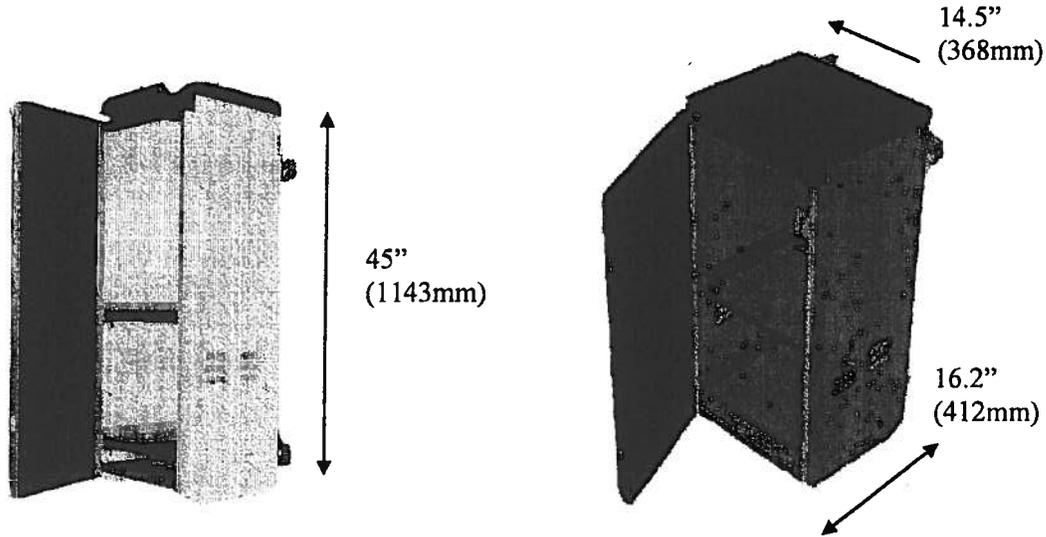
2.3.3 AC BACK PANEL LAYOUT



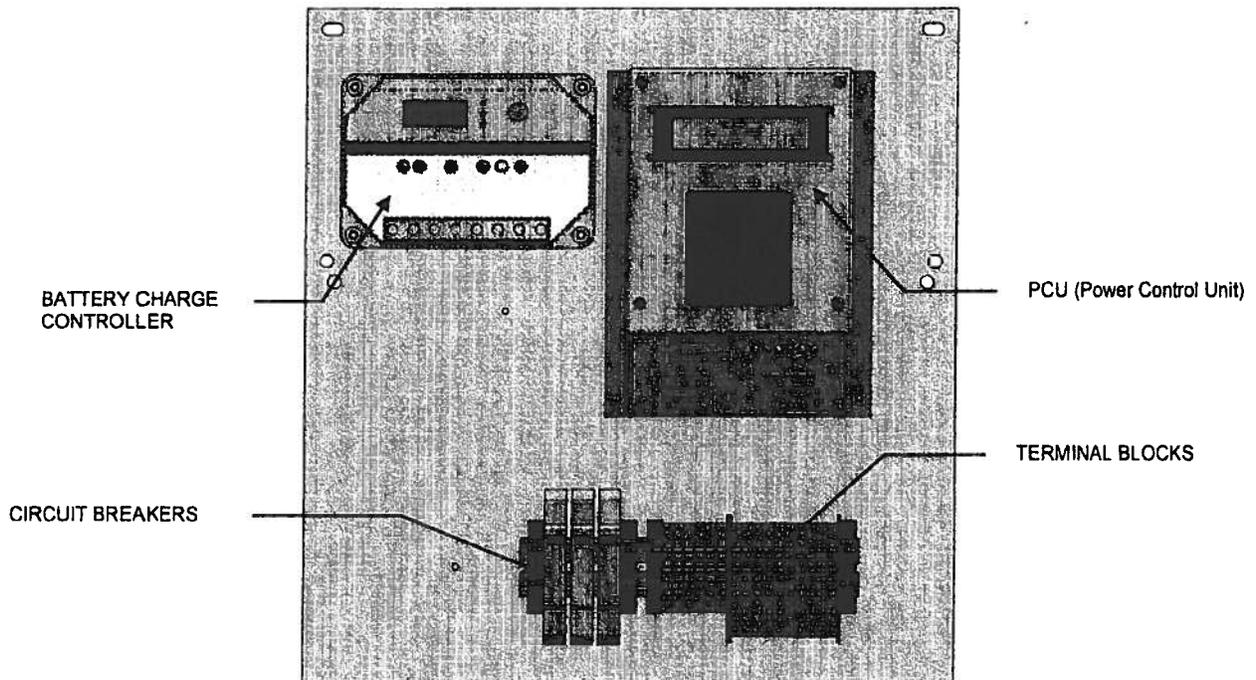
2.4 SOLAR SYSTEM

2.4.1 SOLAR ENCLOSURE

Solar powered Systems are free-standing pedestal mount or pole mount enclosures. Aluminum cabinets contain knock-outs on the rear for 1/2" NPT connectors (refer to sections 2.3.2 & 2.4.2).



2.4.2 SOLAR BACK PANEL LAYOUT



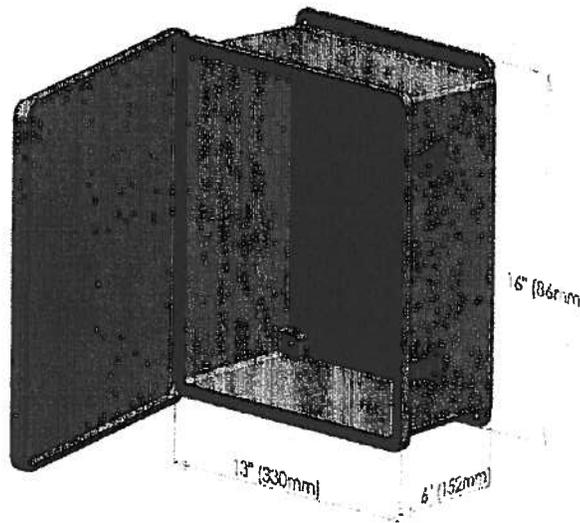
Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

2.5 ECP SYSTEM (ECP-1 & ECP-2)

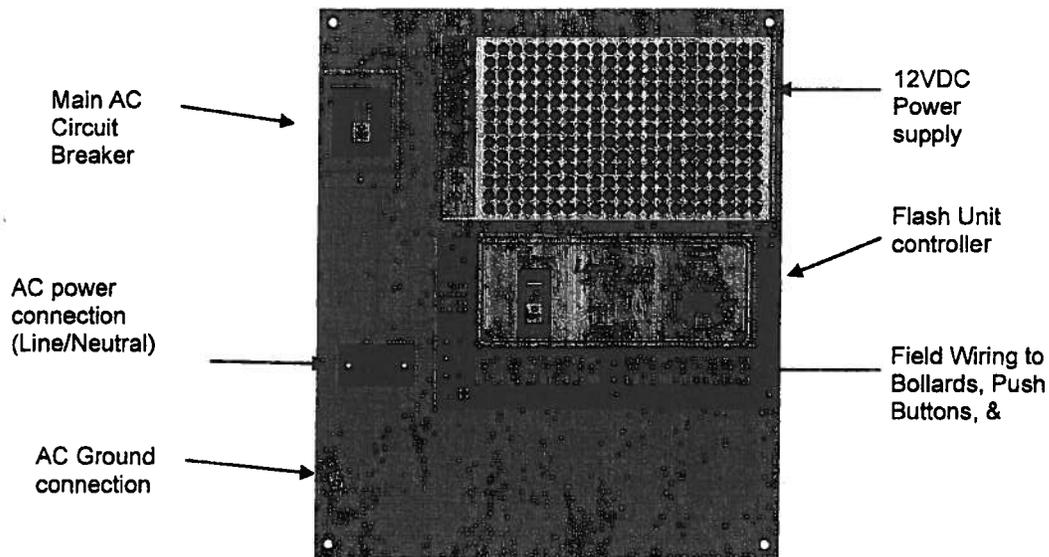
The ECP system differs from the AC & SOLAR systems in several ways. All user INPUT connections are made directly to the Flashing Unit Controller Subassembly. This system is NOT field programmable, only cross time is user selectable. Refer to section 2.5.4 for additional information.

2.5.1 ECP ENCLOSURE

The enclosure is a NEMA4X Fiberglass structure designed for wall or pole mounting only. Uni-strut brackets are provided with enclosure (mounting hardware not included, specific hardware to be supplied by installer). Electrical connections can be made by drilling access holes either on the bottom or the lower region on the rear of the enclosure. The enclosure has sufficient clearance to support up to one 1½" NPT connector on the rear, and several 1½" NPT connectors on the bottom. The standard enclosure color is white.

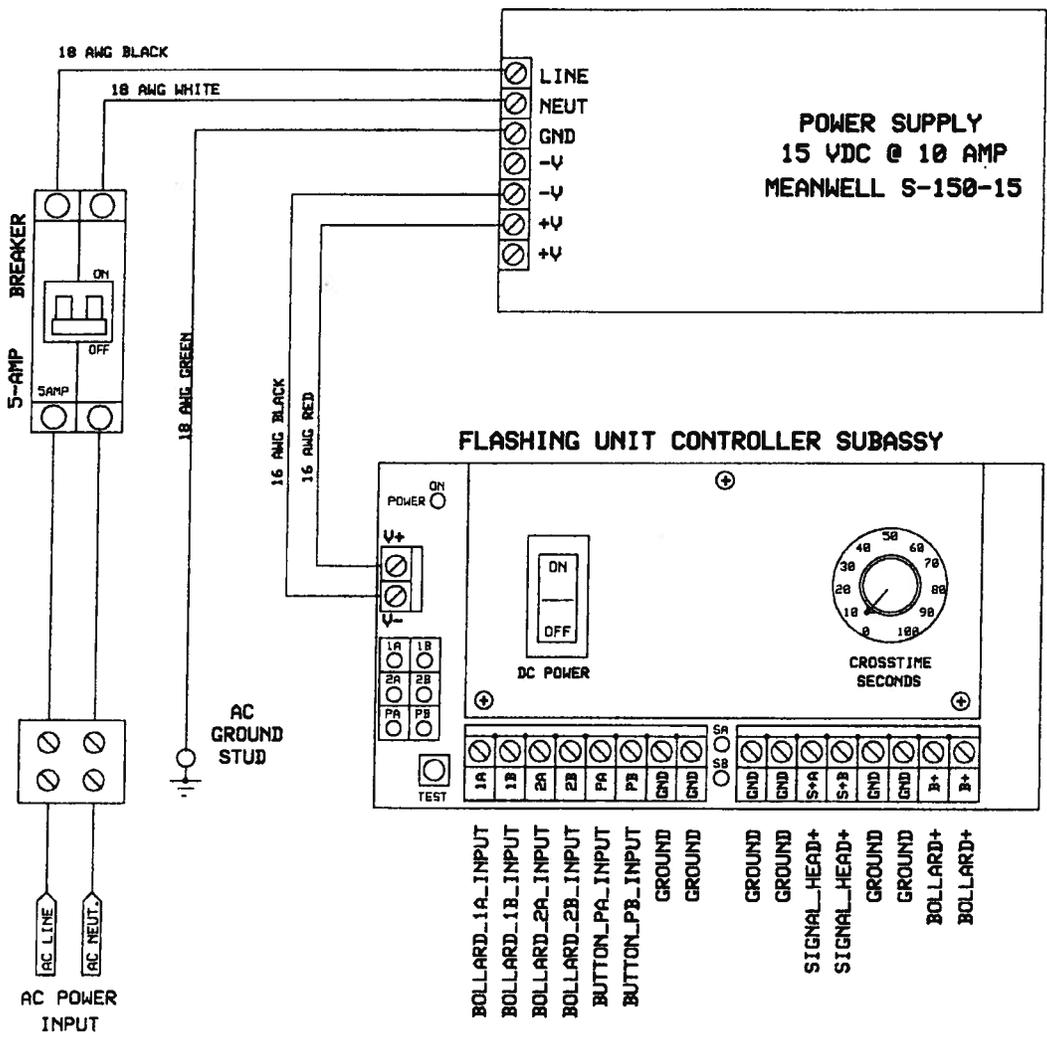


2.5.2 ECP BACK PANEL LAYOUT



Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

2.5.3 ECP BACK PANEL SCHEMATIC



2.5.4 ECP FLASH UNIT PARAMETER ADJUSTMENTS

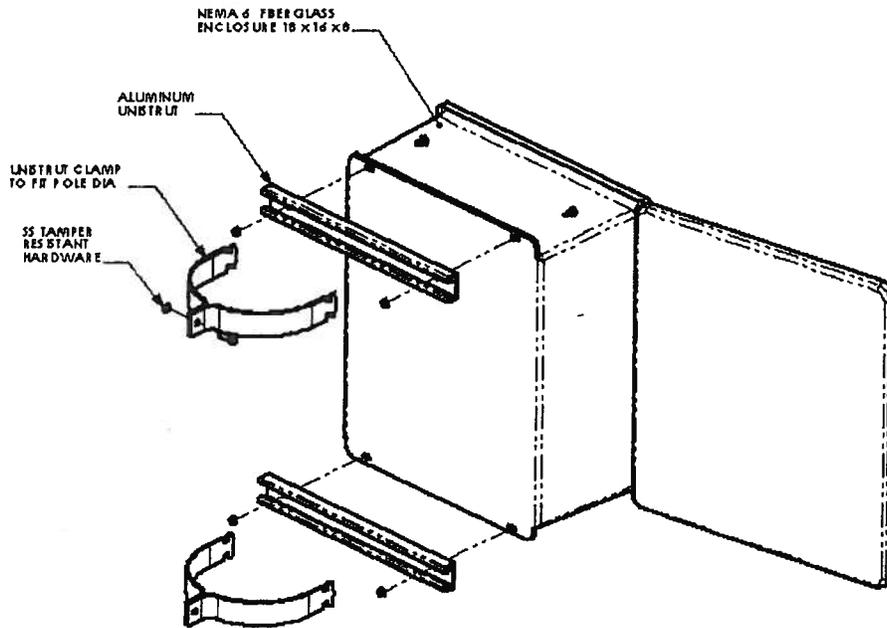
The ECP-1 has only one field adjustment, setting the cross time flash duration. This is set by rotating the selector knob to the number of seconds required for the system to flash once activated. Cross time can be set from 5 seconds to 100 seconds. The ECP will operate with Bollards &/or Push Buttons. Status indicator lights on the Flashing Unit Controller Subassembly show an input activation & the output flashing activation. There is also an LED to indicate that the system is energized. Lastly, there is a test button which can be used for in-cabinet testing of the ECP System.

The ECP-2 can be factory configured for 2 independent outputs each triggered from the any of the activation inputs. This system is customizable but with limitations. Contact LightGuard Systems for specific custom configurations (ie: dual color IRWL and/or DC beacons with alternating flash patterns).

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

2.6 ENCLOSURE POLE MOUNT DETAIL

All enclosures can be pole mounted using supplied Uni-strut brackets and appropriate hardware. The ECP, AC, & SOLAR Systems use the identical brackets.



2.7 BACK PANEL ELECTRICAL CONNECTIONS

AC & SOLAR SYSTEMS

The AC & Solar back panels incorporate the system Power Control Unit (PCU), circuit breakers, and backup battery charge controller. The PCU is field programmable & controls both signaling and timing functions. The battery charge controller sequences battery charging and low voltage load disconnect.

ECP SYSTEM

The ECP back panel incorporates the ECP flash unit, circuit breakers, and DC power supply.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

2.7.1 TERMINAL BLOCK CONNECTION DEFINITIONS (DC ONLY +12VDC & 0VDC)

SYSTEM INPUTS (DC ONLY)

- 1A Bollard Sensor 1st call signal side 1 } Bollards closest to enclosure
- 1B Bollard Sensor 2nd call signal side 1 }
- 2A Bollard Sensor 1st call signal side 2 } Bollards farthest from enclosure
- 2B Bollard Sensor 2nd call signal side 2 }
- PA Normally open line from Push Button assembly closest to enclosure
- PB Normally open line from Push Button assembly farthest from enclosure

SWITCHED 12VDC OUTPUT (Enlighten1 pulse rate)

- S+ In-roadway Warning Signal YEL &/or RED wire depending on IRWL color 2.7.2
- S+ In-roadway Warning Signal YEL &/or RED wire depending on IRWL color 2.7.2

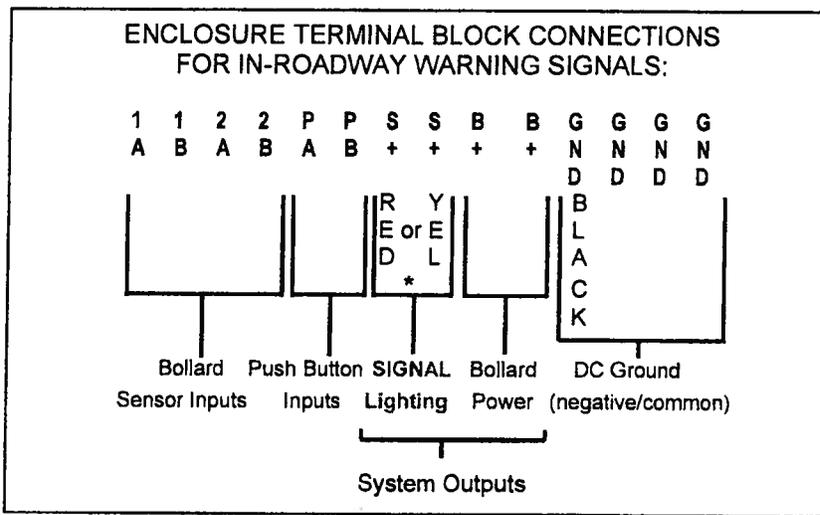
CONSTANT CURRENT SOURCE (12VDC Output For Use With Bollards Only)

- B+ Bollard area LED courtesy lights & Sensor Power
- B+ Bollard area LED courtesy lights & Sensor Power

DC GROUNDS (0 VDC)

- GND In-roadway Warning Signals DC Ground/Common
- GND Push Button DC Ground/Common
- GND Bollard Power DC Ground/Common
- GND LED Push Button Placard DC Ground/Common
- GND LED "Enhanced" Illuminated Pedestrian Symbol Crossing sign DC Ground/Common

2.7.2 TYPICAL ENCLOSURE "FIELD WIRING" TERMINAL BLOCK CONNECTIONS



DRAWING NOT TO SCALE

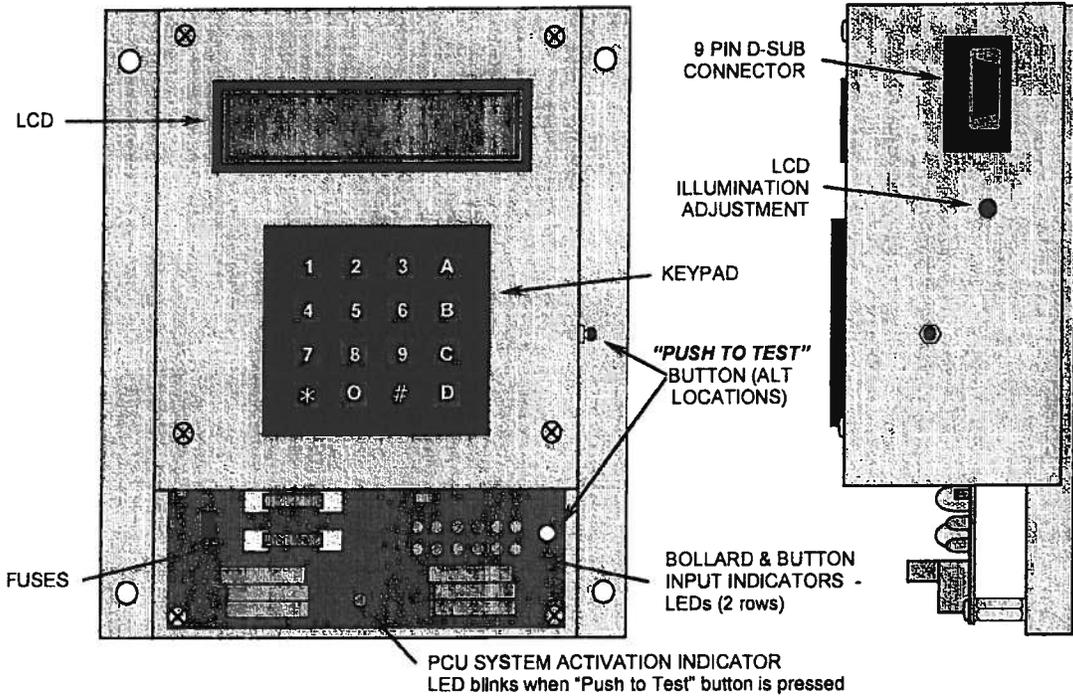
NOTE: ALWAYS USE 14 AWG WIRING, TYPE RHW-2/USE-2/XLP MAX OD .17" (4.3mm) APPROVED BY LOCAL AGENCY FOR IN-ROADWAY WARNING SIGNAL ARRAY HOME RUN CONNECTION. S+ POSITIVE CONDUCTOR COLOR IS DEPENDANT ON IRWL COLOR - RED IS USED FOR RED IRWL, IS USED FOR YEL IRWL. FOR ACTIVATION MECHANISM, ALWAYS USE 8 CONDUCTOR 18 AWG STRANDED SIGNAL CABLE TO RUN FROM ENCLOSURE TO OPPOSITE SIDE OF STREET.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

2.8 POWER CONTROL UNIT (PCU) DESCRIPTION

The PCU is based on a high-speed 8 bit embedded microcontroller utilizing compiled machine control language. A LightGuard proprietary software program provides effective, reliable operation allowing the user to make simple adjustments to the System parameters with a keypad and liquid crystal display (LCD).

2.8.1 TYPICAL POWER CONTROL UNIT (PCU) DRAWING



2.8.2 POWER CONTROL UNIT (PCU) PARAMETER ADJUSTMENTS

The PCU is preprogrammed with easily adjustable parameters. To operate the System manually flip all circuit breaker switches up to "ON" position. All functions are accessible from the keypad. A high-contrast liquid crystal display (LCD) provides easy read out of the settings. Pressing a key will display data, or a parameter, on the LCD. Some keys will access a list of parameters. If no change is desired, press the "#" key to escape or advance to the next parameter in that list. Pressing the "#" key can also escape from a partially entered value. Each parameter has a required number of digits. The required number must be entered or the number will default back to existing number.

The POWER CONTROL UNIT (PCU) KEYPAD FUNCTIONS TABLE describes programming the PCU using the keypad and display. Generally when a menu is accessed using one of the numeric keys, the user must complete all entries within that menu before the PCU will accept other menu parameter inputs. In many cases, the # key will act as a "next" function advancing the menu without changing the existing parameter in program memory. There is no "escape" key to undo keypad entries. If a keypad error is made, the user must complete that function menu & then repeat that function menu with correct keypad entries.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

Additional notes

INITIATING THE SYSTEM – When the PCU is energized for the first time, a message should display on the LCD with instructions to contact LightGuard Systems Inc. for an **ACTIVATION CODE**. This code is used for both system installation tracking & warranty tracking purposes.

CROSS TIME - Refer to local governing agency for System activation / crossing time. Cross time is set in seconds (PCU is pre-programmed with 20 seconds as a factory default). Cross time is entered in 2 digit increments using the numeric keypad. Typical cross time duration is based on pedestrians walking speed being 2 feet to 3 feet per second. Slower pedestrians require more time than faster pedestrians. A generic formula to compute a typical cross time is to divide the length of the crosswalk (width of the street) by either 2 or 3. Cross time should be set by the installer after observing pedestrian patterns.

An example of a 60 foot long crosswalk: $60' \div 2' \text{ per second} = 30 \text{ seconds}$

FACTORY SETTINGS - The system is preset with a cross time of 20 seconds, the activation counts are set to Zero, & the date/time are set for PST, system default is Single Zone Mode.

ACTIVATION COUNT DISPLAY - When the system is in Activation Count Display Mode (LCD shows the number of activations for either bollards or push buttons), the system is in "a sleep state". System activation WILL NOT occur (IRWL will not operate) until the activation count display mode is toggled off by pressing either 1 or 3 on the keypad respectively (software version 1.4 & earlier). When using software version 1.5 & later, activation count display mode will end after 1 minute to allow normal operation.

DOWNLOADING PCU MEMORY – PCU memory contains a limited number (approximately 65,000) of "date/time stamped" activation counts, diagnostics, & "power-up" events. The data is accessible using a computer connected to the appropriate port via RS232. Refer to addendum procedure for correct steps. This feature is available in software version 1.5 & higher.

SYSTEM ACTIVATION DISPLAY – When the system has been activated, the LCD will indicate a countdown of the remaining cross time until the Enlighten1™ flashing sequence ends. This feature is compatible with software version 1.6.7 and higher.

REMOTE COMMUNICATIONS – The PCU is designed for remote communication via the RS232 port. When operated in Terminal Mode, the remote terminal will echo many of the PCU LCD commands and text as well as some system diagnostics. Also while in Terminal Mode, the remote terminal keyboard will operate all of the PCU keypad functions. Refer to addendum procedure for remote connections. This feature is compatible with software version 1.7 and higher.

SINGLE/DUAL ZONE MODE– The PCU is capable of supporting both Single & Dual Zone Modes (whether or not the peripheral hardware for the Dual Zone Mode is physically connected to the PCU). The system default on "power up" is Single Zone Mode. Each time power is recycled to the PCU, the system will revert to Single Zone Mode operation. If Dual Zone Mode is required, pressing the keypad 2 will toggle into Dual Zone Mode. Single zone can be re-selected either by pressing keypad 2 again or by cycling power to the PCU. The mode can be verified (displayed on the LCD) using the keypad *. Refer to Dual Zone Installation Manual Addendum for further information. This feature is available in software version 1.7 & higher.

Custom functions available only on request

2.8.3 POWER CONTROL UNIT (PCU) KEYPAD FUNCTIONS TABLE (software v 1.7.X)

| Function | Keypad Press |
|--|------------------------------------|
| Clear all the Counters (Note: manually record counters prior to resetting to zero) | 0 → 555 |
| Display number of BOLLARD system activations (for Bollard pairs 1, 2, 3, & 4) | 1 → # to close |
| Display number of PUSH BUTTON system activations (for PB's: A, B, C, & D) | 3 → # to close |
| Set Cross Time Enter cross time in 2 digit increments up to 99 seconds. ZONE 1 - Bollards 1&2 Pushbuttons A&B ZONE 2 - Bollards 3&4 Pushbuttons C&D (requires custom PCU and software setting for Single/Dual Zone mode operation) | 4 → 2 DIGITS 7 → 2 DIGITS |
| Set Calendar & 3 Scheduled Activations (<i>Auto Time 1, 2, & 3</i>) | 5 |
| Set current <i>Time of Day</i> Use 4 digits, i.e. 02:30 (24 HOUR CLOCK) | # → 4 DIGITS |
| Set current <i>Date</i> Use 6 digits format mmddyy; i.e. 042903 | # → 6 DIGITS |
| Set current <i>Day of Week</i> (1 = Sun, 2 = Mon, 3= Tue, etc.) | # → 1 DIGIT (1 thru 7) |
| 1st Scheduled Activation Set <i>Auto Time 1 ON</i> Use 4 digits, i.e. 09:30 (24 HOUR CLOCK) | # → 4 DIGITS |
| Set <i>Auto Time 1 OFF</i> Use 4 digits, i.e. 09:40 (24 HOUR CLOCK) | → 4 DIGITS |
| Set <i>Days Active</i> press combination of 0 & 1 for each day of the week SMTWTFS - 0 for <i>inactive</i> day or 1 for <i>active</i> day | → 7 DIGITS (0 or 1) |
| 2nd Scheduled Activation Set <i>Auto Time 2 ON</i> Use 4 digits, i.e. 12:30.(24 HOUR CLOCK) | # → 4 DIGITS |
| Set <i>Auto Time 2 OFF</i> Use 4 digits, i.e. 12:40 (24 HOUR CLOCK) | → 4 DIGITS |
| Set <i>Days Active</i> press combination of 0 & 1 for each day of the week SMTWTFS - 0 for <i>inactive</i> day or 1 for <i>active</i> day | → 7 DIGITS (0 or 1) |
| 3rd Scheduled Activation Set <i>Auto Time 3 ON</i> Use 4 digits, i.e. 15:30.(24 HOUR CLOCK) | # → 4 DIGITS |
| Set <i>Auto Time 3 OFF</i> Use 4 digits, i.e. 15:40 (24 HOUR CLOCK) | → 4 DIGITS |
| Set <i>Days Active</i> press combination of 0 & 1 for each day of the week SMTWTFS - 0 for <i>inactive</i> day or 1 for <i>active</i> day | → 7 DIGITS (0 or 1) |
| Pedestrian Detectors in/out Service turn power on or off to all Bollards using keypad 6 to alternate between on & off | 6 |
| Single/Dual Zone mode toggles software between single zone and dual zone modes. The software MUST be in Single Zone mode for all inputs to activate ZONE ONE. | 2 |
| All Outputs on Constant Blink using keypad 9 to alternate between on & off | 9 |
| Display Software Version | * |

2.8.4 POWER CONTROL UNIT (PCU) DETAILED KEYPAD INSTRUCTIONS (software v 1.7)

The following detailed instructions for using the keypad and display is organized by function. The text on the left describes the key-presses and programming process step, and the text on the right is what is actually shown on the PCU display.

2.8.4.1 1ST TIME START UP

To activate the system for the 1st time, a start code is required. This start code can be obtained by contacting LightGuard Systems using the phone number shown in the display.

| | |
|--|---|
| 1 st time start up Display | Call 1-888-247-2974 or Enter Start Code: |
| Key-in the correct 3 digit start code. Keying in the 1 st digit will overwrite the existing display. Each successive digit will overwrite the previous digit. Example shown is typing in Start Code 123 | 1 |
| | 2 |
| | 3 |

2.8.4.2 DEFAULT DISPLAY

The Default Display will be visible at all times unless another menu is currently activated. After a short period of inactivity, the system will generally revert back to the Default Display (exceptions are constant flash mode & fault conditions) to accept keypad inputs.

| | |
|---|---|
| The example shown is April 1 2009 @ 9:51A | LightGuard Systems 04/01/09 09:51:05 |
|---|---|

2.8.4.3 SOFTWARE VERSION

The system will show the software version & zone mode from the internal micro controller.

| | |
|---|--------------------------------------|
| To display the software version Press *. The example shown is version 1.7.4 in Single Zone Mode | SW version 1.7.4 Single Zone Mode |
|---|--------------------------------------|

2.8.4.4 CHANGE CROSS TIME

The Factory Default Cross Time is set to 20 seconds.

| | |
|---|--|
| To Set Cross Time for Zone 1, Press 4 to open the menu & then 2 digits to set new time (example 15 sec) | Zone 1 Cross Time=20 New Time is 15 |
| To Set Cross Time for Zone 2, Press 7 to open the menu & then 2 digits to set new time (example 25 sec) | Zone 2 Cross Time=20 New Time is 25 |

2.8.4.5 CLEAR ALL THE COUNTERS

| | |
|--|--|
| To Clear all the counters: press 0 to open the menu | Press 555 to Zero Counters & Log: █ |
| Then press 555 | Press 555 to Zero Counters & Log: 555 |
| Clear counters Message will briefly display | Counters are Set to Zero |

2.8.4.6 DISPLAY BOLLARD ACTIVATION COUNTS

| | |
|--|--|
| To Display the number of bollard system activations (bollard pairs 1, 2, 3, 4), press 1 to open the menu. The example shows 12,345 call signals received from each of the bollard pairs. | #1= 12345 #2= 12345 #3= 12345 #4= 12345 |
|--|--|

2.8.4.7 DISPLAY PUSH BUTTON ACTIVATION COUNTS

| | |
|---|--|
| To Display the number of push button system activations (buttons A,B,C,D), press 3 to open the menu. The example shows 12,345 call signals received from each of the bollard pairs. | #A= 12345 #B= 12345 #C= 12345 #D= 12345 |
|---|--|

2.8.4.8 BOLLARD POWER ON/OFF

The power to the bollards can be toggled off/on using the keypad.

| | |
|---|---------------------------------|
| To toggle power off/on to the bollards (both the sensors & courtesy lights) press 6 | Ped Detectors OUT OF SERVICE |
| To toggle power on/off to the bollards (both the sensors & courtesy lights) press 6 | Ped Detectors IN SERVICE |

2.8.4.9 CONSTANT FLASH

The flashing outputs can be set to activate continuously.

| | |
|--|---------------------------------------|
| To set outputs on constant flash, press 9. This message will display until 9 is pressed again or power is recycled | Constant Flash Mode Press 9 to End |
|--|---------------------------------------|

2.8.4.10 CALENDAR SETTING

The calendar menu is linked / integrated into the auto-time activation feature menu. Once this menu is initiated, there is no "back" capability. If a mistake is made in keying, either finish the menu sequence & then repeat the entire process with correct keying or turn the power off/on for system reset. In general, press * to advance the menu without having to input prompted data.

| | |
|--|--------------------------------------|
| To set the internal calendar press 5 to open the menu | # = yes / * = no Set Time? █ |
| Press # to enter a new time in 24 hour clock. Example showing current time 13:11 (1:11 PM) | Time: 13:11 NEW(24Hr.) █ |
| Example showing current time 13:11 (1:11 PM) changing to 0953 (9:53AM) | Time: 13:11 NEW(24Hr.) 0953 |
| New Time Message will briefly display | TIME: 09:53 |
| Press # to enter the date | # = yes / * = no Set Date? █ |
| Enter the date using 6 digits MMDDYY format | Date: 04/01/09 NEW(MMDDYY) █ |
| Example showing current date April 1 2009 changing to January 1, 2010 | Date: 04/01/09 NEW(MMDDYY) 010110 |

LightGuard Systems® Installation & User Manual (all rights reserved)

| | |
|--|--|
| New Date Message will briefly display | Date: 01/01/10 |
| Press # to enter the day of the week | # = yes / * = no Set Day? █ |
| Enter a number to represent the day of the week using a single digit 1 through 7 | Day # is: 6 NEW # (SUN=1) █ |
| Example showing current day of the week is Friday changing to Wednesday | Day # is: 6 NEW # (SUN=1) 4 |
| New Day Message will briefly display | Day: 4 |
| The AutoTime setting prompt will display. Press * to advance the menu without setting AutoTime. Press # to set AutoTime. | # = yes / * = no Set Zone 1 AutoTimes |

2.8.4.11 AUTO TIME

After the calendar has been set, the menu will continue for setting up automatic activations at specific times. This feature is referred to as Auto Time. There are 3 different Auto Time settings available. To bypass this part of the menu, pressing * will advance thru the successive prompts until the Default Display is shown. To program the controller for Auto Time, follow the steps below.

| | |
|---|---|
| Press # to set up Automatic Activations based on schedule. This example shows how to program the system for Zone 1 activations from 7:00A-8:30A on Monday Wednesday & Friday. Note that the same sequence is used for programming Zone 2. | # = yes / * = no Set Zone 1 AutoTimes |
| Auto Times Setting Message will briefly display | Zone 1 AutoTime Settings |
| Then the prompt to Enter a Start Time will display | Time 1 ON: 00:00 NEW Time 1 ON: █ |
| Set a Start time for 1 st Auto activation to 7:00A | Time 1 ON: 00:00 NEW Time 1 ON: 0700 |
| New Start Time Message will briefly display | Time 1 ON: 0700 |
| Then the prompt to Enter a Stop Time will display | Time 1 OFF: 00:00 NEW Time 1 OFF: █ |
| Set a Start time for 1 st Auto activation to 8:30A | Time 1 OFF: 00:00 NEW Time 1 OFF: 0830 |
| New On Time Message will briefly display | Time 1 OFF: 0830 |
| Then a prompt will appear to program the days this scheduled activation will occur. | Days Active1:0000000 NEW SMTWTF: █ |
| Keying in a 1 means that auto time is set for that day, a 0 means no auto time that day. The example shows auto times for Monday Wednesday & Friday only. | Days Active1:0000000 NEW SMTWTF: 0101010 |
| Then a message briefly displays showing the days that have been set to activate. | Days Active1:0101010 |

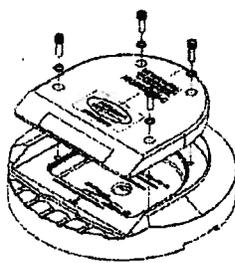
The menu process steps for Auto Time will repeat for EACH of the other 2 auto time activations. These process steps can also be repeated for Zone 2 as required / if applicable.

3 IN-ROADWAY WARNING SIGNAL (IRWL)

3.1 GENERAL DESCRIPTION

The LightGuard System® In-Roadway Warning Light (IRWL) LED light fixture is made of a high strength plastic composite. It is designed for mounting into a base plate assembly that is permanently attached to the roadway. This allows for any in-roadway warning light fixture that may become damaged, or inoperable for any reason, to be easily repaired with a plug-in replacement.

IN-ROADWAY WARNING LIGHT (IRWL) TYPE-9X ASSEMBLY

| General Performance Specifications | | Typical Mounting | Base Plate Compatibility |
|------------------------------------|----------------------------|--|---|
| Parameter | Value | | |
| Visibility | ± 22.5° Horiz +10° Vert |  | SD-10C (composite) CHS-14 (steel) |
| Operating Temp | -20° to +80°C | | Available Models LGS-9X-1 (Red) LGS-9X-2 (Amber/Red) LGS-9X-3 (Amber) LGS-9X-4 (White) |
| Operating Voltage | 9VDC to 15VDC | | |
| DC Current @ 12VDC | 0.1 Amps | | |
| Avg Power Dissipation | 1.5 watts | | |
| Luminous Intensity | 252,000 mcd | | |
| Material | Polyurethane/Nylon | | |
| Housing Color | Black | | |

3.2 MAJOR CONSIDERATIONS FOR LIGHTGUARD SYSTEM IRWL INSTALLATION

There are a number of basic considerations when determining the location and alignment direction of each in-roadway module for any given installation site. These items should be considered during the installation procedure for the LightGuard in-roadway warning system. Be sure to have enough specified wire/cable, 2-part epoxy, and saw cut filler (loop detector type filler) ON SITE BEFORE BEGINNING INSTALLATION.

3.2.1 DISTANCE OUTSIDE OF, AND AWAY FROM CROSSWALK STRIPES

The installer should measure and be certain to keep the distance at least 18" from the outward edge of the crosswalk. In general, greater distances can be used without any noticeable difference to the motorist. However, no greater distance than 10 feet (3m) is recommended by MUTCD standards. If required by a specific circumstance, (i.e., grade or advance curve warning layout) placement may necessitate an authorized deviation, using sound engineering judgment (thereby not conforming to MUTCD standards).

3.2.2 LOCATION OF EACH INDIVIDUAL IRWL MODULE

Each IRWL should be located in a position that will be directionally visible to the approaching motorist from their viewing position at the wheel usually 200' to 400' (61m to 122m) in advance of the crosswalk, allowing sufficient time to recognize and react to the warning lights upon activation. When locating IRWL in the path of street sweeping equipment, caution should be taken to consider the proper location for minimizing possible cosmetic damage to the IRWL at the "curb and gutter" locations (on the approach sides) by avoiding the "skid paths" associated with this type of equipment.

3.2.3 PATTERN

The pattern or layout should follow the recommended configurations that have been tested and proven effective for the type of crosswalk for which the system is being used. The MUTCD - Manual for Uniform Traffic Control Devices 2009 chapter 4N (<http://mutcd.fhwa.dot.gov/html/2009/part4/part4n.htm>) defines the authorized use & application of IRWL. For best practice; one module on the outside travel lane edge of each parking lane or bike lane (stay out of bike/parking lanes), one module on the center

divider lane or line, and one module in each travel lane approximately under the location of each vehicle's license plate, (or centered between the tire paths of the travel lane). The "geographic" center of the lane *may not* be the appropriate location as vehicular traffic tends to travel "off center" of any given marked lane. The idea is to minimize the frequency of tire impact to the in-roadway modules by placing them outside of the predominant vehicle tire wear pattern. With a raised median strip, the module that is usually placed on the centerline or lane should be installed on the far left of the approach lanes next to the raised median curb or barrier. For maximum or higher level needs, an optional addition of one module on each lane delineation line may be considered. Placement should be in accordance with MUTCD. Examples showing optional & required placement for California MUTCD can be found via <http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcdraftrev/4L.pdf>.

3.2.4 AIMING POINTS

The light beam view path of the modules should be determined by the local traffic engineer or responsible agency for the purposes of reaching the motorists viewing point 200' to 400' (61m to 122m) in advance of the crossing (refer to section 3.7 for aiming and alignment). Generally, the layout provides for the modules in the approach travel lanes to be aimed straight down the approaching motorist's viewing path. The parking lane units (from the left and right sides) should also be aimed or aligned toward a "control point" approximately 200' to 400' (61m to 122m) in advance of the crossing, and should also converge at the approaching motorist view path. This would have the outside units canted slightly inward toward the center of the lanes to that point. The units on the center line and opposing travel lanes will be canted slightly toward the approaching motorist travel lanes to those "control points" that will allow the approaching motorist the best view of the light source generally from 200' to 400' (61m to 122m) away depending upon the approach speeds at the particular location. Curved approaches will require a greater degree of analysis to provide the maximum benefit.

3.2.5 SAW CUT FOR WIRING AND IRWL MODULES

The saw cut for wiring should follow the manual for depth and width to accommodate the necessary wiring and tray cable for the installation. As a general rule this averages 3/8" - 1/2" (9.5mm - 12mm) wide cut approximately 2 1/2" (63mm) deep (should be below core drill depth). Operational component connections from PCU to across the street can be pulled to terminal boxes for easy access connecting activation mechanisms and other active LED components using standard type wire. Ensure that the saw cut makes a complete loop through all IRWL locations (refer to wiring diagram section 3.6.2).

3.2.6 DEPRESSION CUTS FOR LIGHT MODULE (IRWL / SIGNAL HEAD) BASE PLATES

The depression cuts for the base plate assemblies can be accomplished in a number of ways. Most contractors prefer core drilling or a chip hammer. A flat bottom "Grinding Core Drill Bit" (section 1.7) is available to improve efficiency. Also, making "cross cuts" in the pavement at the IRWL location will considerably expedite the core drilling process (refer to Figure 3 & Figure 4 for example of Grinding Core Drill & "cross cuts"). After determining the location and aiming direction of a particular light module, then core or chip out hole approximately 1 3/8" ± 1/8" (35mm ± 3mm) deep refer to reference dimension table 3.2.6.1. A clean "corner" is desired at the bottom (flat bottom, vertical edges). Trim interior surface to proper depth, clean and prepare for epoxy. *The size of the depression cut is VERY important. If the depression cut is too deep or the OD is too large, then excess epoxy will be required for securing to the roadway. If the depression cut is too shallow, the base plate will protrude above grade. If the depression cut OD is too small, insufficient epoxy will prevent the base plate from being permanently affixed to the roadbed.*

3.2.6.1 REFERENCE DIMENSIONS FOR BASE PLATE MOUNTING TO ROADWAY

| Base Plate Model | Base Plate Material | Base Plate OD - Outside Diameter | Base Plate Height | Recommended Depression Cut Hole Diameter | Recommended Depression Cut Hole Depth |
|------------------|---------------------|----------------------------------|-------------------|--|---------------------------------------|
| CHS-14 revH min | Steel | 13 3/4" (350mm) | 1 3/8" (35mm) | 14" (356mm) | 1 1/2" max (38mm) |
| SD-10C | Composite | 9 7/8" (251mm) | 1 3/8" (35mm) | 10" (254mm) min | 1 1/2" max (38mm) |



Figure 3

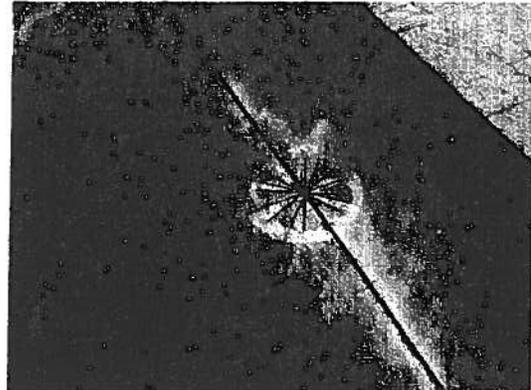


Figure 4

3.2.7 EPOXY

Be sure to have enough wire/cable, SPECIFIED 2 part epoxy (Bondo 7084 Piezo/Traffic Sensor Sealant available at 800-622-8754 or by LGS upon request), and saw cut filler (loop detector type filler specified by local regulations) ON SITE BEFORE BEGINNING INSTALLATION. AFTER ALL WIRES ARE IN PLACE IN THE WIRE CUTS, trim the wire to a suitable length to work with for wiring the base plates. Using duct seal or equivalent, create a temporary "epoxy dam" section 3.5.3 at the interface where the saw cuts enter/exit the depression cut area. The temporary epoxy dam prevents epoxy from flowing from the depression cut into the saw cut.

Remove plastic thread protectors from threaded holes in base plate. Temporarily install socket head cap screws into threaded holes (approximately 3-4 turns) in order to use the screws for base plate leveling. Slip the wire through the center hole and "stand" the base plate on end "ready" to place into the depression. Thoroughly mix the appropriate type of epoxy for use in the base plate depression cut. Place an appropriate amount of 2 part epoxy in the depression (sufficient to completely seal bottom and rise around outside edges of the base plate when pushed into place). To insure a proper moisture seal, place the initial "glob" of epoxy in the center of the depression, move (or wiggle) wires around in the epoxy to attain wire seal, then push material to the outside edges and set the base assembly in place. The base plate should be aimed and level (use the temporarily installed screws to elevate the base plate if required during leveling) before epoxy is allowed to set-up properly. Note: If the depression is for some reason cut too deep, a "few" small rocks, pebbles or BB's can be used to maintain a proper height. It is best to have the epoxy surround the base plate edges approximately level with the surface. Epoxy working life is approximately 10 minutes depending upon ambient temperature. After this duration, the base plate can't be moved. Allow epoxy time to fully set, generally 20 to 30 minutes, prior to installing IRWL.

3.2.8 WIRES

Be certain that wire (ref section 1.6) type RHW-2/USE-2/XLP MAX OD 0.17" (4.3mm) is the correct size and type for in-roadway modules, and activation mechanisms (bollards &/or Pushbuttons) for single run across street as recommended. Pull and cut 14 AWG wires to appropriate length. DO NOT STRIP INSULATION from IRWL wire. Connect to molded plug connector (pigtail cable assembly) provided in base plate assembly using provided Scotchlok Self-Stripping Pigtail Connectors-crimp to seal (see section 3.6).

3.2.9 SIGNAL HEAD INSTALLATION

Using compressed air, remove dirt and all debris from base plate cavity. Ensure that mounting screw threads are clear. Place duct seal or plumbers putty onto the base plate in the region under the signal head around the outside edge perimeter (refer to Figure 1) to minimize the potential for moisture entering the base plate. Plug pig-tailed base plate cable electrical connector (RECEPTACLE) into IRWL cable electrical connector (PLUG). Note appropriate alignment for 3 pin connector. Ensure that

mated molded plug connectors are PROPERLY SEATED. Check for proper "O" ring placement and attach signal head to base using **SOCKET HEAD CAP SCREWS** with **LOCK WASHERS** and **FLAT WASHERS**. Tighten using an **INCH POUND TORQUE WRENCH**.

Composite Base plate: Recommended torque value is not to exceed 4 ft lbs 48 in lbs (5N m) – **NO TIGHTER**. Hand tightening with a standard Allen wrench is also acceptable. **WARNING** – the composite base plate is very sensitive to this procedure, as damage to the threads may occur if tightened over 4 ft lbs (5N m).

Check for even contact and snug fit with base plate top surface. Place additional duct seal or plumbers putty into the gap between the base plate and the signal head and into the counter bore holes for the socket head cap screws to minimize the potential for moisture or debris from entering the base plate (refer to [Figure 2](#)). Check for LED light module operation and move on to next unit.

NOTE: It is **IMPERATIVE** that these steps be followed when installing the signal heads. Failure to do so voids the manufacturer's warranty. It is highly recommended that within 30-45 days after initial installation, that the heads be re-checked to verify that the 4 ft lbs (5N m) of torque has been maintained.

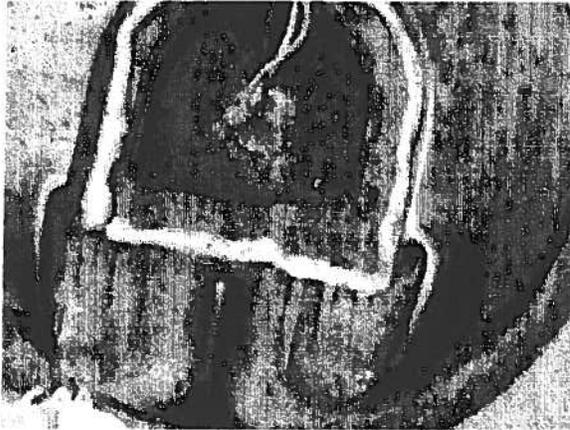


Figure 5

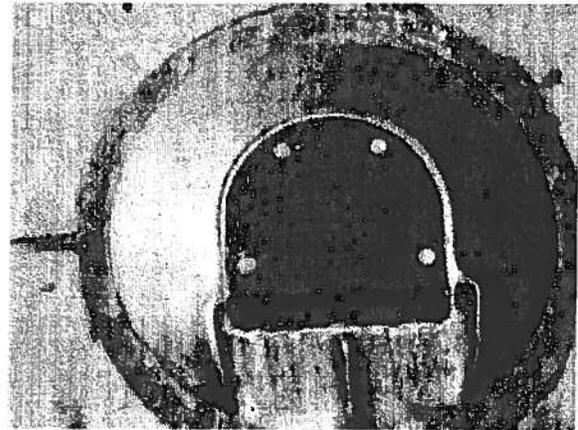


Figure 6

3.2.10 NEW ROAD SURFACE CONSTRUCTION INSTALLATIONS

If site is new construction, conduit under the roadway surface and knockout templates (to achieve base plate depression excavation for installation) is an option for the installer/contractor. This will avoid or minimize saw cutting into new roadway surfaces. Plywood cutouts or similar knockouts to match the base plate assembly size may be utilized in preparation for the installation of the base plates upon completion of the roadway surface. Precise engineering must be exercised to insure proper placement and alignment of the in-roadway modules on the lane lines and travel lanes once the work is completed. A separate conduit is recommended for the single run of tray cable across the street.

3.3 CONCRETE INSTALLATION PROCEDURE

The following information is a basic guideline for installing LightGuard Systems In-Roadway Warning Lights at locations where new concrete is to be poured.

Conduit must be installed. It should be placed at least 3" to 4" (76mm to 101mm) below the surface of the roadway (or as required by local regulations). The single ¾" (19mm) hole in the center of the base plate can be enlarged to approx. 2½" (63mm) dia in order to insert two ¾" PVC conduits connected to 90° elbows up into the base plate wiring cavity. Alternatively, a single 1½" to 2" diameter metal or PVC

conduit can be used with a TEE connection stub that extends at least 1" (25mm) above the surface (after concrete is poured) for pulling wire loops through TEE's. This is installed at each location where an In-Roadway Warning Light Base plate will be placed. Minimum recommended conduit is ¾" PVC to comply with NEC 14AWG type RHW-2/USE-2/XLP conductors.

Use a circular wooden plug or equivalent 1½" (38mm) thick by approx 10⅝" (257mm) dia for SD-10 Base plate or 14" (355mm) dia for CHS-14 Base plate) with a center hole having a diameter just larger than the conduit stub(s) protruding up from the road bed as a concrete forming tool (ref section 3.2.6.1). The plug center hole diameter should be minimum 1/8" (3mm) smaller than center hole in base plate to ensure subsequent base plate seating. The plug is placed over the conduit stub (or elbows) during the concrete pour to create a depression form for installing the base plate when concrete is dry.

After the concrete is dry, the wooden plug is removed & the base plate is affixed into the road (ref section 3.2). Excess concrete around the conduit should be removed to allow epoxy to bond the conduit to the base plate at the center hole. The extended conduit can then be cut flush to the inside surface of the base plate. Remove any excess epoxy &/or concrete from the base plate. After conductors are terminated, the exposed portion of the conduit opening should be filled with duct seal to minimize the potential of moisture or contaminants from entering the conduit.

3.4 IRWL SIGNAL AND BASE PLATE INSTALLATION GUIDELINES

NOTE: Correct Placement of Bases is CRITICAL to System Performance

Step 1 - Determine placement and site angles of in-roadway warning signals to intersect at optimum driver viewing zone as specified by Improvement Drawings (See Section 3.7.1). Signal assemblies can be manually aimed, but laser site method is preferred.

Step 2 - Provide depression cut-out for base plates approximately 1 3/8" (35mm) ± 1/8" (3mm) deep on concrete or asphalt. Depression cut-out should be ¼" to ½" (6mm to 12mm), slightly larger than base plate. Depression cut-outs should be level, or even, to conform to the existing approach grade of the roadway.

Step 3 - Perform saw cuts using pavement cutting device in accordance with predetermined layout to facilitate hook-ups through bottom of base plate to terminal connection points. Cuts should be ½" (12mm) wide in accordance with the CA Standard Plan ES-5A, or local standards, with a depth of 2" to 2½" (50mm to 63mm) for direct burial of wire (see Sections 3.5.1 and 3.5.2).

Step 4 - Dig out for traffic electric hand hole boxes and install boxes for wiring access points at predetermined locations in accordance with the CA Standard Plan ES-5E, or local standards.

Step 5 - Install all necessary wire to predetermined connection points and lay in cleared roadway cuts. Using duct seal or equivalent, create a temporary "epoxy dam" section 3.5.3 at the interface where the saw cuts enter/exit the depression cut area. The epoxy dam will temporarily hold down the wires & simultaneously dam the core drill area to prevent flow of epoxy back into the saw cut.

Step 6 - Check for proper site distance angles and level depth of base plate (See Sections 3.7, 3.5 and 3.2.4). Mark alignment on roadway for base plate focus direction. Top of base plate (circumferential edge shown in section 3.5.1) should be flush or slightly below (less than .10" = 2.5mm) roadway surface AND free from excess adhesive (See section 3.5).

Step 7 - Mix only enough 2-part epoxy (BONDO 7084) for 2 to 3 base plates, since Epoxy working life is approximately 10 minutes. Surfaces should be cleaned of dirt or debris, and dry before applying adhesive. Ensure that wires are vertical in the center of the depression cut. Pour epoxy into depression cut approximately ¼" (6mm) depth. Pull wire through center hole in base plate. Secure base plates to roadway surface by pressing the base plate into the epoxy in the depression cut. Ensure

that epoxy flows around the outside diameter of the base plate and slightly around the wires emerging from the center hole of the base plate, but DOES NOT fill the base plate. Ensure that epoxy fills outside diameter of base plate up to grade level. Ensure that the base plate is aligned with the mark made in step 6 above (See section 3.5) and is aimed vertically toward the zone of convergence prior to epoxy curing. Allow minimum of 30 minutes of epoxy cure time prior to moving wires for connecting pigtail gel plugs (section. 3.6).

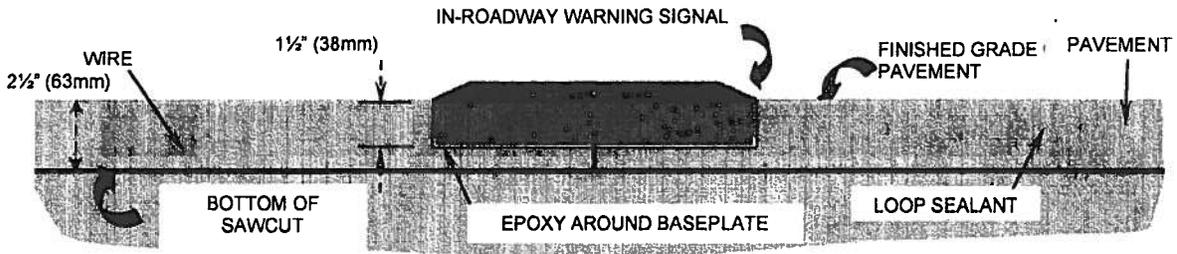
Step 8 - Allow minimum of 1 hour cure time (above 70°F & 2 hours if colder temperatures) before opening traffic lanes to vehicles travelling over recently epoxied base plates. Signal heads can be secured to base plates as soon as epoxy has sufficiently hardened. *NOTE: Temperature is critical.*

Step 9 - Secure in-roadway warning signal to base plates using socket head cap screws using Allen Wrench or equivalent. Socket head cap screws are to be coated with anti-seize compound for maintenance purposes to ensure that screws can be removed after exposure to the environment & additionally contain an embedded nylon thread-lock bead to prevent the screws from backing out while exposed to the roadway environment.

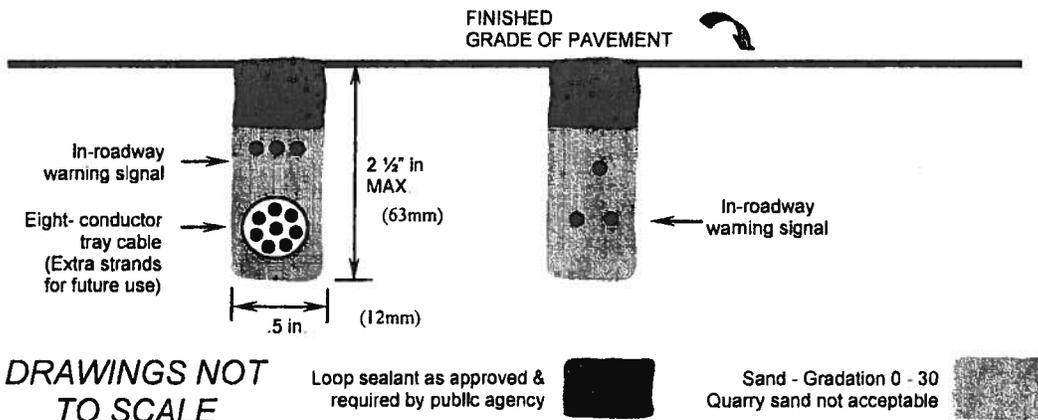
Step 10 - Complete "dress-up" saw cuts with Loop Sealant etc. DO NOT use Loop Sealant to "dress up" outside diameter of base plate to level epoxy surface with grade.

3.5 IRWL SAW CUT CROSS-SECTION DIAGRAMS

3.5.1 FRONT VIEW - PARALLEL TO ROADWAY (SD10-C BASE PLATE SHOWN)



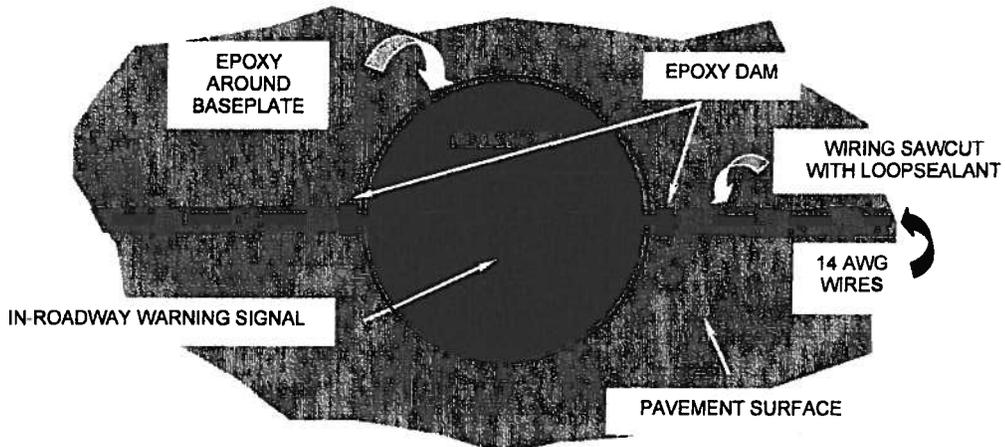
3.5.2 SIDE VIEW (PERPENDICULAR TO ROADWAY)



DRAWINGS NOT TO SCALE

NOTE: USE 14 AWG WIRING, (ref section 1.6.8) APPROVED BY LOCAL AGENCY FOR IN-ROADWAY WARNING SIGNAL ARRAY HOME RUN CONNECTION. FOR BOLLARD AND PUSH BUTTON'S, ALWAYS USE 8 CONDUCTOR 18 AWG MINIMUM DIRECT BURIAL CABLE TO ROUTE FROM ENCLOSURE TO OPPOSITE SIDE OF STREET FOR BOLLARD AND PUSH BUTTON'S.

3.5.3 TOP VIEW (SD-10C BASE PLATE SHOWN)



3.6 TYPICAL IRWL SIGNAL BASE PLATE WIRING DRAWING

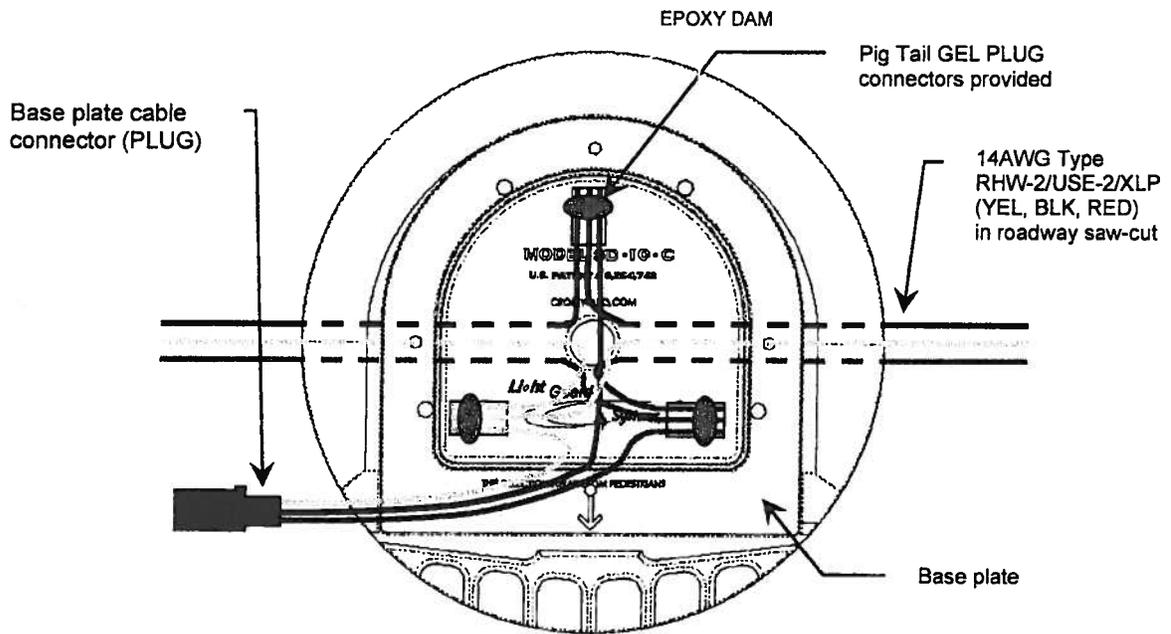


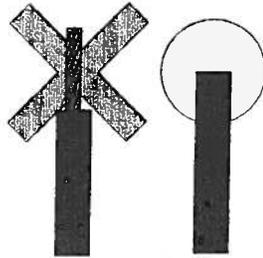
Figure 3.7A – Base Plate Wiring (SD-10C shown)

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

3.6.1 GEL PLUG TERMINATION INSTRUCTIONS

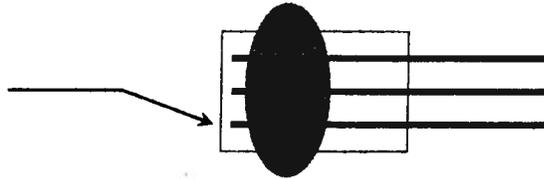
The Scotchlok 314 Self-Stripping Electrical Pigtail Connectors are moisture resistant and do not require wire stripping. **This can only be done in baseplates that have enough wire extending from the roadway to allow the IRWL pigtail to set into the underside of the IRWL connector cavity when assembled. The GEL PLUG connector requires 3/4" (19mm) of wire to be fully inserted into it.**

- 1) Outer Diameter of type RHW-2/USE-2/XLP wire should be **MAX OD 0.17" (4.3mm)**. This will allow the insulated wire to be inserted into the Scotchlok 314 connector. Any exposed bare wire should be clipped off from the wires when connected to ensure that no part of the conductor is exposed.

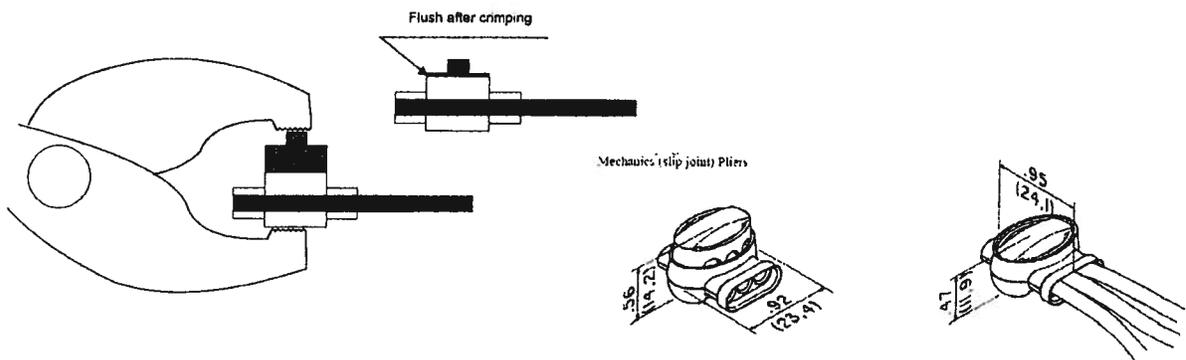


- 2) Insert all three wires to be connected into the three open holes in the connector, until they all reach the back end of the connector.

End of Insulated wire should touch back of connector

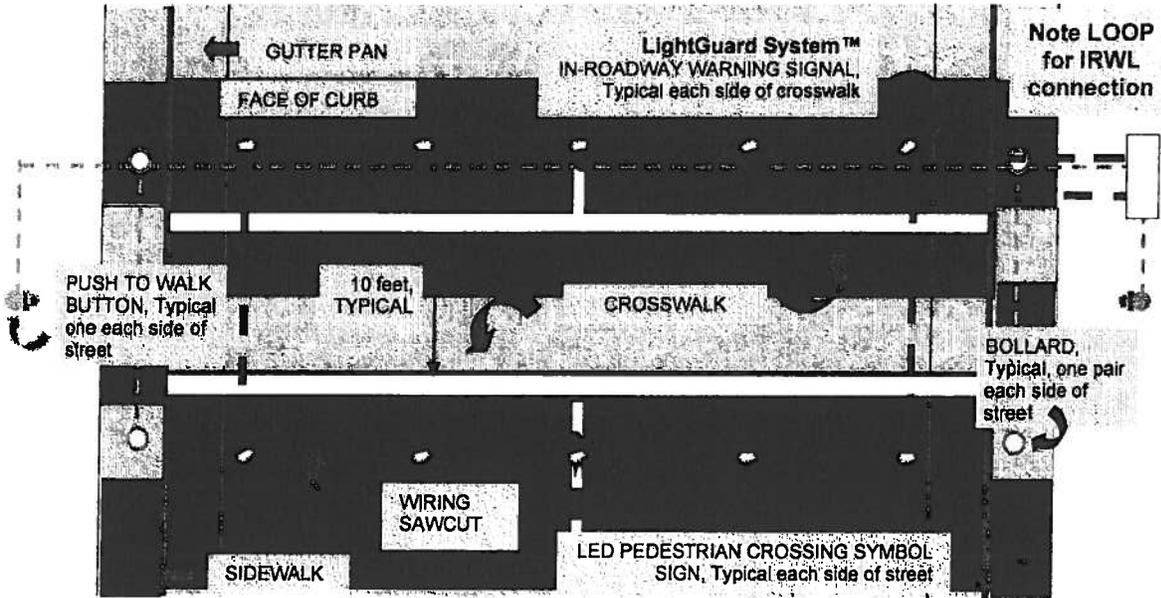


- 3) With a standard pair of slip joint pliers, pinch down on the blue cap of the connector until the outer edge of the blue cap is flush with the rim of the white connector housing. It may be necessary to wipe off the expelled gel after crimping.



- 4) Place the connector in the bottom (lowest part) of the base cavity and route the wires so no pinches will occur when the head is tightened. Double-sided adhesive tape can be used to hold connector in place until head is re-installed.
- 5) Plug IRWL into connector and fit IRWL into base. **Adjust wires so NO PINCHES occur.**

3.6.2 SAMPLE LIGHTGUARD SYSTEM IRWL DIAGRAM



Refer to section 3.7.1 & 3.7.2 for IRWL Aiming and Alignment

3.7 CONVERGENCE ZONES

The "Zone of Convergence" refers to the area in the lanes of travel where the beams from the in-roadway LED lights merge. This "zone" gives the driver adequate time to react to the presence of a pedestrian by drawing his/her attention to the crosswalk. When aligning signal heads, great care must be taken to position them correctly to achieve this desired distance.

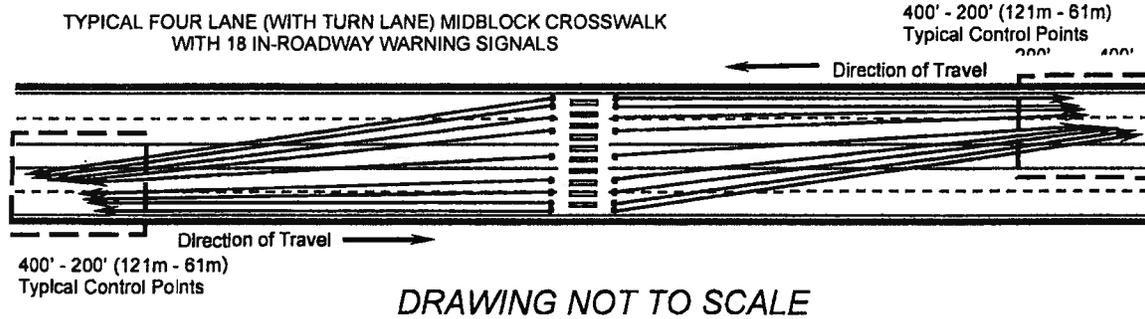
If the speed limit on the roadway is 25 mph (40Kmh), the "zone" should be approximately 250' (76m) out from the signal heads. If the speed limit is 45 mph (72Kmh), signal heads should be aligned to make the zone 350' (106m) to 400' (121m) away from the signal heads. See chart for additional stopping distances based on road conditions and rate of speed.

Note: Alignment of in-roadway warning signals to be site specific - city engineer or roadway authority to establish "control points" for each actual location. Control points may vary depending upon terrain, slope, vehicle approach speed, or regulation etc.

Chart - Minimum Vehicle Stopping Distance on Dry Pavement

| Posted Speed Limit | 1 Second Reaction Time | Braking Distance | Total Stopping Distance |
|--------------------|------------------------|------------------|-------------------------|
| 25 mph (40Kmh) | 37 feet (11m) | 53 feet (16m) | 90 feet (27m) |
| 30 mph (48Kmh) | 44 feet (13m) | 81 feet (25m) | 125 feet (38m) |
| 35 mph (56Kmh) | 51 feet (15m) | 110 feet (33m) | 161 feet (49m) |
| 40 mph (64Kmh) | 59 feet (18m) | 143 feet (43m) | 202 feet (62m) |
| 45 mph (72Kmh) | 66 feet (20m) | 184 feet (56m) | 250 feet (76m) |
| 50 mph (80Kmh) | 73 feet (22m) | 227 feet (69m) | 300 feet (91m) |
| 55 mph (88Kmh) | 81 feet (25m) | 271 feet (83m) | 352 feet (107m) |
| 60 mph (96Kmh) | 88 feet (27m) | 323 feet (98m) | 411 feet (125m) |

3.7.1 TYPICAL IRWL SIGNAL ALIGNMENT - STRAIGHT ROADWAY

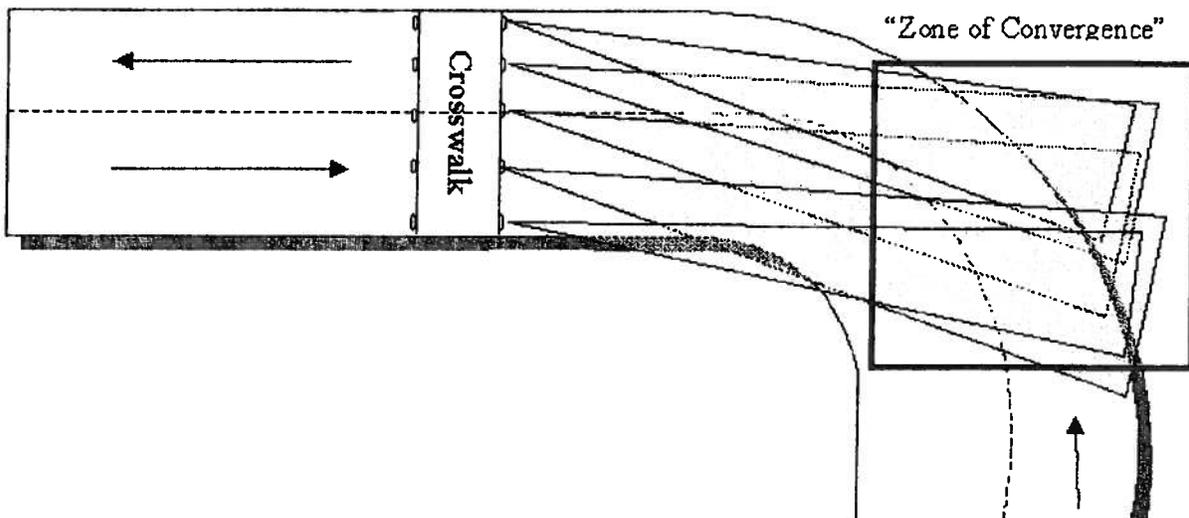


3.7.2 TYPICAL IRWL SIGNAL ALIGNMENT - CURVED ROADWAY

Determining the location of the "Zone of Convergence" on a curved roadway is similar to a straight roadway. Using the chart showing the *Minimum Stopping Distance on Dry Pavement*, determine the total stopping distance based upon the speed limit of the roadway. The **minimum** starting point of the convergence zone is determined by the **minimum** stopping distance on dry pavement for the posted speed limit. This minimum stopping distance includes a motorist decision distance, based on a one-second reaction time, plus the necessary speed deceleration distance required to come to a complete stop under optimum conditions.

As an example, the minimum stopping distance on dry pavement for a roadway with a 35 mph (56Kmh) speed limit is approximately 161 ft. (49m). This minimum distance would allow a motorist to visually recognize the flashing amber LED lights, slow down, and if necessary, bring his/her vehicle to a complete, safe stop.

Signal heads should be aligned to make the LED lights and therefore the zone appear as soon as possible as the driver approaches. On curved or winding roads, the entrance to the zone isn't always at the optimal distance to provide the earliest possible notification to approaching vehicles. Optional LED signal heads may also be installed down the center line of the road to give even more advance warning, giving the driver time to brake and stop for the pedestrian.



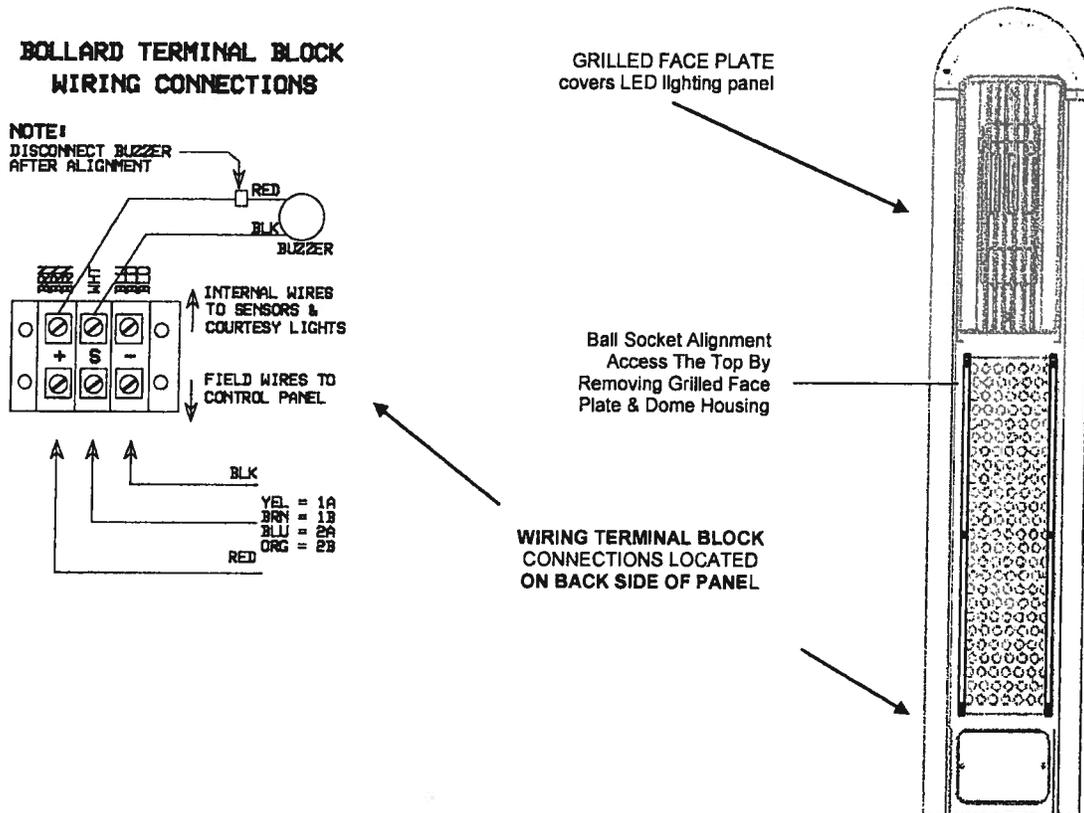
Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

4 AUTOMATIC ACTIVATION SYSTEM - SMART CROSSWALK™

4.1 AUTOMATIC BOLLARD DETECTION SYSTEM DESCRIPTION

Automatic Activation System consists of "gateways" comprised of bollards or posts. Each bollard contains sensor circuitry, and they are placed so pedestrians entering a crosswalk must pass between them automatically activating the Smart Crosswalk™. The built-in sensors detect pedestrians using the crosswalk and detect their direction of travel. The built-in sensor module projects infrared beams of modulated light to the respective receiver module. Each module incorporates a high gain detector. This allows the System to activate for Crosswalk entry, and not for exit.

4.2 BOLLARD DRAWING



SPECIFICATIONS

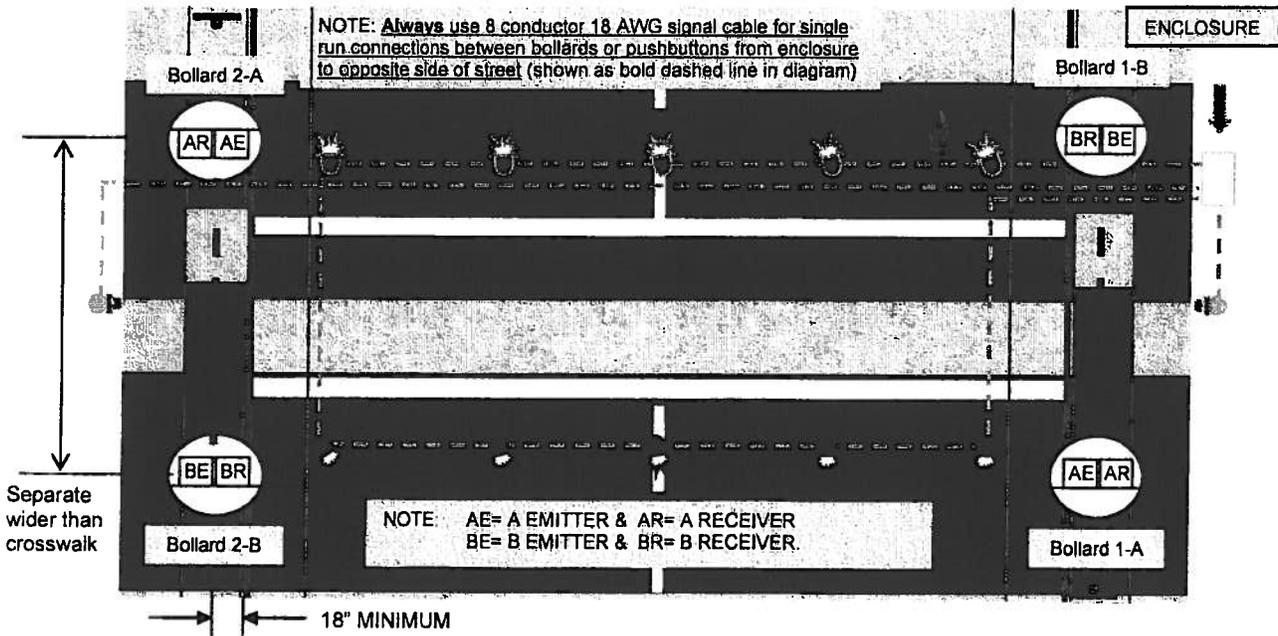
| | |
|------------------------|---|
| SIZE: | Height: 42" (1067mm) Diameter: 8½" (216mm) |
| COLOR: | White (standard) |
| MATERIAL: | Extruded Aluminum Body with Cast Top |
| DETECTION METHOD: | Break Beam Modulated at 880 nm |
| RATING: | 12.5 volts DC (not to exceed 15 V) |
| DISTANCE: | Not to Exceed 50 feet between Bollards |
| OPERATING TEMPERATURE: | -20° C to +70° C Humidity 90% at 50° C (non-condensing) |

4.3. BOLLARD INSTALLATION GUIDELINES

4.3.1. INSTALLATION STEPS

- Step 1 Prior to installing bollards, the proposed site should be inspected several times to observe the everyday habits of local citizens who utilize the crosswalk. Particular attention should be paid to how far back pedestrians may "cut the corner" when entering the crosswalk. Bollards, as positioned, may not detect every pedestrian using the crosswalk. For example, a 12 ft. (3.6m) wide crosswalk (dimension from outside crosswalk stripe to outside crosswalk stripe), bollards would be positioned approximately 5 to 6 ft. (1.5m to 1.8m) outside of the outer edge of the crosswalk stripe and about 18" to 24" (46cm to 61cm) behind the face of curb. Once bollard locations have been determined, wiring, or conduit, may be run prior to installation of the hold down bolts (See Section 4.3.2).
- Step 2 The preferred method of securing bollards into position is to remove an 8" (20cm) square section of sidewalk then dig approximately 18" (46cm) and set anchor bolts in 6 sack concrete mix (Refer to Bollard Mounting Detail Section 4.3.4). Other methods are acceptable, such as drilled anchor bolts, however, the bolts may become loose as a result of the bollard being bumped. A loose bollard will cause the calibrated internal sensors to become misaligned (reference section 4.5.1 for alignment). J-Bolt alignment template is provided. Snap a "chalk line" between bollard pair locations to ensure that j-bolt templates are directly facing each other (not skewed).
- Step 3 After bollard anchor bolts have been set, and the concrete has cured, the bollards can be secured to the anchor bolts. Position the base of the bollard approximately 1/8" to 1/4" (3mm to 6mm) above the finished sidewalk grade, level, and secure. All hardware MUST be tightly secured. If installed on a sloping sidewalk, ensure that bollard is vertical using leveling nuts.
- Step 4 Run wires and make final wiring connections to each bollard (See Section 4.2). Make wiring connections to terminal blocks in enclosure (See Section 4.3.2). Once wiring connections have been completed the bollard light sensors are ready to be aligned (See Sections 4.5).

4.3.2 SAMPLE BOLLARD LAYOUT AND WIRING DIAGRAM



DRAWING NOT TO SCALE

LightGuard Systems® Installation & User Manual (all rights reserved)

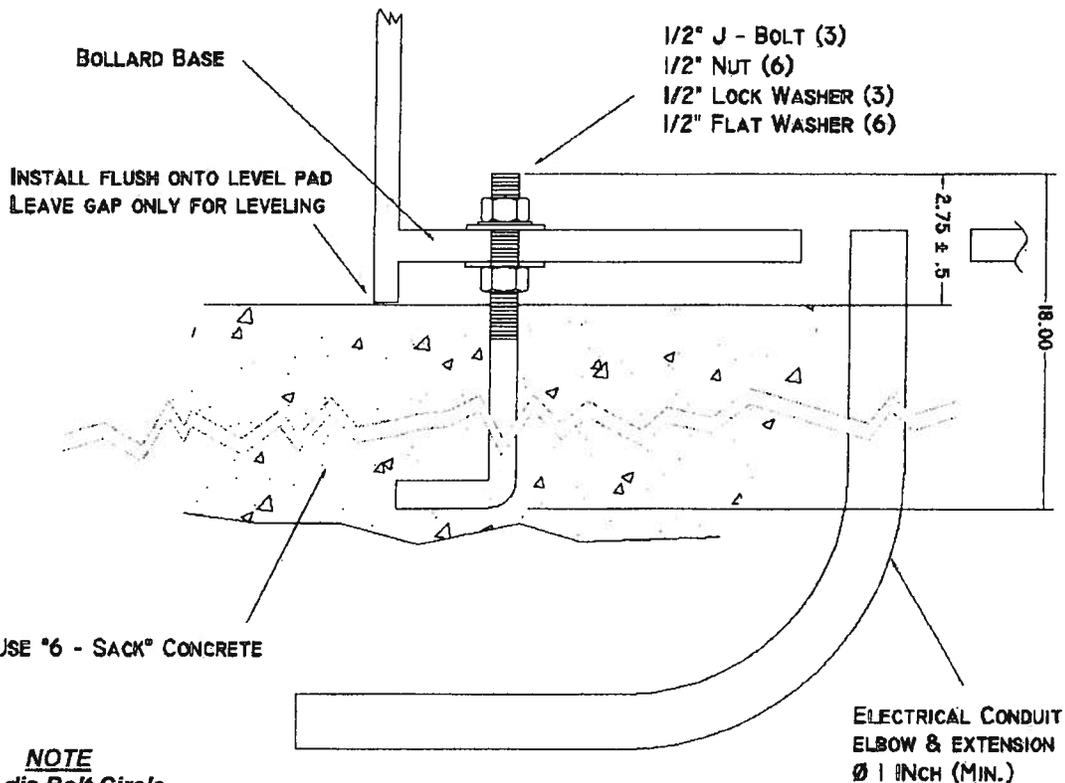
Refer to section 3.7.1 & 3.7.2 for IRWL Aiming and Alignment

4.3.3 BOLLARD WIRING TERMINAL BLOCK CONNECTIONS

| | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENCLOSURE TERMINAL BLOCK CONNECTIONS FOR BOLLARDS: | | | | | | | | | | | | | |
| 1 | 1 | 2 | 2 | P | P | S | S | B | B | G | G | G | G |
| A | B | A | B | A | B | + | + | + | + | N | N | N | N |
| Y | B | B | O | | | | | | R | B | | | |
| E | R | L | R | | | | | | E | L | | | |
| L | O | U | A | | | | | | D | D | D | D | |
| L | W | E | N | | | | | | | | | | |
| O | N | | G | | | | | | | | | | |
| W | | | E | | | | | | | | | | |

4.3.4 BOLLARD MOUNTING DIAGRAM

USE TEMPLATE PROVIDED TO INSTALL
 Ø .50 J - BOLT INTO NEW CONCRETE.
IMPORTANT: MAKE J - BOLT HEIGHT AS SHOWN.



NOTE
 5.5" dia Bolt Circle
 Template(3 @ 120°)
 furnished by
 LightGuard Systems

NOTE: To alleviate wire access or electrical connection difficulties, conduit height should not exceed 1" above grade – unless required by local regulations

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

4.4 BOLLARD SENSOR ADJUSTMENT

Each bollard is equipped with detection sensors 1 transmitter/emitter and 1 receiver (See Section [4.3.1](#)). To adjust the detection sensors follow the procedure below;

Step 1 Remove upper frosted glass grilled faceplate on bollard 1-A, located near enclosure (See Section [4.2](#) & Figure 4-5)

Step 2 Remove 2 counter sunk Allen screws at the bottom of frosted glass opening.

Step 3 Disconnect Brown & Blue terminal block wires from lighted window panel (courtesy light LED).

Step 4 Slide rounded top of bollard (Light Dome Assy) upward and out.

Step 5 Standing behind the bollard, look down 18" (45cm) into the top portion of Bollard 1-A. There are 2 black colored sensor modules. The sensor on the right is the Zone receiver and the sensor on the left is the Zone emitter (See [section 4.3.1](#) & Figure 4-5).

Step 6 With PCU enclosure door open, observe the 2 rows of Activation LED indicators immediately below, and slightly to the right of, the PCU keypad (See Section 2.5.1, pg. 8). Starting from left, to right, the first yellow upper LED is Zone 1A, and the green LED immediately below is Zone 1B, and the second yellow upper LED is Zone 2A, and the second green LED immediately below is Zone 2B. (Note: some older model PCUs may have all green LED indicators lights). When one of the Activation LED's is illuminated, the power control unit (PCU) has been signaled that an object has entered the activation zone. Once sensor A is triggered, followed by sensor B, the system is activated for the desired cross time. If an Activation LED is illuminated but no object has entered the activation zone, then the receiver is not receiving the emitter's beam (See note below, this page)

Step 7 Repeat above procedure for bollards 1-B, 2-A, and 2-B. Note that standing behind each bollard, the emitter is always on left side and receiver is always on right side.

4.5. BOLLARD ALIGNMENT

After following steps in Section [4.4](#), if any activation LEDs in the PCU are illuminated, this indicates bollard detection sensors are out of alignment. To adjust alignment of the bollards refer to Section [4.5.1](#), and follow the procedure below:

Step 1 - Determine that bollards 1A and 1B are plumb, and aimed directly at each other. If the bollards are not aimed directly at each other, then align sensors following steps in Section [4.4](#) above to compensate for bollard misalignment.

Step 2 - Make sure bollard piezo-electric buzzer at bottom of bollard is temporarily connected with red wire to + and black to S. If the sensor is *not aligned* the buzzer will sound.

Step 3 - Ensure there is power to emitting sensor in each bollard, (when standing in behind the bollard the emitter is on the left side). If there appears to be a power problem, correct then continue.

Step 4 - Adjust a bollard's receiver and emitter sensors by 1) loosening screws on each side of sensor and move sensor until piezo buzzer silences. When properly aligned, each Activation LED indicator in the PCU will *NOT* be lit and the piezo will *NOT* sound which means that both detection zones are clear and ready for operation. 2) Tighten sensor screws when properly aligned and disconnect piezo. If Buzzers are not disconnected after alignment, then each time the Bollard Beam is "broken" the buzzer will sound momentarily. The LightGuard System is supplied with a portable mirror (located in electrical

cabinet) that can be used to view the LED status Indicators located on the back side of each of the bollard sensors. (Refer to Figure 4-5). Under normal operation; 1) the emitter/transmitter LED Status indication will be green, 2) the receiver LED Status indication will be green only when partially aligned, both green and orange when perfectly aligned, and yellow only when the light beam is broken (not receiving signal from emitter). If an LED status Indication is Orange, the sensor is shorted and requires troubleshooting.

Follow above Steps 1 through 4 for bollards 2A and 2B. Once bollards 2A and 2B are aligned, and reassembled, ensure that all Activation LED indicators (2 rows of LED's immediately below the PCU keypad), are not lit (See Section 2.5). Reassemble the bollards by reversing Steps 1 through 7, of Section 4.3.1

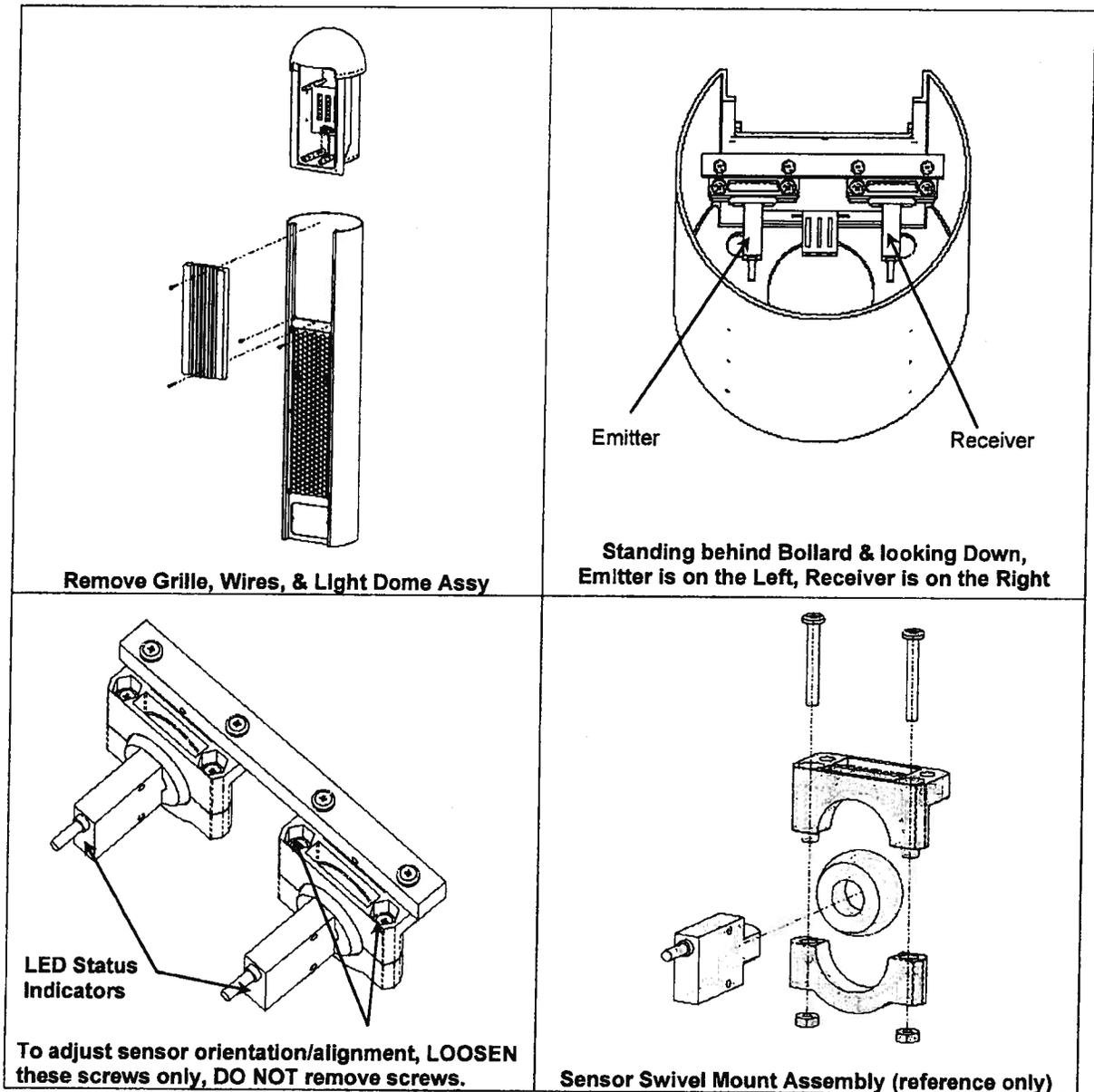
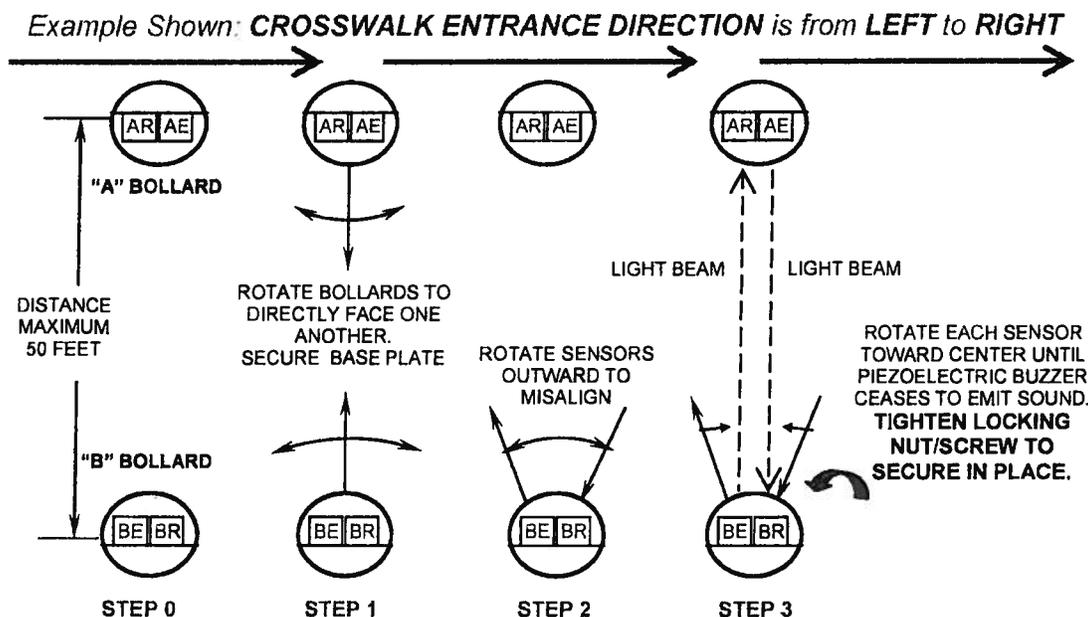


Figure 4-5

4.5.1 BOLLARD ALIGNMENT DRAWING



NOTES:

- ENTERING THE CROSSWALK, "A" BOLLARD IS ALWAYS ON THE LEFT, "B" BOLLARD IS ALWAYS ON THE RIGHT
- WHEN BOLLARDS ARE INSTALLED AT COPLANAR ELEVATION, THEN VERTICAL ALIGNMENT IS INHERENT.
- ELEVATION MISALIGNMENT SHOULD BE MINIMIZED
- THE SET UP DEPICTED IS AN **EXAMPLE OF BOLLARD PAIR ENTERING CROSSWALK FROM THE LEFT**
- AE= EMITTER INSIDE THE "A" BOLLARD – LOCATED ON *LEFT SIDE* AS THE CROSSWALK IS ENTERED
- AR= RECEIVER INSIDE "A" BOLLARD – LOCATED ON *LEFT SIDE* AS THE CROSSWALK IS ENTERED
- BE= EMITTER INSIDE "B" BOLLARD – LOCATED ON *RIGHT SIDE* AS THE CROSSWALK IS ENTERED
- BR= RECEIVER INSIDE "B" BOLLARD – LOCATED ON *RIGHT SIDE* AS THE CROSSWALK IS ENTERED

4.6. BOLLARD DETECTION ZONE OPERATION

- Step 1** Ensure zones are correctly connected to the flashing controller by observing the Activation LED indicators immediately below the PCU keypad (see Section 2.8.1) or alternatively on the left side on the ECP.
- Step 2** Observe pedestrian entering the crosswalk between the bollards. The first LED that lights should be yellow (PCU upper row is A zone), the second should be green (PCU lower row is B-zone - lower rows are green in some PCUs). If the LED's illuminate in the reverse order, then the wires are reversed. To correct, reverse wires 1A and 1B at the PCU terminal block connections.
- Step 3** Observe pedestrian exiting the crosswalk. The activation LED indicators should light in order of Zone 2B, then Zone 2A. In this condition, the PCU will ignore the call signal and not initiate the flashing sequence.
- Step 4** Observe pedestrian returning from other side of street entering the crosswalk between bollards 2A and 2B. Ensure that when pedestrian enters the crosswalk between bollards that the 2A Activation LED (yellow) comes on, then the 2B Activation LED (green) comes on.

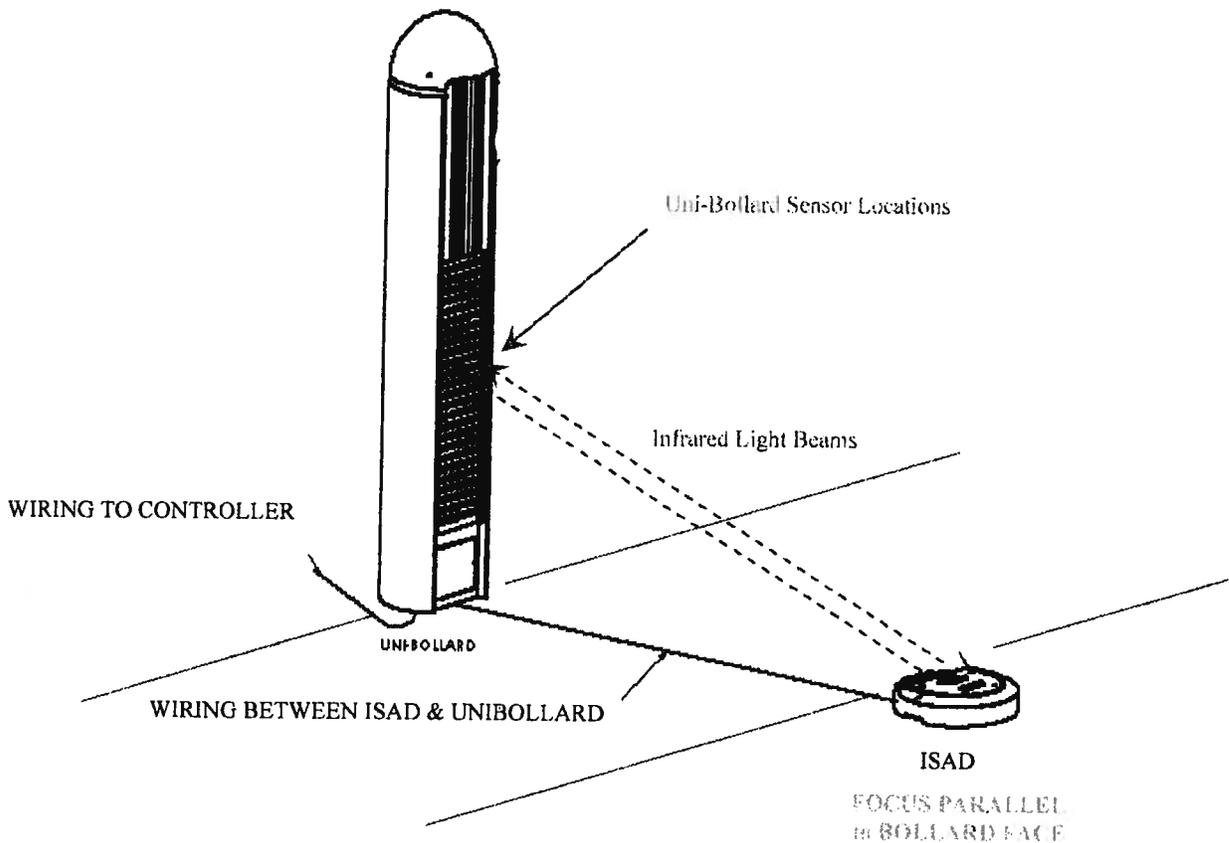
4.7 UNI-BOLLARD / ISAD INSTALLATION OPTION

The Uni-Bollard is similar to the standard Bollard. Both contain a courtesy light. The difference between the standard Bollard and the Uni-Bollard is that the Uni-Bollard contains 2 receivers instead of a receiver/transmitter pair. The Uni-Bollard is designed to be installed with an ISAD (which contains at least 1 broad beam width transmitter). Each Uni-Bollard is required to have 4 conductors – (1) 12VDC, (2) Switch wires, & (1) ground. The switch wires are terminated in the control panel in the manner described in section 4.3.2.

Access to the Uni-Bollard sensors is identical to the procedure noted in section 4.2. Electrical connections are made to clearly marked terminal posts located inside the Uni-Bollard

The ISAD installs in the pavement in the identical manner as an In-Roadway Warning Signal shown in section 3. The recommended maximum distance between the Uni-Bollard & the ISAD for reliable operation is 25 ft. (7m).

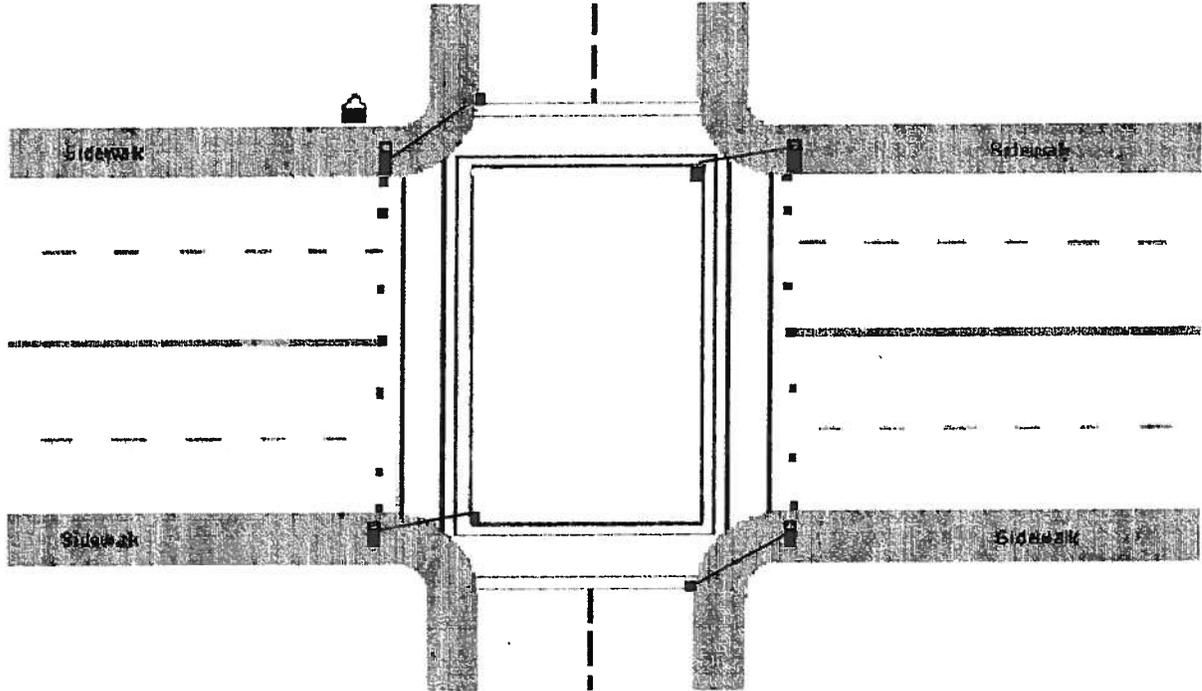
4.7.1 UNI-BOLLARD CONFIGURATION DIAGRAM



Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

4.7.2 EXAMPLE UNI-BOLLARD INSTALLATION DIAGRAM

Typical Uni-Bollard installations are arranged with an ISAD installed in the roadway & a Uni-Bollard installed on the sidewalk. The drawing below depicts example locations for field installation.

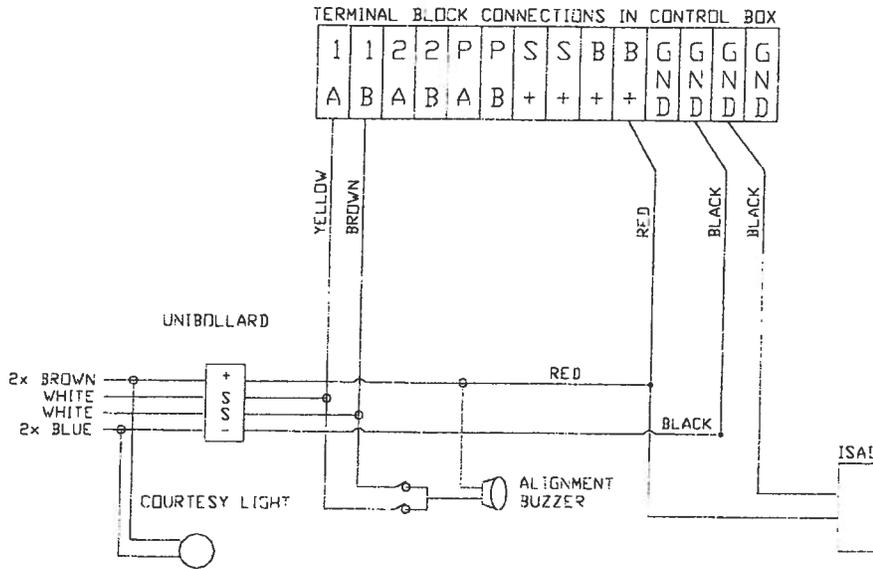


4.7.3 ISAD PLACEMENT & CONSIDERATIONS

- The ISAD should not be placed such that Direct Sunlight is focused into the face of the ISAD. This could degrade activation reliability
- The ISAD should not be placed in the roadway such that debris or Water can "build up" on the face. This will cause excessive field maintenance.
- The ISAD should be placed relatively close to the curb (not in the flow of traffic). If the ISAD is placed in the flow of traffic, this will induce nuisance (false) activations of the crosswalk warning system.
- The ISAD must be oriented such that it is facing directly parallel to the Uni-Bollard (refer to figure in section 4.7.1) & is relatively level with the roadway. However the ISAD may require tilting to ensure that the transmitters in the ISAD are pointed at the Uni-bollard sensor locations. The Uni-Bollard sensors are used to effect the ISAD alignment.

4.7.4 UNI-BOLLARD WIRING DIAGRAM

The following diagram illustrates how to connect a Uni-Bollard & ISAD to the LGS controller cabinet. The ISAD is powered from the B+ and GND terminals. The crosswalk entrance side of the Uni-Bollard is connected to either 1A or 2A. The crosswalk exit side of the Uni-Bollard is connected to either 1B or 2B.



4.7.5 UNI-BOLLARD SENSOR ADJUSTMENT

The ISAD cannot be adjusted in the field. Only the Uni-Bollard can be aligned to the ISAD after installation. The Uni-Bollard sensors are adjusted as described in section 4.4. The audible buzzer in the Uni-Bollard is attached to one sensor for alignment & then subsequently disconnected. The audible buzzer is then attached to the other sensor for alignment & then subsequently disconnected.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

5 PUSH BUTTON ACTIVATION

5.1 MANUAL PUSH BUTTON ACTIVATION DESCRIPTION

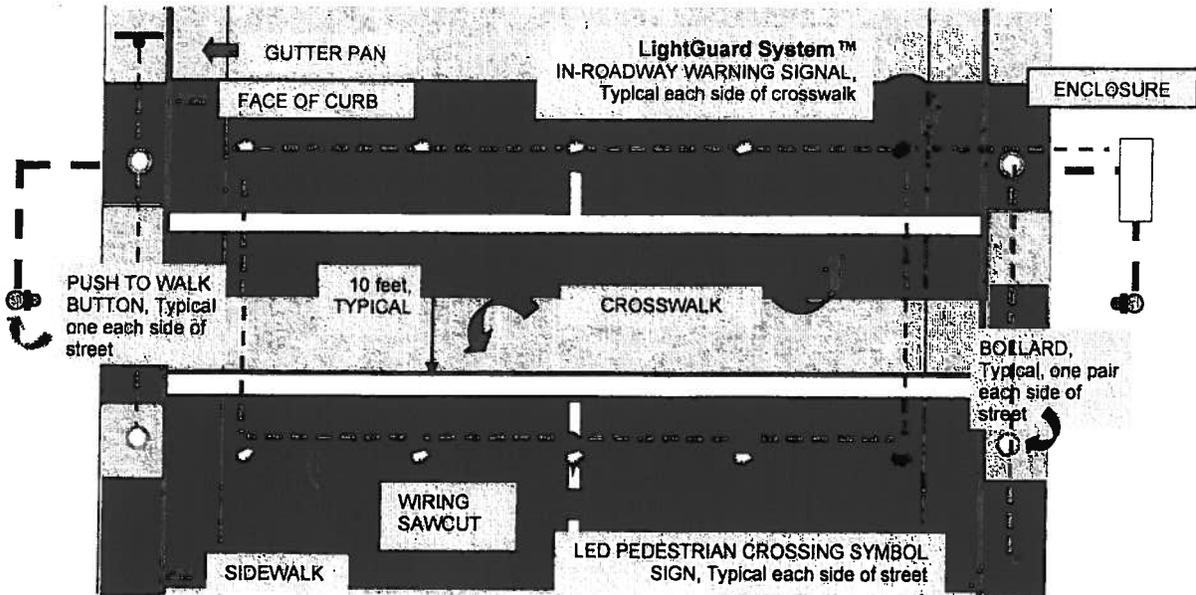
Manual installations utilize a standard pedestrian operated push button assembly to activate the system. In these installations, a pole mounted control box containing the push button, a small sign with the words "CROSS WITH CAUTION", and a row of 4 flashing amber LEDs, as shown below, is placed near the entrance to crosswalk (refer to section 3.6.2). The row of 4 flashing, amber, LEDs indicates to the pedestrian the warning system is activated. The words "CROSS WITH CAUTION" remind the pedestrian to maintain vigilance for their own safety by paying attention to traffic conditions while crossing the street. This standard pedestrian activation push button device should be installed as recommended in the Manual on Uniform Traffic Control Devices (MUTCD) or other local agency approved specifications.

5.2 ILLUMINATED PUSH BUTTON ASSEMBLY

GENERAL SPECIFICATIONS

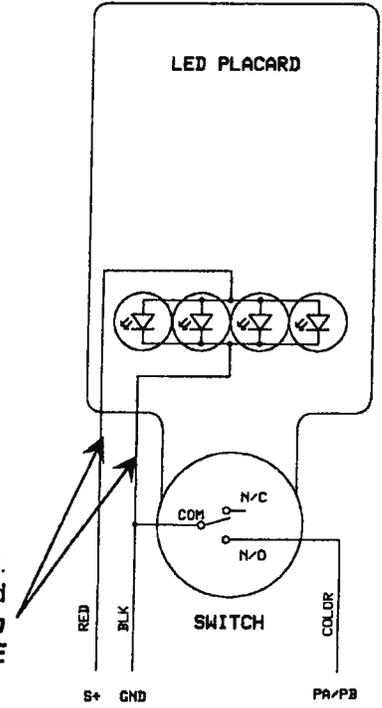
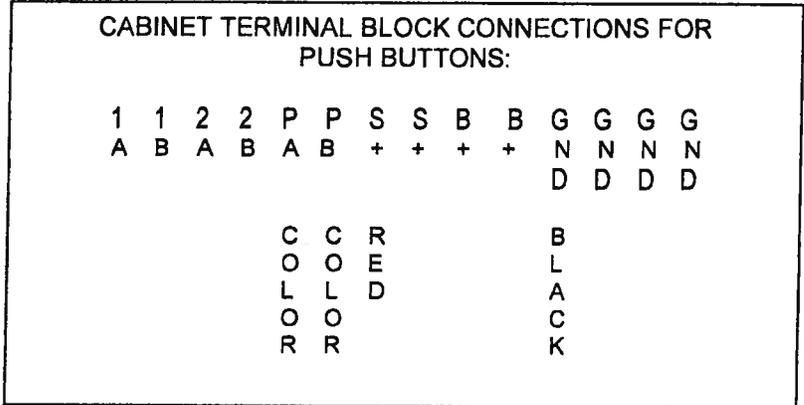
| | |
|-------------------|---|
| ASSEMBLY SIZE: | Height: 11¾" (300mm) - Width: 5" (127mm) |
| COLOR: | Green housing, yellow/black faceplate, silver tone 2 inch push button |
| FACEPLATE LIGHTS: | Amber Light Emitting Diodes (LEDs) which flash with system activation |
| MATERIAL: | Cast Aluminum |
| VOLTAGE: | 12.5 volts DC (not to exceed 15 V) |
| MOUNTING: | See local agency approved standard specifications for location and height |

5.3 SAMPLE PUSH BUTTON LAYOUT AND WIRING DIAGRAM



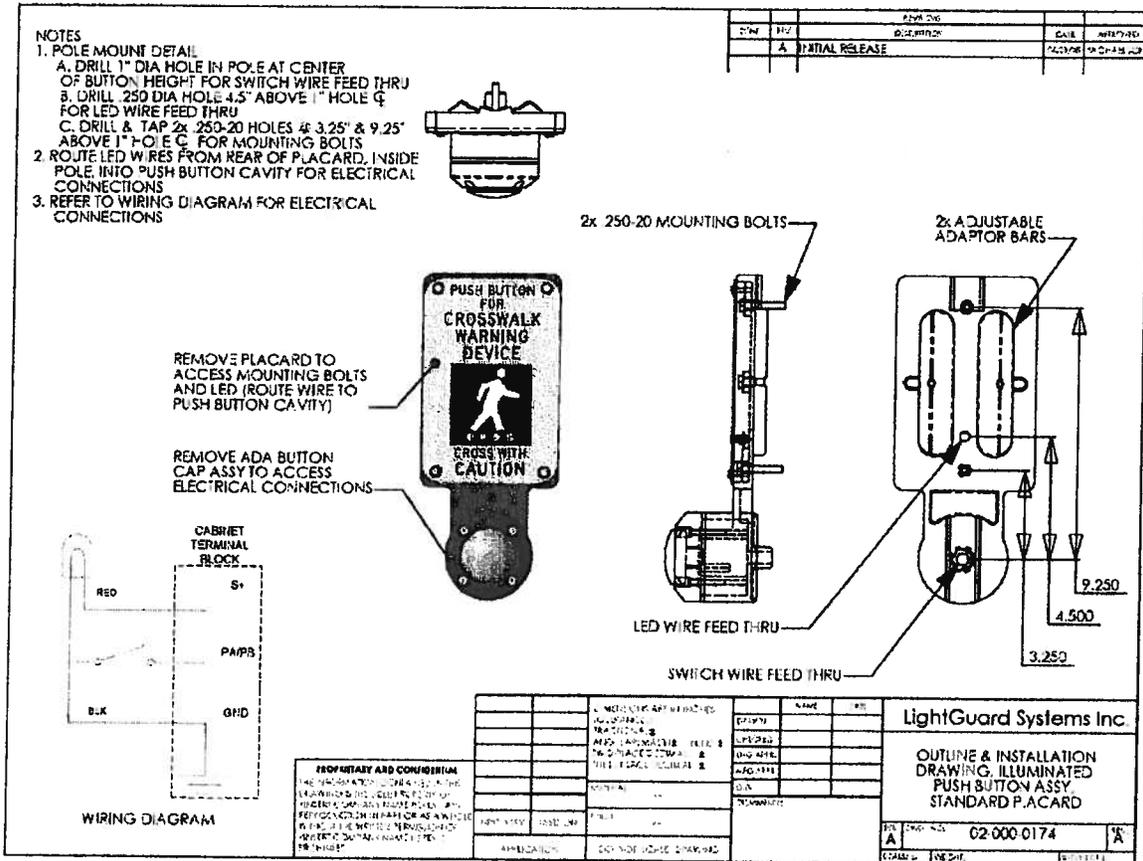
Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

5.3.1 PUSH BUTTON WIRING TERMINAL BLOCK CONNECTIONS



5.4 PUSH BUTTON INSTALLATION DETAIL DRAWING

Follow instructions noted on drawing for pole mounting & wiring detail. Mounting bolt holes must be tapped in pole. Wire access holes should be de-burred to prevent wire insulation damage. **Conductors between LED placard cavity & Push Button cavity MUST be routed INSIDE the pole to ensure weather tight integrity.**



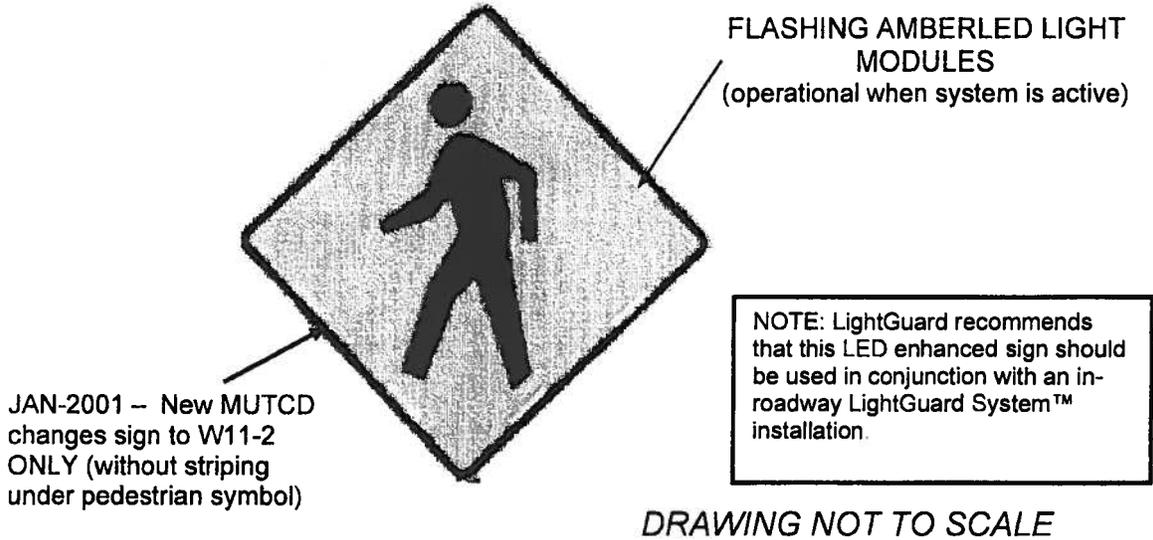
Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

6 LED "ENHANCED" ILLUMINATED WARNING SIGNS

6.1 LED "ENHANCED" SIGN GENERAL DESCRIPTION

LightGuard System® installations may, as an option, utilize fluorescent-yellow-green (FYG) color, diamond shaped pedestrian crossing symbol signs (W54, W11A-2, W-11-2, W-54-A or equivalent), equipped with flashing amber LED modules located below the walking pedestrian symbol (See below). These signs are placed at, or before, the crosswalk to assist in warning approaching motorists that a pedestrian is in, or about to enter the crosswalk. The embedded LED modules flash at the LightGuard System® enhanced flash rate. This LED "enhanced" pedestrian crossing symbol sign should be installed at the crosswalk location as recommended in the Manual on Uniform Traffic Control Devices (MUTCD) to replace the standard yellow W54 sign. For school crossings, a W66 or W-63 type (S2-1 or S-2-1 in FYG) school symbol sign also available. NOTE: Any advance warning signs should be consistent with color of other signs.

6.2 LED "ENHANCED" PEDESTRIAN CROSSING SIGN DRAWING



ACTIVE PEDESTRIAN CROSSING SYMBOL SIGN WITH LED MODULES

SPECIFICATIONS

| | |
|-------------------|---|
| SIZE: | 30" x 30" (76cm x 76cm) |
| TYPE: | Standard configurations: W-54, W-54A, W-63, W-66, W-79, R-1, W-47, W-11A-2, W11-2, S-1-1, S-2-1, W-11-1, W-11A-1, R-1-1, W-10-1 Custom configurations available upon request |
| COLOR: | Standard fluorescent -yellow-green. Optional high intensity yellow |
| FACEPLATE LIGHTS: | Amber Light Emitting Diodes (LEDs) which flash with system activation |
| VOLTAGE: | 12.5 volts DC (not to exceed 15 V) |
| MOUNTING: | Bracket assembly provided (tamper resistant fasten hardware to be supplied by installer) See local agency approved standard specifications for location and height |

7 LIGHTGUARD SYSTEMS SOLAR POWER OPTION

7.1 INSTALLATION STEPS

1. Using the drawing, assemble the Solar Panel mount with the hardware supplied.
2. Use the 1/4" hardware to attach the module to the Module Rails.
3. Use the 5/16" hardware to bolt the Module Rails to the SPM-1 Pole Bracket.
4. Adjust the mount to the proper tilt angle for your site latitude.
5. Face the solar module due South (NOT MAGNETIC SOUTH) for Northern Latitudes and due North for Southern Latitudes.
6. ENSURE that the Batteries are fully charged prior to installation.

7.2 SOLAR MODULE

Use the 14 / 2 TC tray cable supplied to wire the solar module into the charge control panel inside the enclosure. It is recommended that 1/2" flexible metal conduit be run between the solar module junction box and the mast to protect the tray cable. An opening in the mast to accept the conduit will need to be provided.

Remove the cover of the black junction box on the back of the module and note the 6 screws. Also, note a positive (+) sign and a negative (-) sign which show the 2 positive and negative terminals. Connect 1 wire to either of the 2 positive (+) and negative (-) terminals. Use the red conductor for positive and the black for negative. Do not use either of the 2 screws in the middle, these screws are not electrically connected to the module circuit.

Route the tray cable down the mast into the enclosure. Make sure the solar module is covered, or not connected to the tray cable, when routing the cable through the enclosure. Even in low sunlight the module can produce 18 to 20 volts.

7.2.1 SOLAR MODULE DESCRIPTION

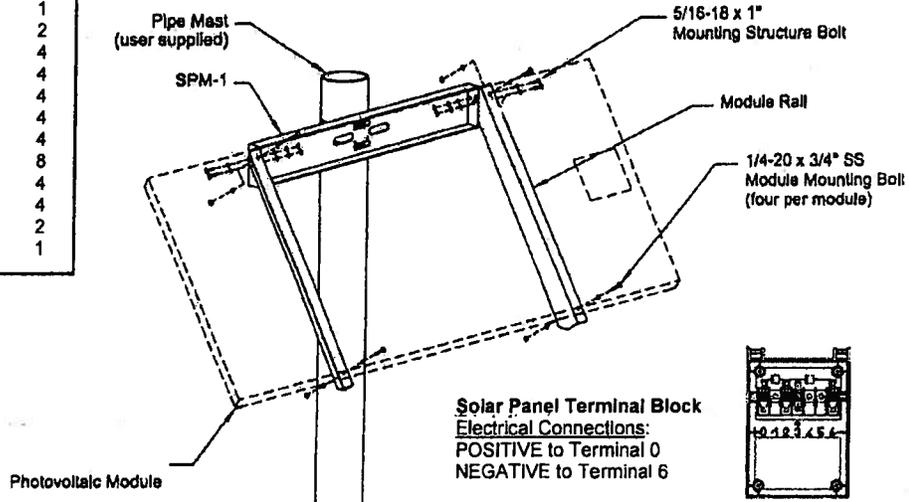
The solar array consists of a minimum 75 watt solar power module which is to be pole mounted. This solar module is designed to charge the two 12 volt batteries in the system. In full sun, this module can produce a maximum on 4.25 amps when charging the battery. During the day, the amount of charging current will vary with the intensity of the sunlight hitting the module. The open circuit voltage (voltage when not connected to charging circuit) can be up to 21 volts.

7.2.2 SOLAR MODULE MOUNTING

The solar module is to be mounted to the side of a 4" galvanized mast using the aluminum side-of-pole mount and hardware supplied. **The solar module must be oriented facing TRUE South.** Attach the mounting rails to the pole bracket and adjust the tilt angle to create an angle setting for your local latitude from horizontal facing South. Refer to sections 7.2.3 & 7.2.4 for orientation details. Use U-bolts to secure the mount to the mast

Instructions for SOLAR PANEL MOUNT, model #HPMH-50/90, side-of-pole mounting kit:

| PARTS LIST | |
|------------------------|-----|
| Part | Qty |
| SPM-1 | 1 |
| Module Rail | 2 |
| 1/4-20X3/4" SS Bolt | 4 |
| 1/4-20 SS Flat Washer | 4 |
| 1/4-20 SS Lock Washer | 4 |
| 1/4-20 SS Nut | 4 |
| 5/16-18 x 1" SS Bolt | 4 |
| 5/16-18 SS Flat Washer | 8 |
| 5/16-18 SS Lock Washer | 4 |
| 5/16-18 SS Nut | 4 |
| 4" Hose Clamp | 2 |
| 4" U-Bolt | 1 |



7.2.3 ORIENTING THE SOLAR MODULE

The following information was authored by www.powerupco.com & is reprinted herein without permission

It is important for proper system operation that the array be oriented true South (if you are located in the northern hemisphere). The directions of magnetic South and true South differ from one another depending on geographic location. This variance is called declination. Check the deviation for your region in order to extrapolate true South from a compass heading of magnetic South. The map in this section shows the magnetic declination for the US. For example, central Oklahoma falls between the 8° E and the 10° E lines. This means that the north point of a compass points about 9° E of true north. So true north is actually 9° to the WEST of where the compass points

7.2.4 DECLINATION ANGLE FOR SOLAR PANELS

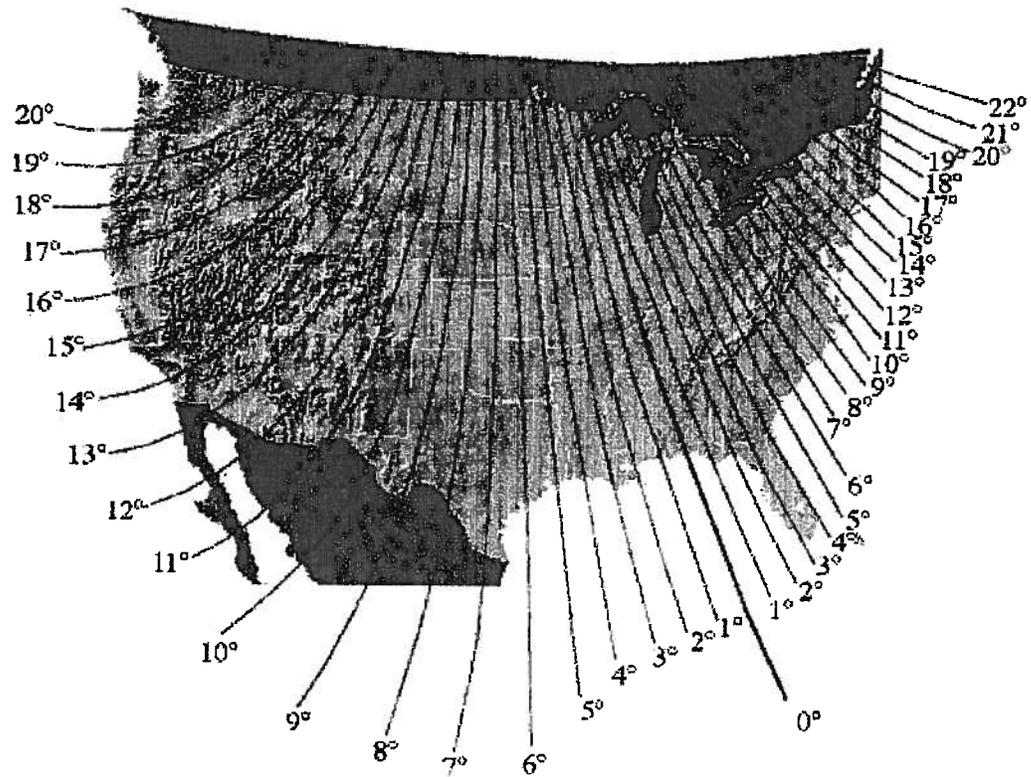
The following information was authored by <http://www.oksolar.com> and is reprinted herein without permission

When installing photovoltaic modules, be aware that they generate maximum power when facing the sun directly. The fixed position which approximates this ideal over the course of the year, thus maximizing annual energy production, is facing due South (in the Northern Hemisphere) or due North (in the Southern Hemisphere) at the angle listed in the table in the next column. Note that these orientations are true. The table below shows the fixed angle above horizontal at which modules should be installed in order to maximize annual energy output.

At some installations, it may be cost-effective to adjust the tilt seasonally. At most latitudes, performance can be improved during the summer by using an angle flatter than the chart's recommendation; conversely, a steeper angle can improve winter performance.

If modules are not cleaned regularly, it is recommended that they not be mounted at an angle flatter than 15°. Flatter angles cannot take full advantage of the cleansing action of rainfall.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)



7.2.5 MODULE TILT ANGLE

Solar modules produce the most power when they are pointed directly at the sun. For installations where the solar modules are mounted to a permanent structure, the solar modules should be tilted for optimum winter performance. As a rule, if the system power production is adequate in the winter, it will be satisfactory during the rest of the year. The module tilt angle is measured between the solar modules and the ground.

Example: A module mounted in Miami, Florida (latitude 26° should be tilted at approximately 31° from horizontal, and should be faced due South.

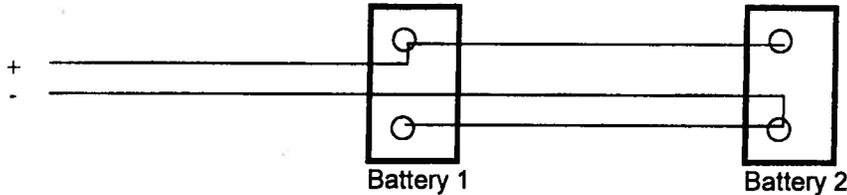
| Latitude Site | Tilt Angle |
|---------------|---------------------------|
| 0-15° | 15° |
| 15-25° | SAME AS Latitude |
| 25-30° | add 5° to local latitude |
| 30-35° | add 10° to local latitude |
| 35-40° | add 15° to local latitude |
| 40° + | add 20° to local latitude |

7.3 SOLAR SYSTEM BATTERIES

The enclosure contains 2 SLA batteries, the PCU (power control unit) and the charge controller. Two 12 volt deep cycle sealed gel-cell batteries are supplied. Each battery is rated at approximately 100 amp hours. The batteries are to be wired in parallel (positive-to-positive and negative-to-negative) to give 12 volts nominal at 200 amp hours of storage. Use the red and black battery cables supplied to parallel the batteries. Install the wiring into the terminal blocks & circuit breaker before installing the batteries.

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

Use the red and black cables, supplied with the ring terminals, to make the battery connections. Connect the red cable to the positive post on 1 battery and the black cable to the negative post on the other battery. This will ensure even charging between the 2 batteries (note figure below).



Connect the red and black #14 tray cable wires, from the solar module, to the labeled circuit breaker and negative buss block (refer to Section 2.4.3).

7.4 CHARGE CONTROLLER

7.4.1 CHARGE CONTROLLER WIRING

The charge controller, located inside the enclosure, provides all wiring connections for the solar module, batteries, and power to the PCU. The PCU controls power to the in-roadway warning signals, signs, and push buttons.

Ensure all circuit breakers are OFF before making any connections. There are three 15 amp circuit breakers:

- 1) Solar Module circuit breaker; controls power from the solar module.
- 2) Load circuit breaker; controls load power to the PCU, in-roadway warning signals, and signs.
- 3) Battery Main circuit breaker; controls battery power to the system.

7.4.2 SOLAR CONTROLLER

A charge / load controller is located on the charge control panel (for further information / specs, contact your LGS representative). This controller is being used to regulate the battery charging and protect the batteries from being over discharged. The charge controller is pre-wired and factory adjusted. Do not make any adjustments to the charge controller without contacting LightGuard Systems, Inc. first. Indicator(s) on the face of the controller indicates the battery state of charge. Note the legend on the face of the charge controller.

During normal operation, the charge controller will allow the battery voltage to rise up to approximately 14.1 volts while charging. This end-of-charge voltage will vary with temperature. The charge controller might employ a supplemental temperature probe attached to the side of one of the batteries in the enclosure. If supplied, attach the probe approximately three quarters of the way up the side of the battery case using the adhesive pad on the probe. This will ensure proper charging of the batteries throughout the year.

At night, the battery voltage should register between 12.0 and 12.8 volts depending upon how well the batteries were charged during the day. In times of exceptionally bad weather, and / or exceptionally heavy crosswalk usage, the battery voltage may drop below 12.0 volts. When the voltage drops to below approximately 11.8 volts, the charge controller will shut off power to the PCU and in-roadway warning signals ensuring protection of the batteries from damage as a result of over discharge. The charge controller will not allow power back to the PCU until the voltage rises back up to approximately 12.8 volts after several hours of charging. This solar power system is designed to operate in all weather conditions throughout the year.

A copy of the Charge Controller Owners Manual is available upon request.

8 TROUBLE SHOOTING / MAINTENANCE / AFTER INSTALLATION

8.1 TROUBLE SHOOTING GUIDE

| SYMPTOM | CHECK | ACTION |
|--|---|--|
| SYSTEM WILL NOT ACTIVATE | Check PCU for proper System operation by "PUSH TO TEST" Button on right side of PCU | If LED Activation Indicator flashes, Check bollards for proper alignment and sensors shields for obstruction. Check push buttons connections. If LED Indicator does not flash, check PCU components. |
| IN-ROADWAY WARNING SIGNALS FLASHING DIMLY, OR NOT AT ALL | Check all in-roadway warning signals for damage | Remove & Replace (R & R) with spare warning signal as needed. |
| | Check all in-roadway warning signal window ramps for blockage or debris. | Broom any debris from pavement around in-roadway warning signals to allow for unobstructed motorist viewability. |
| | Check all in-roadway warning signal light modules for proper flash operation | View in-roadway warning signals from 150' to 200' away for the approaching motorists' perspective. R & R with spare warning signal as needed. |
| | Insure that enclosure components are operational | Shut off power to PCU via circuit breakers and disconnect battery. Check battery voltage. Load test battery 3-4 AMP. Tighten wire connections, and/or remove, and look for corrosion and retighten. Perform a wire push/pull test to verify wires are firmly installed. Power up PCU with battery only. Check voltage at battery to assure that battery has minimum of 12.5 Volts. Document counters and log date, time of service, and name of personnel repairs. List any repair findings. Secure system door. |
| GRAFFITI OR PAINT ON BOLLARDS OR ENCLOSURE EQUIPMENT | Check for proper activation operation | Remove graffiti or paint. Tagster Graffiti Emulsifier from Rhomar Industries is recommended. Call (800) 688-6221 to order. |
| SYSTEM ON CONSTANT BLINK * PCU FLASHING 50/50 | Check for stuck PB or mis-Aligned Bollards ref section 4.4 | Inspect PCU display for diagnostic information. System enters "Default Flash Pattern" to alert maintenance crews that attention is required. If the LCD does not indicate which input is "stuck", then press "D" on the keypad to display input diagnostics. |
| PUSH BUTTON INPUTS DO NOT ACTIVATE FLASHING OUTPUT | Verify that button(s) is/are operational. Verify conductor integrity from push buttons to flashing controller | Inputs can be simulated at the flashing controller. Temporarily remove the button Input field wires from the Din Rail locations PA/PB& affix a jumper wire (12" stripped 1/2" at both ends) into the DC GROUND on the Din Rail. Then use the "free end" of the jumper to make contact with the PA/PB inputs on the flashing controller. If an LED Indicator illuminates, then the PCU can receive signals & the problem is with the field wiring or the Push Button(s) |

- Routine maintenance should include periodic on-site inspections of the System for proper operation.
- Check activation system for proper operation and tighten fastening hardware as needed.
- Clean bollards and sensor shield if needed and check for proper bollard alignment and activation.
- In-roadway warning signals should be visually checked for sufficient light output with window ramps swiped clean as needed. Should window ramp become obscured over time, remove and replace with spare warning signal.
- Check for proper adhesion of all warning signals to the roadway surface. Fill any gaps around in-roadway signal assemblies with bituminous hot stick to prevent debris or moisture intrusion.
- Inspect wire trench cuts for sufficient loop sealant and fill where needed with filler or bituminous hot stick material.
- Check enclosure and sign mounts for secure attachment and tighten fastening hardware as needed.
- Note/Record activation counts using PCU keypad functions 1, 2, or 3, then reset to clear by pressing 0, then 555 (NOT MANDATORY)
- Note and clean any graffiti from enclosure equipment. (We recommend Tagster™ Graffiti Emulsifier from Rhomar Industries - Springfield, Missouri - (800) 688-6221 - Email: rhomarind@aol.com)

8.2 FIELD RELATED TOTAL PREVENTATIVE MAINTENANCE

After initial installation, the following steps should be followed to test/validate correct operation and to ensure proper operation in the future. Installation should consist of all components secured appropriately and all electrical connections terminated as required.

Step 1 Energize all circuit breakers

Step 2 Contact LightGuard Systems to obtain a 3 digit ACTIVATION CODE for warranty & maintenance tracking purposes. (888) 247-2974

Step 3 Verify that no LED fault/activation indicators are ON in the PCU. These indicators are 2 rows of LED (Yellow & Green) directly below the PCU housing in the enclosure. If any fault/activation indicators are on, check Bollard alignment, push buttons, and field wiring connections.

Step 4 Press keypad 9 to initiate constant blink. Verify that all IRWL & optional illuminated LED signs & Push Buttons are active

Step 5 Press keypad 9 to toggle constant blink off

Step 6 Test/verify that activation mechanisms operate (PB &/or Bollards) and activate flashing output for the cross time duration. *If any Bollards activate the system when exiting the crosswalk instead of entering the crosswalk, swap A & B wires in control panel for that Bollard pair.*

Step 7 Set cross time as required (refer to section [2.8.3](#))

8.3 FIELD RELATED TOTAL PREVENTATIVE MAINTENANCE

8.3.1 SCOPE

This procedure describes the recommended process for inspecting & maintaining LGS equipment after installation. This section applies to illuminated signs, electrical interface cabinets, In Roadway Warning Lights (IRWL), and activation mechanisms (Bollards & Push Buttons).

8.3.2 MAINTENANCE PERIOD

Perform Preventative Maintenance/Inspection approximately every 6 months.

8.3.3 MATERIAL REQUIRED

- A. Battery tester
- B. Non-Metallic Whisk broom
- C. Soapy water and cloth

8.3.4 RECOMMENDED SPARES

- A. IRWL

8.3.5 ELECTRICAL INTERFACE CABINET (AC, SOLAR, ECP)

1. Open Electrical Interface cabinet
2. Clean any foreign matter that might have accumulated inside cabinet, (spider webs etc.)
3. Test battery voltage, if value is less than 12VDC refer to trouble shooting guide (section [8.1](#))
4. Optional activation data, (consider posting on inside cabinet door for recordation review).
 - a. use keypad 1 & 3 to display activation history, record activation data (date & number of activations) on paper and store in LGS enclosure
 - b. reset activation counters using keypad 0, then 555 to clear activation history
5. Press keypad 9 to verify that all light outputs activate, press 9 again to toggle outputs back to ready mode
6. SOLAR powered systems
 - a. If solar panel has foreign matter on it, clean solar panel using water
 - b. Verify that the charge controller indicates that the batteries are being charged & warranty period (date) on batteries is valid

8.3.6 ILLUMINATED SIGNS

1. Verify that light windows in illuminated signs are clear of debris, and properly aligned to target path, and all LED modules operate fully.

8.3.7 ACTIVATION MECHANISMS

1. Push buttons
 - a. verify that LED lenses on push button placards are clear of debris
 - b. verify that push buttons activate flash sequence (Four LED indicators each sign)
2. Bollards
 - c. Verify that Bollards are aligned (indicated by Electrical Interface Panel LED's LD1 through LD12 are all NOT illuminated)
 - d. Verify that Bollard courtesy lights are illuminated (refer to section 4.3)
 - e. Ensure that Bollard sensors are clean with no obstructions inhibiting sensor performance
 - f. Ensure that Bollards are SOLIDLY secure to mounting pads by attempting to "rock them"

8.3.8 IRWL

1. Verify that all IRWL illuminate when system is activated
 - a. if any IRWL do not activate, refer to troubleshooting guide in LGS Installation Manual
2. Verify "self clearing" design is keeping debris build-up clear from front of units, (If needed wipe window with wet cloth).
3. Within 60-90 days of Initial installation, verify that each IRWL is secure/seated in base plate. If loose, then remove IRWL, clean mating surfaces, and reinstall in accordance with LGS Installation Manual. Repeat at 6 month intervals.
4. If any IRWL are broken, then replace units
5. Inspect IRWL for signs of condensation. If from approximately 200 feet this presents a noticeable decrease in performance or signal head visibility, it should be replaced. If condition does not appear to affect the light visible to the motorist, it may not need replacement (review warranty in T's & C's).

8.4 EQUIPMENT LIST

This section describes standard components of the LightGuard family of products applicable to this Installation Manual.

8.4.1 SPARES & REPLACEMENTS EQUIPMENT LIST

The following list contains LGS model names/numbers for items typically sold as spares or replacements.

| ITEM | DESCRIPTION |
|--------------------|--|
| LGS-SN-LED | Amber LED module for illuminated signs |
| LGS-BOL SENS ASSY | T3 bollard sensor assembly – RCVR, XMTR, swivel mount, bracket |
| LGS-GEL-PLUGS | IRWL electrical splice connection inside base plate |
| LGS-ORING | IRWL sealing oring |
| LGS-PB ONLY | Push button mechanism |
| LGS-GRAYHILL RELAY | Magnecraft relay for obsolete back panel |
| LGS-CDMRLY | Crydom relay for obsolete back panel |
| LGS-9X-1 | Signal head only - red LED |
| LGS-9X-2 | Signal head only - bi-color red/amber LED |
| LGS-9X-3 | Signal head only - amber LED |
| LGS-9X-4 | Signal head only - white LED |
| LGS-CHS 14 | Base plate only - 14" snowplow resistant |
| LGS-PCU-MICRO | Lgs-micro controller module for PCU |
| LGS-SD10-C-FG | Base plate only - 10" composite |
| LGS-SOL-PANEL-ONLY | Solar panel for LGS 2' x 4' (80 watts) |

8.4.2 STANDARD EQUIPMENT LIST

The following list contains LGS model names/numbers for Standard items applicable to this Manual.

| ITEM | DESCRIPTION |
|-------------------------|---|
| LGS-SOLAR SYSTEM | Solar Powered PCU w/Programmable Interface, Batteries, Cabinet & Panel |
| LGS-SOLAR SYS-DUAL ZONE | Solar System with Dual Independent Zone Upgrade |
| LGS-ECP-1 | Entry Level LGS Control Panel and Cabinet |
| LGS-ECP-2 | Entry Level LGS Control Panel - custom applications only |
| LGS-PCU/A DUAL | Dual Zone A/C PCU w/ Battery Backup & Programmable Interface, Cabinet |
| LGS-PCU/BKPN-AC | AC Power Control Unit w/Backpan, Battery Backup & Programmable Interface Only |
| LGS-PCU-AC | Standard A/C PCU w/Programmable Interface, Battery, Backup, Backpan & Cabinet |
| LGS-9X-3/CHS-14 | Amber LED Signal Head w/ Snow Plow Resistant 14"Base Plate |
| LGS-9X-3/SD10-C | Amber LED Signal Head w/ 10" Composite Base Plate |
| LGS-9X-1/CHS-14 | Red LED Signal Head w/ Snow Plow Resistant 14"Base Plate |
| LGS-9X-1/SD10-C | Red LED Signal Head w/ 10" Composite Base Plate |
| LGS-9X-2/CHS-14 | Bi-Color LED Signal Head w/ Snow Plow Resistant 14"Base Plate |
| LGS-9X-2/SD10-C | Bi-Color LED Signal Head w/ 10" Composite Base Plate |
| LGS-PBA-BRAILLE | ADA 2" Push Button Assembly w/ Braille Placard- Pair |
| LGS-PBA-PAIR | ADA 2" Push Button Assembly w/LED Placard - Pair (L & R) |
| LGS-PBA-POL-PAIR | ADA 2" Push Button Assembly w/LED Placard & Audible Message-Pair |
| LGS-ISAD/UNIBOLLARD-SET | In Surface Unit & Automatic Pedestrian Detection Bollard Activation (set) |
| LGS-RAD | Remote Activation Detector |
| LGS-T3 | Automatic Pedestrian Detection Bollard |
| LGS-W11-8 | Fire Station Sign & LED Enhanced Symbol |
| LGS-W16-7P | Arrow Sign |
| LGS-W47 | Highway Rail grade Crossing Sign & LED Enhanced Symbol |
| LGS-W54/W-11A-2 | Ped Sign w/ Crosswalk Lines & LED Enhanced Symbol |
| LGS-W54-A/W11-2 | Ped Sign w/out Crosswalk Lines & LED Enhanced Symbol |
| LGS-W54-A/W11-2-B | Ped Sign w/ Crosswalk Lines & LED Enhanced Border |
| LGS-W54-A/W11A-2-B | Ped Sign w/o Crosswalk & LED Enhanced Border |
| LGS-W63/S-1-1 | School Sign w/ Crosswalk Lines & LED Enhanced Symbol |
| LGS-W63/S-1-1-B | School Sign w/ Crosswalk & LED Enhanced Border |
| LGS-W66/S-2-1 | School Sign w/out Crosswalk Lines & LED Enhanced Symbol |
| LGS-W66/S-2-1-B | School Sign w/o Crosswalk & LED Enhanced Border |
| LGS-W79/W-11-1 | Bicycle Crossing Sign & LED Enhanced Symbol |
| LGS-ISAD | In Surface Activation Device Only |
| LGS-T3I | Unibollard/ISAD Activation Unit (part as a pair w/ISAD) |
| LGS-BONDO | Two Part Epoxy for Securing Base Plate Into Roadway (pass thru item) |
| LGS-CAB-SOL | Pad Mount Enclosure for Solar or AC Systems |
| LGS-PCU-ASSEMBLY | A/C Power Control Unit Only - No Enclosure or Backpan |
| LGS-AC BEACON-KIT | Separate 110VAC Wig-Wag Output Simultaneous w/ Signal Head Flashing |
| LGS-AC-OUT-UPGRD | Separate 110VAC Output Simultaneous w/ Signal Head Flashing |
| LGS-DC BEACON-KIT | Separate 12VDC Wig-Wag Output Simultaneous w/ Signal Head Flashing |
| LGS-DC-OUT-UPGD | Separate 12VDC Output Simultaneous w/ Signal Head Flashing |
| LGS-NOVAX-UPGD | Upgrade LGS Controller for Novax Audible Alert |

9 ADDENDUMS

This section is reserved for addendums typically applicable to various upgrade kits noted as optional equipment in Section 1.6. Each addendum is supplied separately with appropriate upgrade kit.



Features/Benefits

- 16 LED Module Signal Lights
- LED-AllInGaP Technology Ultra Bright 100,000 hrs
- Dove Prism Lens Technology
- Easily Mounts To Roadway Base
- 12VDC Operation (Down To 9VDC)
- Visible to 1,500 Feet From Signal Head
- Rugged, Reliable, With Little Maintenance
- Snap Together Waterproof Electrical Connection

IN-ROADWAY WARNING LIGHTS (IRWL)

Signal Head Series 9X

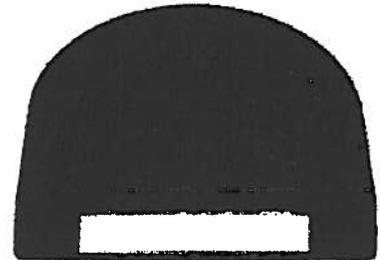
LightGuard Systems Part Number: LGS-9X

Description: The signal head contains the in-pavement LED light module.

Compliant to FHWA Standards: MUTCD Chapter 4, Section N

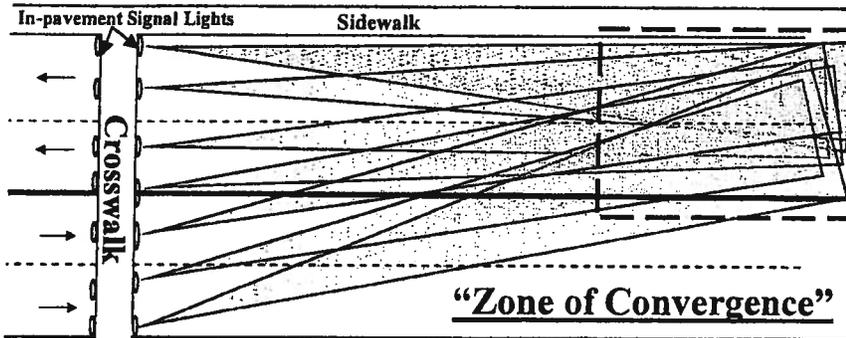
Application Notes

LightGuard Systems' newest technology is our System 9X LED dubbed "LightStar™." The In-Roadway Warning Light (IRWL) signal head module meets Federal Highway Administration — Manual on Uniform Traffic Devices (FHWA MUTCD) standards. The signal head module features a watertight cable connector, solid-state electronics and sealed LED modules which isolate the electronic components from environmental moisture intrusion. The "Debris Free™"- Self Clearing Design eliminates most issues relating to lens blockage.



The signal head is designed to tightly fit into the protective base plate. It is easily connected to the electrical cable system wires with snap together, water tight connectors. The interior of the signal head unit is designed with double redundancy, isolating the solid state LED modules from roadway moisture and corrosive intrusion. The signal head unit is fastened to the base plate with stainless steel socket head 1/4"-20 screws with thread locks and anti-seize compound applied to the threads in the factory.

Typical IRWL system use employs several signal heads on both side of the crosswalk using the *Enlighten1™* flash rate operating at a 50% duty cycle. The flashing light beam can easily be seen in daylight from 200 to 600 feet (or more) away and at night up to 1,500 feet (or more) away.



The *Enlighten1™* flash rate was developed in cooperation with University of California, Berkley Vision Detection Laboratory, specifically to capture and hold driver awareness.

The "Zone of Convergence" refers to the area in the traffic lanes where specialized lenses direct beams of bright light from the signal head LED light modules to merge.

This "zone" is configured to give the driver adequate time to react to the presence of a pedestrian in the crosswalk. During installation the signal head modules must be properly positioned and directed towards the approaching motorist.

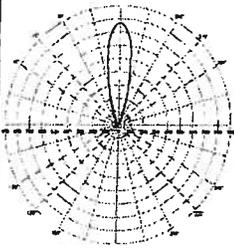
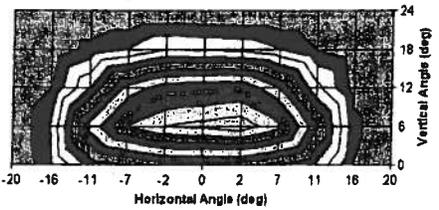
The chart on the left provides details for determining the "Zone of Convergence" based on the stopping distances on dry road conditions and rate of vehicular speed. Source: Santa Rosa, California City Police Department 1994.

| Posted Speed Limit | 1 Second Reaction Time | Braking Distance | Total Stopping Distance |
|--------------------|------------------------|------------------|-------------------------|
| 25 mph | 37 feet | 53 feet | 90 feet |
| 30 mph | 44 feet | 81 feet | 125 feet |
| 35 mph | 51 feet | 110 feet | 161 feet |
| 40 mph | 59 feet | 143 feet | 202 feet |
| 45 mph | 66 feet | 184 feet | 250 feet |
| 50 mph | 73 feet | 227 feet | 300 feet |
| 55 mph | 81 feet | 271 feet | 352 feet |
| 60 mph | 88 feet | 323 feet | 411 feet |

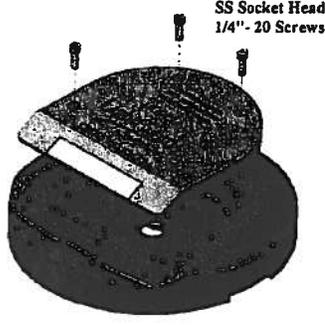
Copyright 1998—2011 LightGuard Systems, Inc, All Rights Reserved
2292 Airport Blvd. Santa Rosa, CA 95403 Phone (707) 542-4547; Fax (707) 525-6333

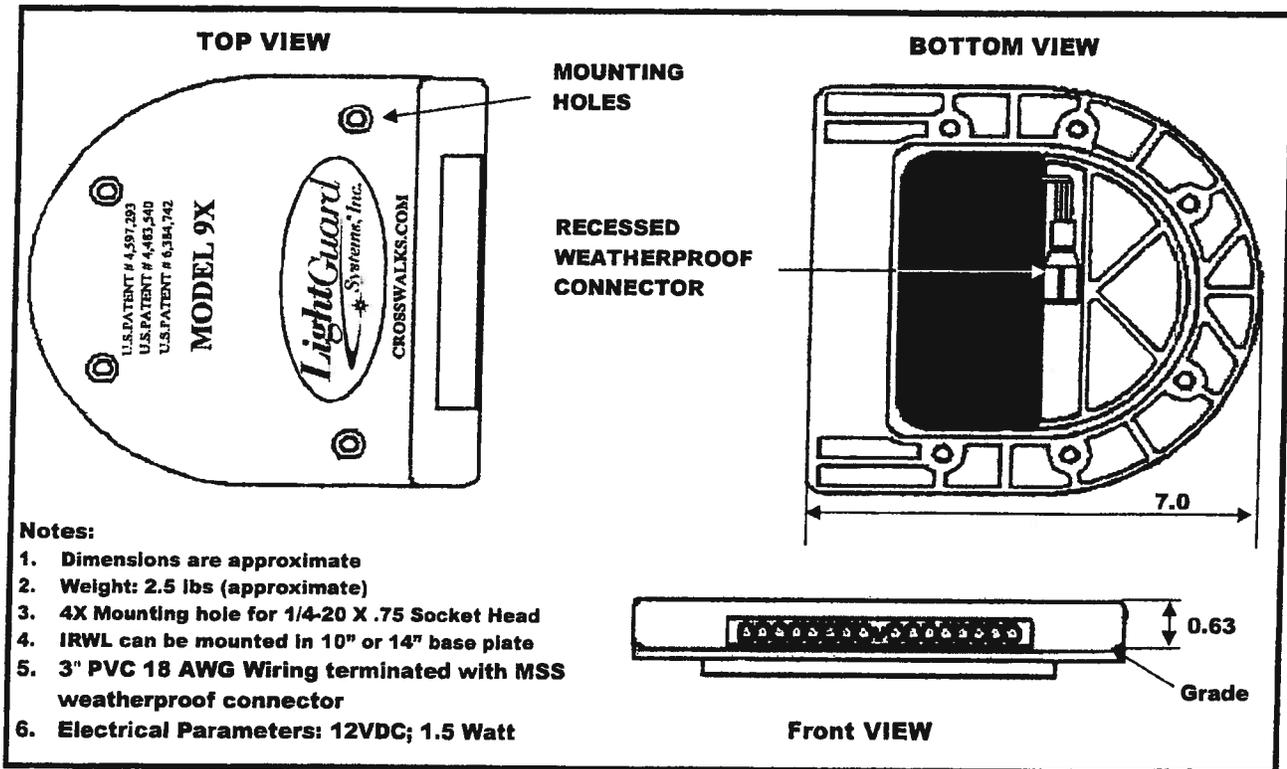
Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

General Performance Specifications

| Parameter | Value | Intensity Profile | Photometric Plot |
|-----------------------|---------------------------|---|--|
| Visibility | ± 15° (30° Viewing angle) |  | <p>9X Photometric Data (Amber 594nm) Lumens</p>  <p>Maximum value @ center 815 Lumens 16 LED Lamps per light fixture</p> |
| Operating Temp | -40° to +80°C | | |
| Operating Voltage | 9VDC to 15VDC | | |
| DC Current @ 12VDC | Less than 0.2 Amps | | |
| Avg Power Dissipation | 2.5 Watts max | | |
| Luminous Intensity | 252,000 mcd | | |
| Material | Polyurethane/Nylon | | |
| Color | Black | | |

Model # Reference Table

| LGS P/N | Description | LED Color | Typical Mounting |
|-----------|--|--|---|
| LGS-9X-1 | In Roadway Warning Light: Red | Red |  <p>SS Socket Head 1/4"-20 Screws</p> |
| LGS-9X-2 | In Roadway Warning Light: Bi- | Red/Amber | |
| LGS-9X-3 | In Roadway Warning Light: Amber | Amber - wavelength between 590nm & 600nm | |
| LGS-9X-4 | In Roadway Warning Light: White | White | |
| LGS-9AX-3 | In Roadway Warning Light: Amber With Sloped Edge For System 6 Base Plate | Amber - wavelength between 590nm & 600nm | |



Copyright 1998—2011 LightGuard Systems, Inc, All Rights Reserved
 2292 Airport Blvd. Santa Rosa, CA 95403 Phone (707) 542-4547; Fax (707) 525-6333

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)



- Features/Benefits**
- Easily Installed In Roadway
 - Maintenance Free Operation
 - Resistant Marine Grade Coating
 - Self Clearing Debris Free™ Design
 - High Strength Case Hardened Steel
 - Can Be Installed In Asphalt Or Concrete
 - Secures Smart Crosswalk™ Signal Head

SMART CROSSWALK™ SYSTEM SNOW PLOW RESISTANT BASE PLATE

LightGuard System Part Number: LGS-CHS-14

Description: 14" Snow Plow Resistant Base Plate

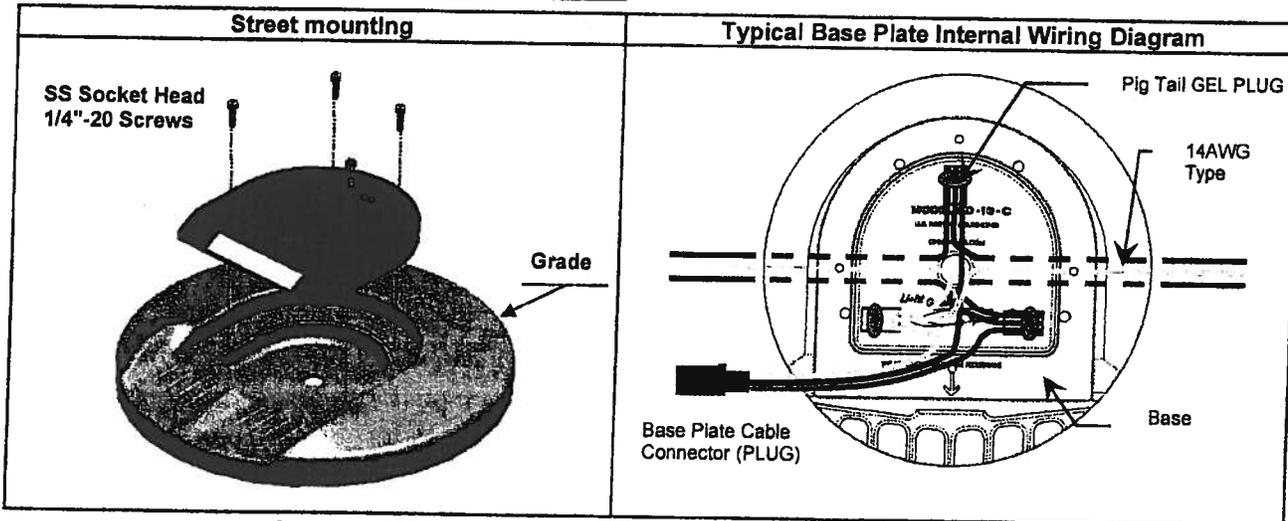
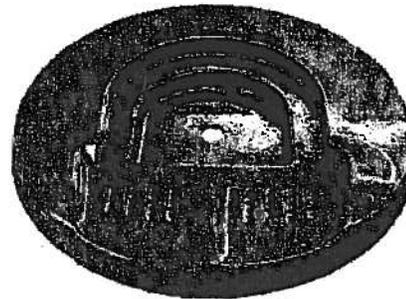
Application Notes

The CHS-14 mounting base plate is embedded into the roadway securing the In-Roadway Warning Lights (IRWL) signal heads. The case hardened steel base plate is coated with 2 coats of corrosion resistant steel primer. Two part epoxy is used to permanently embed the base plate into the roadway. The signal head is fastened to the base plate with stainless steel socket head 1/4"-20 screws with thread locks, anti-seize compound is applied to the threads in the factory.

The shallow depth of the base plate ensures that the sub surface of the road base is not compromised. The top outer edge of the base plate is flush with the road surface with the signal head projecting 1/2" above the road surface. The steel base plate is designed for installation in asphalt or concrete roadbeds located in "snow country". The base plate interior cavity is designed to contain the cable wiring for the signal head. The electrical conductors are installed through direct burial or inside conduit. This base plate is compatible with all previous LightGuard signal head modules.

General Performance Specifications

| Parameter | Value |
|----------------|-----------------------------------|
| Operating Temp | -20° to +80°C |
| Material | High Strength Case Hardened Steel |
| Color | Gray, Silver, or Black |
| Size | 13 7/8" diameter, 1.875" deep |
| Weight | 25 lb |



Copyright 1998—2011 LightGuard Systems®, Inc. All Rights Reserved
 2292 Airport Blvd Santa Rosa, CA 95403 Phone (707) 542-4547 Fax (707) 525-6333

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)



- Features/Benefits**
- Aesthetically Pleasing
 - Optional Audible Sounds
 - Easily Installed In Sidewalk
 - Simple Control Panel Installations
 - 12VDC Operation (Down To 9VDC)
 - Internally Illuminated Courtesy Light
 - Directional Detecting Infrared Sensors

AUTOMATIC ACTIVATION BOLLARDS

LightGuard Systems Part Number: LGS-T3

Description: Automatic Pedestrian Detection Bollard

Automatic Activation Series — Bollards

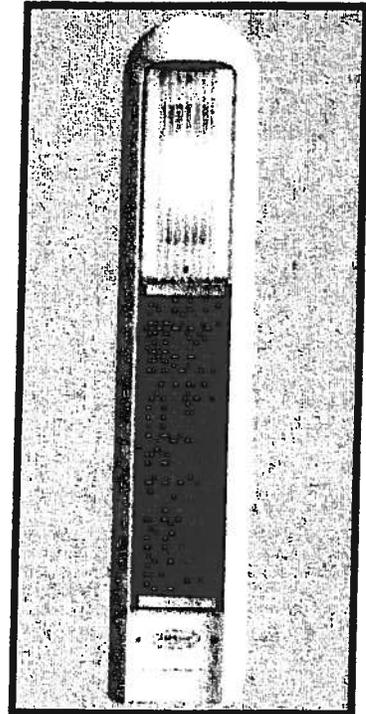
Application Notes

Automatic activation bollard devices consist of "gateways" comprised of a pair of bollards. The bollards are positioned to "invite" pedestrians to enter a crosswalk at a desired location.

The infrared sensing devices typically are preset by our factory. However, it is possible to adjust the alignment of the sensor modules in the field. The infrared light beams are projected to the respective receiver module. The bollard "gate" system is directionally sensitive and is activated only when entering into the crosswalk zone not when exiting.

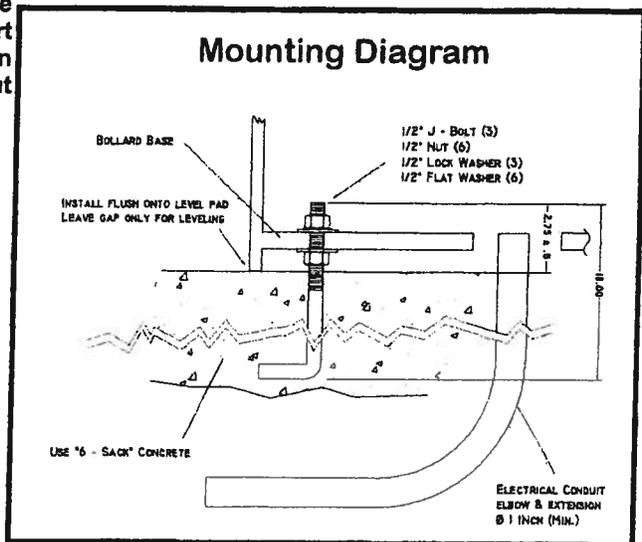
At each end of the crosswalk entrances, a pair of bollard devices are placed and normally there are 4 bollards per crosswalk. When pedestrians enter into a crosswalk zone they pass between the bollards and the Smart Crosswalk™ system is automatically activated. Each bollard contains 24/7 LED courtesy lights making the bollard visible at night or during inclement weather.

Prior to installing bollards, the proposed site should be reviewed to observe the habits of local citizens using the crosswalk. The bollards can be separated by as much as 60 feet apart to allow for a wide entry zone. Particular attention should be paid as to how far back pedestrians may "cut the corner" when entering the crosswalk.



General Performance Specifications

| Parameter | Value |
|----------------------|--------------------------------|
| Maximum Separation | 60 Feet |
| Power consumption | 2.5 Watts |
| Operating Temp | -20° to +80°C |
| Operating Voltage | 9VDC to 15VDC |
| Color | White (Other Colors Available) |
| Courtesy Light Color | Amber |
| Size | 42" Tall, 8" Diameter |



Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)



- Features/Benefits**
- Enlighten1™ Flash Rate
 - High Visibility (Up To 1 Mile)
 - Easily Mounts To Standard Poles
 - LED Modules Inside Metal Conduit Bodies
 - Constructed With Heavy Gauge Aluminum
 - Accommodates Tamper Resistant Hardware

Illuminated Regulatory & Warning Signs

Border Symbol Enhancement Series — 8 LED Bars

LED Module Compliant to standards:

MUTCD Chapter 2A

Application Notes

These illuminated LED enhanced signs are intended to be placed either adjacent to or in advance of any Smart Crosswalk™ site location. They provide additional warning to approaching motorists by displaying 8 bars of LED Modules flashing the Enlightened1™ light pattern when activated. The LED Module bars are placed around the perimeter of the sign making them visible up to one mile away.

Each LED module operates at a 50% duty cycle. These LED enhanced warning signs can be configured to standard DC beacon controllers flashing in a wig-wag pattern ½ sec on - ½ sec off.

Custom made road signs available upon request.

General Performance Specifications

| Parameter | Value | Mounting | Light Pattern | Wiring Diagram |
|-----------------------|------------------------------------|----------|---------------|----------------|
| Viewing Angle | ± 20° | | | |
| Viewing Distance | Up to 1 mile | | | |
| Operating Temp | -20° to +80°C | | | |
| Operating Voltage | 9VDC to 15VDC | | | |
| DC Current @ 12VDC | 1.3 Amps | | | |
| Avg Power Dissipation | 12 Watts | | | |
| Luminous Intensity | 666,000 mcd | | | |
| Retro-reflective | Diamond grade | | | |
| Background color | Fluorescent YEL/GRN/ RED/CUSTOM | | | |

Model # Reference Table

| Image | Fed # | LGS P/N | Description | Size |
|-------|-------|-------------------|---|--------------|
| | W11-2 | LGS-W54-A/W11-2-B | Pedestrian Sign w/out Crosswalk Lines & LED Enhanced Border | 30" Diamond |
| | S1-1 | LGS-W63/S-2-1-B | School Sign w/o Crosswalk & LED Enhanced Border | 30" Pentagon |
| | R1-1 | LGS-R1-1 | Stop Sign & LED Enhanced Border | 30" Octagon |

Copyright 1998-2011 LightGuard Systems Inc., All Rights Reserved
 2292 Airport Blvd. Santa Rosa, CA 95403 Phone (707) 542-4547; Fax (707) 525-6333

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)



Basic Power Control Unit

LightGuard Systems®
 Part Number: LGS-ECP
 Description: Entry Level Power Control Unit Panel And Cabinet

- Features/Benefits**
- AC to DC Converter
 - Dedicated Micro Controller
 - 120 VAC Single Phase Input
 - Simple Electrical Connections
 - Lockable Weatherproof Cabinet
 - Internal Branch Circuit Protection
 - Easily Mounts to Poles, Pads, or Other Surfaces

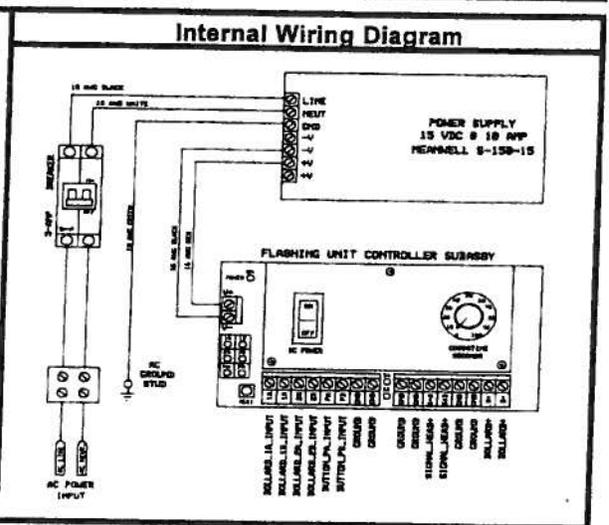
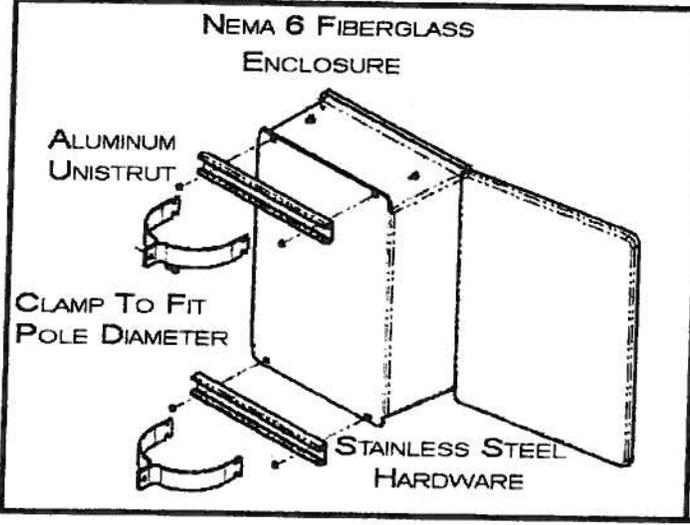
Application Notes

The entry level ECP accepts call signal inputs from either manual push buttons or automatic activation devices to initiate Enlighten1™ flashing rate light sequence. Motorists should thereby be visually alerted to the presence of pedestrians entering the crosswalk. The LED module flashing sequence is activated for a preset duration allowing adequate crossing time.

Available with limited internal factory configured options and preset programming.

General Performance Specifications

| Parameter | Value |
|--------------------------|---|
| Power consumption | 1 Watt (In Standby Mode) |
| Operating Temp | 0°C to +50°C |
| Input Operating Voltage | 120 VAC |
| Input Current Protection | 5A Fast Acting (2 Pole Circuit Breaker) |
| Output Operating Voltage | 13.5 VDC to 15VDC |
| Output DC Load Max | 5 Amps |
| Enclosure Type | NEMA 6 Fiberglass w/Padlock Latch |
| Enclosure Color | White (Standard) |
| Enclosure Size | 16" x 14" x 8" |



Copyright 1999 — 2011 LightGuard Systems Inc. All Rights Reserved

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

LightGuard

Systems, Inc.

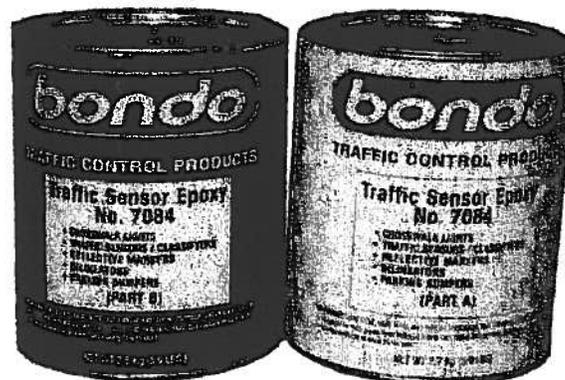
"Pursuing Safety Through Technology"

PRODUCT SPECIFICATION SHEET

Item Name:

2 Part Epoxy (Pass Through Item)

Description: Permanent roadway mounting for signal heads. 2 part epoxy manufactured by Bondo Corporation available in "1 gallon kits". This epoxy is used for roadway applications providing a moisture proof seal around direct burial wire & In Roadway Warning Lights (IRWL) base plates.



LIGHTGUARD P/N: LGS-Bondo

- Approximate Size:** Each "1 Gallon Kit" is comprised of two partially filled 1 gallon containers
- Color:** Final mixed color is Gray, (Part A is Black, part B is white)
- Material:** High strength epoxy (refer to note 1)
- Application:** CHS-14 base plates - approx 1 kit per 2 base plates
SD-10 base plates – approx 1 kit per 3 base plates
- MSDS:** Available from Bondo Corporation at URL noted
http://www.bondo-online.com/bnd_cds/product_msd/English/7084.pdf

2292 Airport Blvd. Santa Rosa, CA 95403 Ph (707) 542-4547 Fax 707) 525-6333

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)



2292 Airport Blvd
Santa Rosa, CA 95403
Phone (707) 542-4547
Fax (707) 525-6333

Quotation **Quote # 100512- 1**

SUBMITTED TO:

Rob Lederman
Erins Crossings Benefit
Customer Street Address
Buffalo, NY, 0Zip
USA
rob@robscomedypplayhouse.com
Phone 716-380-6100

PRICING IS FOR A TYPICAL 4 LANE CROSSING WITH
AUTOMATIC DETECTION BOLLARDS A/C
CONTROLLER AND SIGNS AS A BUDGETARY
ESTIMATE

Reference: Erins Crossing

MSRP

Date: 10/5/2012 **Shipment:** FOB Santa Rosa **Terms and Conditions:** 50/50 Discount pricing SEE NOTE 6 **Salesperson:** Sher Paz

| Item | QTY | Model Number & Description | MSRP Total |
|------|-----|--|--------------|
| 1 | 14 | LGS-9X-3/CHS-14 Amber LED Signal Head w/ Snow Plow Resistant 14"Base Plate | \$ 10,500.00 |
| 2 | 10 | LGS-BONDO Two Part Epoxy for Securing Base Plate into Roadway (pass thru item) | \$ 1,650.00 |
| 3 | 4 | LGS-T3 Automatic Pedestrian Detection Bollard | \$ 5,000.00 |
| 4 | 2 | LGS-W54A/W11-2-B Ped Sign w/o Crosswalk Lines & LED Enhanced Border | \$ 1,590.00 |
| 5 | 1 | LGS-PCU-AC Std A/C PCU w/Programmable Interface, Batt. Backup, Backpan & Cabinet | \$ 3,610.00 |
| 6 | 1 | LGS-ECP-1 Entry Level LGS Control Panel and Cabinet | \$ 1,695.00 |

ALTERNATE

3A 1 LGS-PBA-PAIR ADA 2" Push Button Assembly w/LED Placard - pair (R & L) \$ 750.00
Woud Replace Line Item # 3

Subtotal Without Shipping & Handling \$ 24,045.00
Estimated GROUND Shipping & Handling Charges #VALUE!

Notes:

- See attached Terms and Conditions.
- This offer excludes the following, but is not limited to: installation, poles, wire, miscellaneous mounting hardware, applicable sales tax, drawings, bonds, fees, permit fees or any other added fees.
- This product complies with U.S. Patent no. 6,384,742 awarded to LightGuard Systems, Inc. Use license is authorized for each system purchased.
- LGS-BONDO is Pass Through Item Only
- Delivery 6 to 8 weeks After Receipt of Order (ARO) - Subject to CHANGE due to parts availability
- PAYMENT TERMS:** 50% Due Upon Order 50% Due Upon Completed Order Ready To Ship. 50/50 terms are our best pricing and represent a 4% discount off our standard prices. If you choose different terms, upon approval of credit, up to 4% percent will be added to the invoice items.

Sher Paz
Sher Paz
Authorized Sales Agent

Date: October 5, 2012

(Quote tool version 2v52)

Quotation is subject to attached TERMS AND CONDITIONS and shall expire thirty days from date unless other wise noted

Attachment: Light Guard (COM-2013-63 : Suszynski Family - Erin's Crossings)

LIGHTGUARD SYSTEMS, INC. TERMS AND CONDITIONS

1. **LGS Proprietary Status:** LGS is the owner and supplier of a pedestrian crosswalk warning system ("System") protected by U.S. Patent Numbers 6,384,742 & 6,597,293 & 6,683,540. The System is designed for alerting motorists that they are approaching an occupied crosswalk, or controlled intersection, or rail grade crossings. The System is also referred to as the "LightGuard Systems®", "Smart Crosswalk"™ pending, and the "Pedestrian Crosswalk Warning System". The System consists of flashing light emitting diodes (LED) lights and activating equipment. The System is designed for installation at crosswalks and other roadway crossings.

Approved Uniform Traffic Control Device: The System has been approved as an In-Roadway Warning Light (RWL's) device in the millennium edition of the Federal MUTCD manual Sec. 4L.

3. **Written Modification of Terms or Change Orders:** This agreement may not be modified in any manner without the prior written consent of LGS. Notwithstanding delivery of the items identified herein, no terms or conditions in oral or written communications from BUYER (including the BUYER'S Purchase Order or other forms) shall be binding on LGS unless specifically accepted in writing and signed by LGS.

4. **Price Changes:** All prices are net of any applicable taxes and are subject to change without notice.

5. **Taxes:** Applicable taxes will be added to the purchase of the System unless BUYER provides LGS with, at the time of order placement, tax exemption certificates acceptable to LGS for this transaction from the appropriate taxing authorities exempting BUYER from added tax.

6. **Warranty:** LGS warrants to BUYER for a period of twenty-four (24) months from the date of shipment to BUYER, pursuant to BUYER'S order, that the System shipped and furnished conforms to final LGS specifications and is free from defects in workmanship by LGS. LGS further warrants that the signal head will function normally for a period of thirty-six (36) months (visible to the motorist from normal viewing distances of 200 feet to 400 feet, average, day or night) and not more than four individual LED's become inoperative. Warranty does not cover light condensation/moisture, scratches, hazing or sun degradation to polycarbonates, poor installation technique, or damage from improperly maintained street sweeping equipment.

BUYER shall provide supervision of installation in strict conformance with LGS recommended guidelines as set forth in the LGS Installation Manual available on-line (includes re-torque of signal heads within the specified time period) then in effect by LGS from date of delivery. BUYER shall be solely liable to third parties for the condition of the System as installed. LGS is not, and shall not be, responsible for express or implied warranties, or other remedies which differ from those stated herein. BUYER agrees to save and hold LGS harmless from any, and all, liability, loss, cost, and expense, including attorney's fees arising out of, or in connection with, any BUYER offered warranties.

Therefore, except to the extent of the warranty stated herein, LGS DISCLAIMS all Warranties, whether express or implied, and specifically DISCLAIMS all implied warranties of merchantability and fitness for a PARTICULAR PURPOSE. In no event shall LGS be liable to BUYER in WARRANTY, contract, negligence, strict liability or otherwise for any damages, whether incidental or consequential, which are alleged to be caused by one or more of LGS PRODUCTS. BUYER'S sole and exclusive remedy against LGS for breach of warranty, breach of contract, negligence, strict liability, or otherwise, shall be for REPAIR or replacement of the subject product (excluding installation and removal CHARGES, which shall be BUYER'S RESPONSIBILITY) or LGS may refund the purchase price at the sole option of LGS which such EXCLUSIVE remedy shall expire two years from the date of shipment by LGS of the goods.

7. **Repair and Replace:** All sales are final. In some cases where returns may be permitted at the sole discretion of LGS, after receipt by LGS of written notice from BUYER of a defect in a component, the responsibility of LGS is limited to replacement or repair at the place designated by LGS of any component or components which have been returned to LGS by BUYER, and which LGS determines to be defective, or which do not conform to the system shipped, provided that such component or components are returned by BUYER within ninety (90) days after notice of such defect is received by LGS. Components replaced or repaired within the warranty period shall carry the unexpired portion of the original warranty from the date of receipt of the report of the defect. Warranty services will be provided during normal LGS business hours. BUYER agrees to pay LGS for services required to be performed outside normal business hours, or for additional costs incurred by LGS, in order to comply with local labor contracts.

All components returned by BUYER for repair or replacement must be sent freight prepaid to the address designated by LGS and will be returned to BUYER freight prepaid. BUYER must obtain a Returned Materials Authorization (RMA), signed by LGS, prior to returning any part(s).

Warranty is NOT valid unless BUYER complies with conditions set forth in this paragraph. LGS is not liable for any damage done by unauthorized repair, replaced components, from any misapplications of the component, or for damage due to shipping, accidents, abuse, negligence, or acts of God. In no event shall LGS be liable for loss, damage or expense directly or indirectly arising from the use of the System, or from any other cause, except as expressly stated in this warranty.

8. **Special Damages:** LGS is not liable for, and BUYER expressly waives any right of action it has or may have against LGS for, any consequential or special damages arising out of any breach of warranty express or implied. LGS will not be liable for payment of any labor subcontracted or performed by BUYER for preparation of System under warranty for return to LGS or for work for field repair or replacement. LGS shall not honor any invoice from any source for either labor performed or subcontracted by BUYER.

Condition of Warranty: Any obligation of LGS under its warranty policy is expressly conditioned upon the timely receipt of all payments from BUYER in strict compliance with payment terms. Time is expressly made the essence of this contract and specifically with respect to payment obligations of BUYER. Failure of BUYER to timely pay for the System suspends the warranty obligations of LGS. The expiration date of the warranty shall not be extended upon payment of any overdue amount. BUYER shall not withhold payment of invoices pending settlement of claims. This warranty, and any condition to this warranty, may be modified only in writing and signed by an authorized representative of LGS and shall extend only to BUYER.

All LightGuard Systems Inc. products are designed to function/operate as an integrated system. LightGuard Systems does not warranty or otherwise guarantee any of its products to function/operate or provide any level of safety when directly integrated with or connected to other product line or un-authorized or un-tested products or systems. Any deviation of use not consistent with the LightGuard Systems Inc. Installation Manual or guidelines will void any and all written or implied warranty(s).

10. **Accessories and Buy Out Items:** Any accessories, and "buy out items", which are defined as components to System (e.g. batteries) and supplied by LGS but manufactured by others, carries only any warranty such manufacturer thereof has made to LGS and which by its terms specifically extends to BUYER.

11. **Indemnity:** BUYER agrees to save and hold LGS harmless of and from any and all, liability for the System, including attorney's fees and costs of defense, after delivery to BUYER by LGS, installation by BUYER, and use by City, or other entity, as installed.

12. **Jurisdiction and Venue:** Any questions, claims, disputes or litigation, arising from or related to BUYER'S Purchase Order shall be held in Sonoma County and governed by the laws of California without regard to the principles of conflicts of law. Any and all disputes arising between the parties shall be resolved in the following order: 1) By good faith, negotiations between the representatives of LGS and BUYER, who have authority to fully and finally resolve the dispute, 2) If necessary, by non-binding arbitration in Sonoma County, California. The arbitration will comply with, and be governed by, the provisions of the California Arbitration Act, sections 1280 through 1294.2, of the California code of Civil Procedure; 3) The parties will each appoint one person to select a third impartial arbitrator to hear and decide the dispute. The cost of arbitration will be borne in proportion the arbitrator shall determine. The prevailing party in any proceeding shall be entitled to recover attorney's fees and costs therein incurred.

13. **Validity:** If any provision of this Agreement shall be held to be invalid, or unenforceable, the same shall not affect in any respect whatsoever the validity or enforceability of the remainder of this Agreement.

14. **Credit Terms:** PLEASE CALL FOR SPECIAL TERMS DIFFERENT FROM NOTE 6.

14. **Finance Charges:** Accounts delinquent 30 days or more will incur a finance charge of 10% per annum.

16. **Freight:** All prices are F.O.B. Santa Rosa, CA. Routing and means of transportation will be "Best Way" (transportation carrier may be arranged by LGS).

17. **Minimum Order:** The minimum acceptable order is twenty-five hundred dollars (\$2500.00) list price, except for replacement parts at one hundred fifty dollars (\$150.00).

18. **Quotations:** All quotations, bids, contracts, & orders, are subject to a final written approval or acceptance and acknowledgement by LGS. Quotations will be firm for 30 days from date of submission by LGS.

19. **Cancellation Charges:** All acknowledged orders are subject to a cancellation charge of up to the price of the goods.

20. **Estimated Delivery Dates:** Delivery: Ten - twelve (10-12) weeks ARO (after receipt of written order) however, LGS shall not be liable in any respect for failure or delay in the fulfillment, or performance, of this contract if hindered or prevented, directly or indirectly, by war, conditions of wars, acts of enemies; national emergency; sabotage, revolution or other disorders; inadequate transportation facilities; inability to secure raw materials or supplies, fuel, or power; fire, flood, windstorm, earthquakes or other acts of God; strikes, lockouts, or other labor disputes; orders or acts of any government or governmental agency or authority; interference by Civil or military authority; or any cause of like or different kind beyond the reasonable control of LGS.

21. **Workmanship:** All work by LGS to be completed in a workmanlike manner according to standard industry practices. Any alteration or deviation from the System as described herein is strictly prohibited unless specifically authorized by LGS in writing in advance thereof. Such authorized alteration or deviation will be executed only upon prior written orders and will become an extra charge over and above this formal quotation. LGS shall not be responsible for any delays due to alterations, deviations, strikes, acts of God, or other circumstances beyond the control of LGS. LGS reserves the right to substitute components in the System it deems comparable due to unavailability or unexpected delays in receipt of components from LGS vendors. LGS reserves the right to change without notice, details or specifications in product design. Product use certifies agreement to LGS terms and conditions.

Solar Powered Systems: These are designed to operate within the performance characteristics outlined in the attached solar calculation worksheet. If the actual electrical load exceeds that noted in the worksheet (% ily power consumption), then the customer is responsible to increase the power via additional solar panels &/or batteries as required.)