

Town of Skowhegan  
Downtown Lighting Study



claypoole design  
Lighting Design and Electrical Engineering  
2-12-03

## OBJECTIVES

The Town of Skowhegan has expressed an interest in exploring the cost and feasibility of installing new light fixtures on Water Street in the downtown business district. The town would like to mount new fixtures on the existing steel poles to reduce costs. The solution proposed by the town is dependent on a number of factors. These poles must be structurally capable of supporting the weight and wind load of the new fixtures. Preliminary assessment supports the theory that these poles are more than adequate. The existing overhead wiring shall remain in place to serve the fixtures. The condition and capacity of this wiring must be evaluated to determine if it can remain in place or must be replaced. The new lighting must provide the quantity of illumination and glare (“brightness”) control for streets and sidewalks in accordance with Illumination Engineering Society standards. It is also desirable to create a unique and pleasing appearance for the downtown to promote commerce.

## PROPOSED DESIGN

The existing “cobrahead” lighting communicates a “highway” aesthetic to the downtown. The orange light also has the same appearance as found on major roadways. The downtown is over lighted and the lighting system is not energy efficient, driving up operating costs. The overhead wiring is at an elevation where it is not a visual distraction. Mounting new fixtures below the wiring will decrease the visibility of wiring.

Experience demonstrates that approximately 15 new fixtures will be required to light the downtown. This is approximately 65% of the fixtures currently in use. The savings realized by this change are about \$400 a year. Drawing E1 indicates the proposed lay out. Fixture locations alternate from one side of the street to the other, with the exception of the beginning and end of the zone designated for new fixtures. Two fixtures, one directly opposite the other, at these locations create a gateway and increased illumination.

It is also proposed to install banners with the flatiron logo on the same pole as the new fixtures or on the poles between the fixtures. These banners will be illuminated with small scale floodlights so they are visible both day and night.

The lighting will be controlled by photo-cells for dusk to dawn operation, like the existing fixtures. The lamps (sources) will be long life metal halide lamps similar to those in the Municipal parking lot. This warm “white” illumination provides better contrast than the existing high pressure sodium (“orange”) lamps. The fixtures will provide better visual comfort and a pedestrian friendly environment that without color distortion.

Please see a few proposed fixture, bracket and banner arrangements on the elevations provided in the report.

In accordance with information from CMP, the existing overhead conductors are in poor and unsafe condition, it is recommended that they be replaced.

## PRELIMINARY CONSTRUCTION COST ESTIMATE

A preliminary cost estimate is attached for review and planning. It is important to understand that the estimate establishes a starting point and it must be revised as the scope of the detailed design is developed. The final budget will depend on the design as approved by the committee and available resources. This estimate also includes the operating and maintenance costs associated with the new lighting. Because the details of the design are not yet developed we are including a 15% contingency. Please note that the project may be phased if funds are not available to complete the entire project. A comparison has also been made over the 15 year life of the system between leasing the identical fixture from CMP. This lease also includes maintenance costs, but not energy costs. It is apparent that a lease is only attractive if there are insufficient funds to build the project as the annual cost is three times the cost of building the project with available funds. Even if the cost of the fixtures is financed at an interest rate of 6% for 15 years, it is still 50% less expensive than the CMP lease. The cost to evaluate the structural characteristics of the existing steel poles is not yet included. It might be about \$1000. Claypoole Design will get a quotation for engineering services.

## DETAILED DESIGN

In order to implement the design, review of the proposed fixtures and possibly others would result in the selection of a fixture style. The style must reinforce the architecture style of the downtown. Calculations to determine light levels and fixture performance can be coordinated by Claypoole Design, and made by the fixture manufacturer at no cost to the town. The existing poles would need to be measured so details for mounting the fixtures to the existing poles can be developed.

The flood light assembly for lighting the banners using commercially available hardware will be developed.

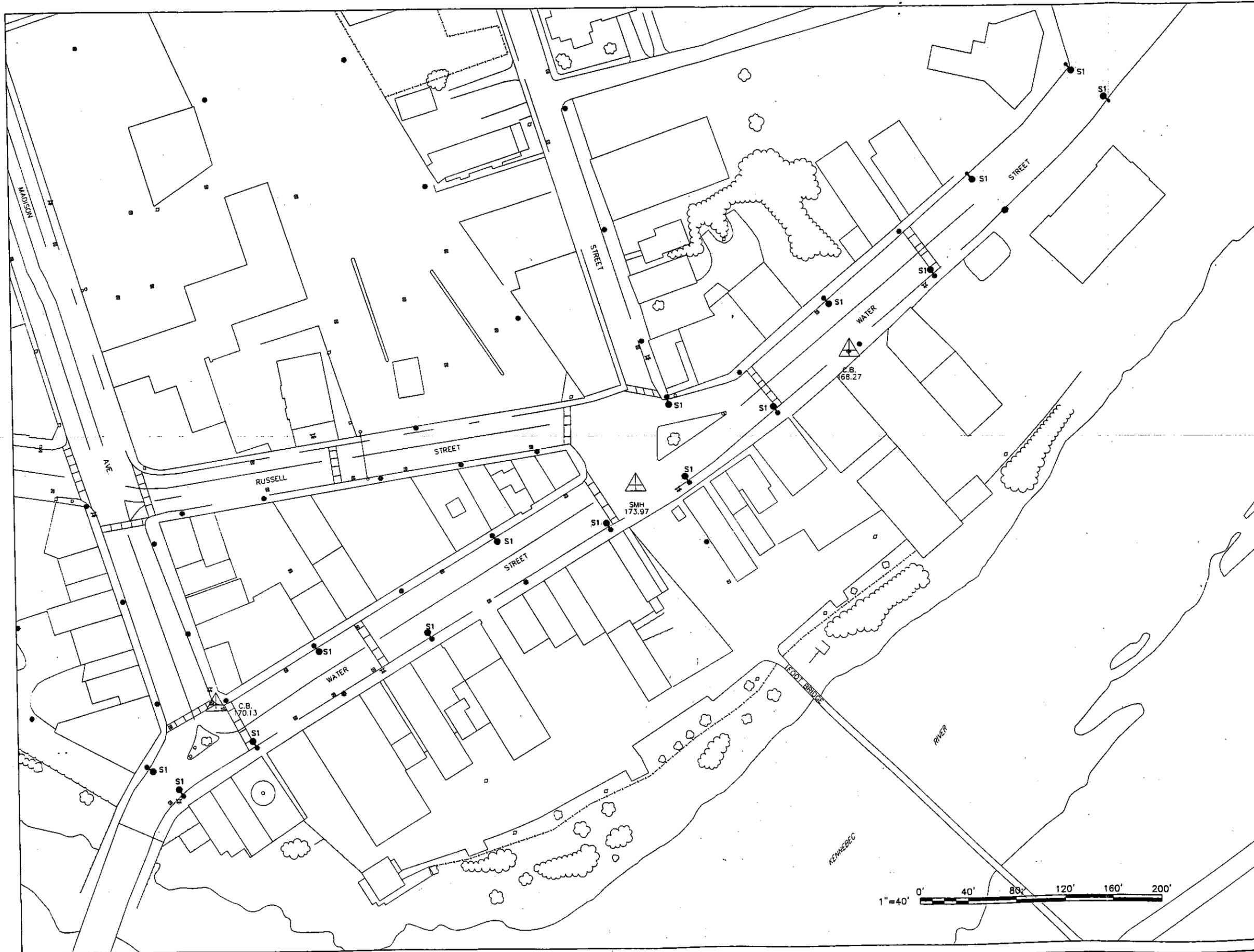
Specifications for painting the existing poles and providing wiring to the fixtures will be developed. It is important that proper procedures be followed for painting the poles so they do not become an annual maintenance item, with the exception of minor touch up.

Direction to CMP will be provided to remove and install new overhead wiring. CMP can probably do this work at lower cost than a contractor.

Currently no costs are being carried for the lease of poles from CMP. Rhonda Perkins is researching the ability of CMP to turn over ownership of the steel poles to the town.

As a group we should determine who is going to perform which parts of the construction. All design decisions will be guided by Claypoole Design and reviewed and approved by the committee.

- EXISTING "COBRA HEAD"
- NEW FIXTURE MOUNTED ON EXISTING POLE
- NEW BANNER & LIGHTING MOUNTED ON EXISTING POLE.



REV	DATE	BY	DESCRIPTION

DRAWING PLOTTED: 02/13/03  
 CLIENT REVIEW  
 DRAWING STATUS: 03-TOS-03-E1  
 CAD DWG. FILE: 03-TOS-03-E1  
 CAD SOFTWARE: AECAD REL. 14  
 THIS ORIGINAL DRAWING RELEASED TO THE CLIENT ON \_\_\_\_\_  
 THE CLAYPOOLE DESIGN ASSUMES NO RESPONSIBILITY FOR ANY SUBSEQUENT REVISIONS TO THIS DRAWING.

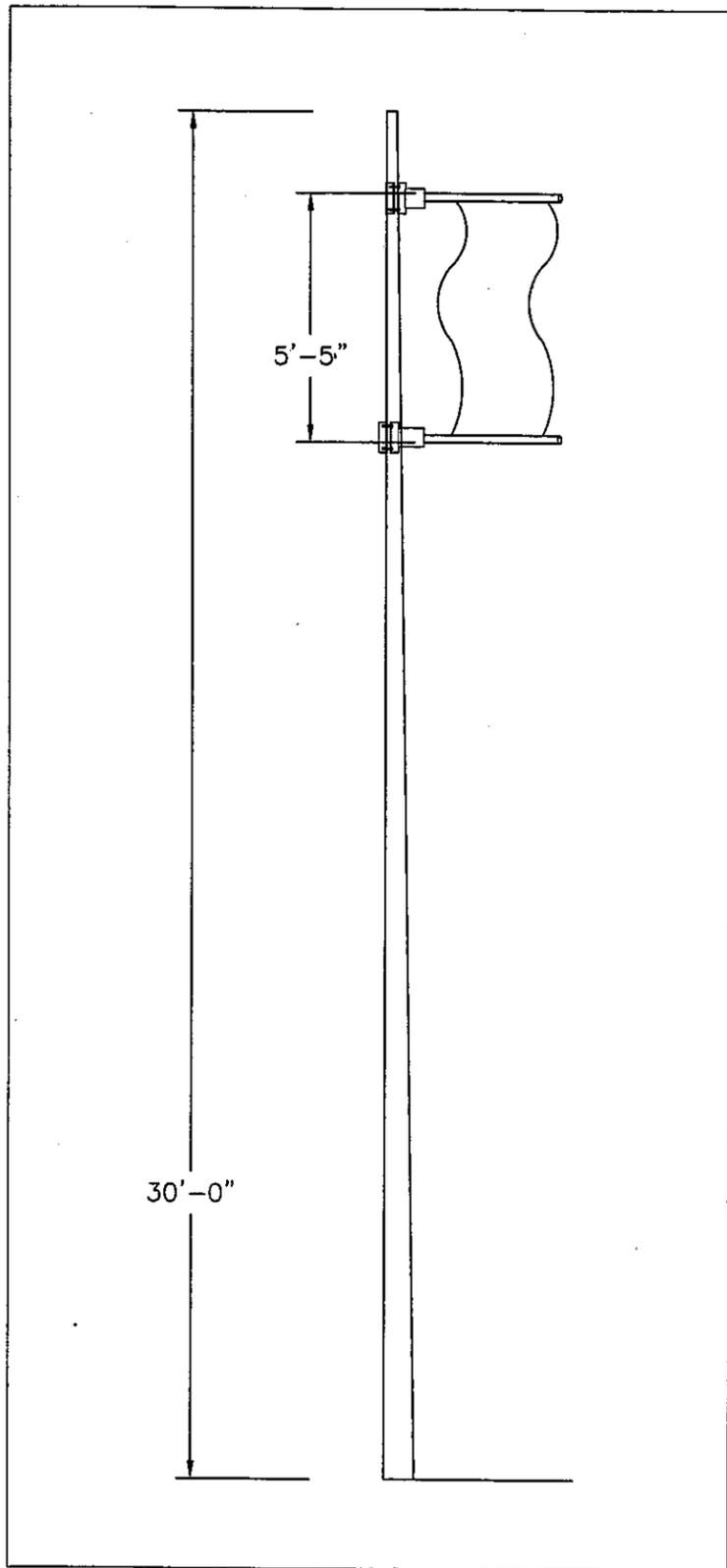
DESIGN: MLC	SEAL
DRAWN: JEF	
CHECKED: MLC	
APPROVED:	
SCALE: 1"=40'	

**claypoole design**  
 Lighting Design and Electrical Engineering  
 Michael L. Claypoole, P. E. TEL. (207) 474-8000  
 P. O. BOX 3128 SKOWHEGAN, MAINE 04976 FAX (207) 474-0543

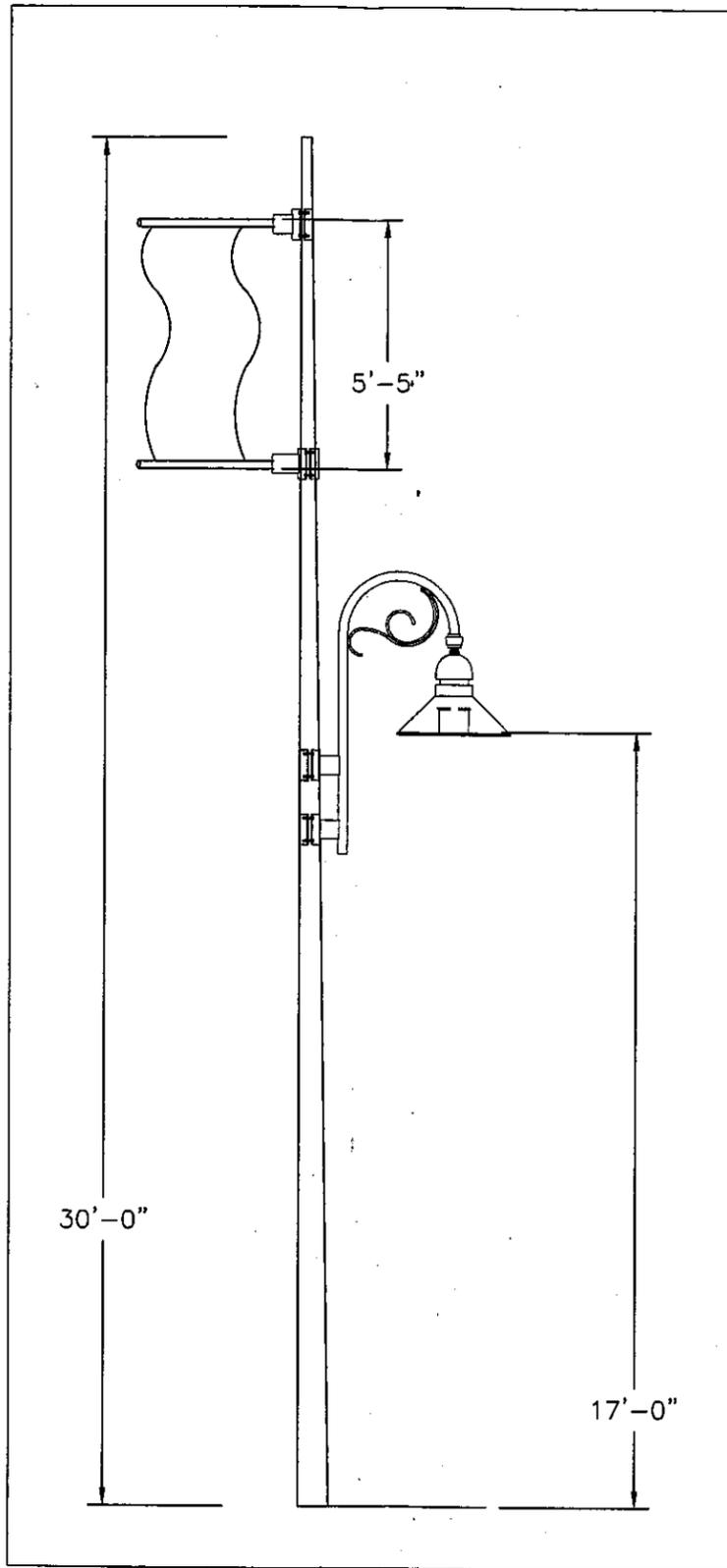
CLIENT/PROJECT  
 TOWN OF SKOWHEGAN  
 SKOWHEGAN, MAINE  
 STREET & SIDEWALK LIGHTING

DRAWING TITLE  
 SITE PLAN

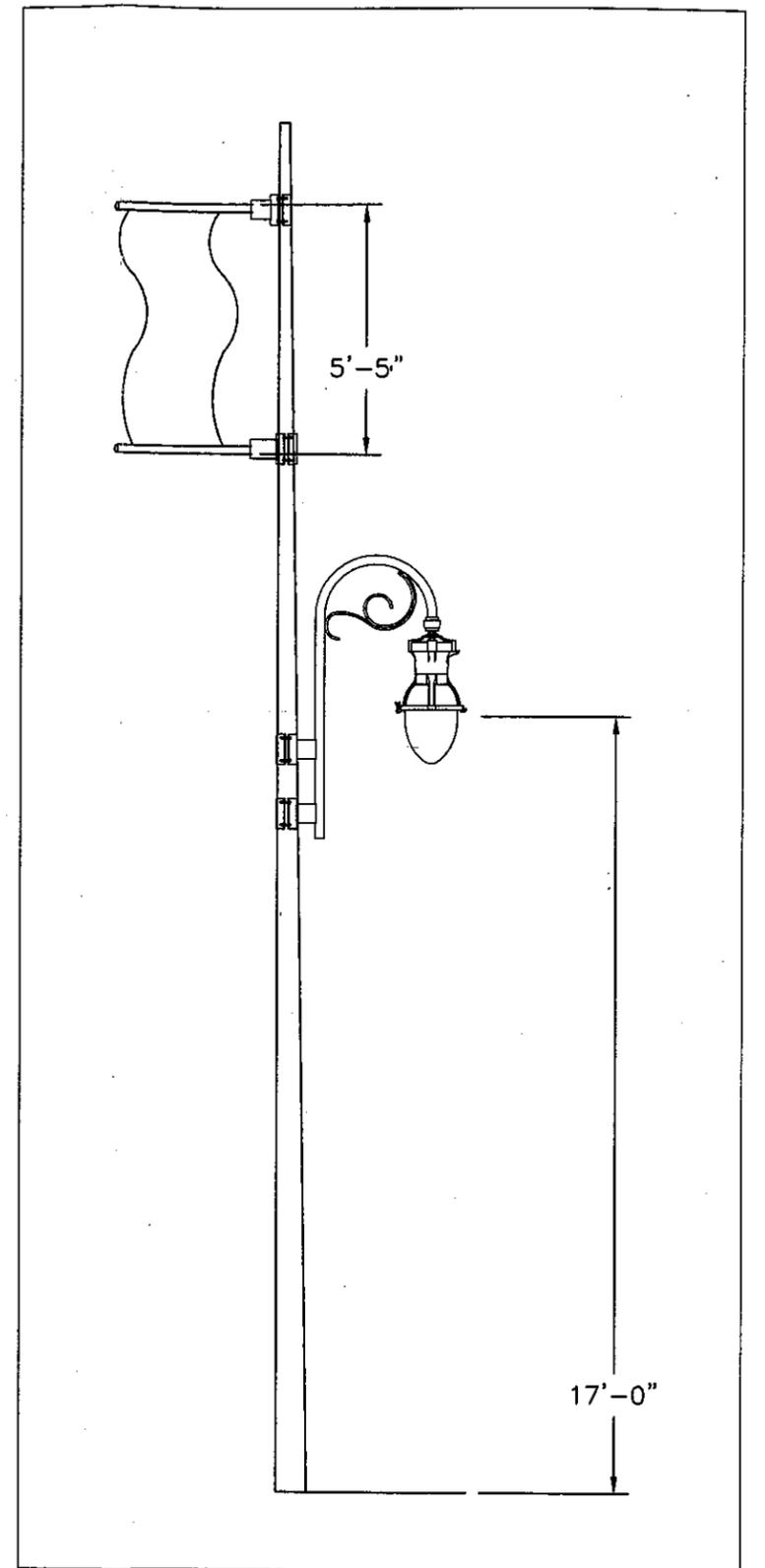
DWG NO.	REV	
E1		
PROJ. NO.	FILE	SHEET
03-TOS-01	MLC	1 OF 3



POLE WITH BANNER



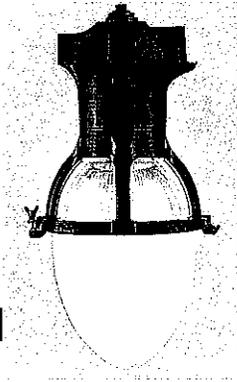
POLE WITH HALLBROOK FIXTURE & BANNER



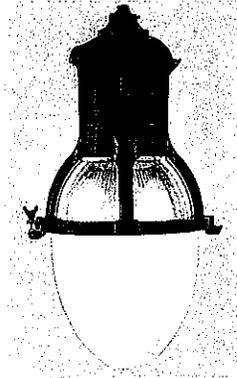
POLE WITH ESPLANADE FIXTURE & BANNER

TOWN OF SKOWHEGAN  
STREET LIGHTING  
PRELIMINARY  
COST ESTIMATE

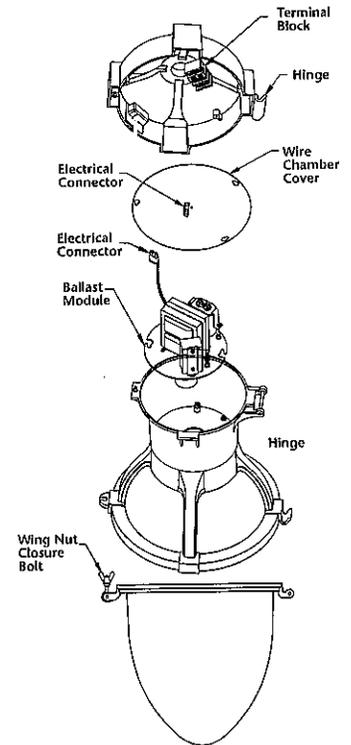
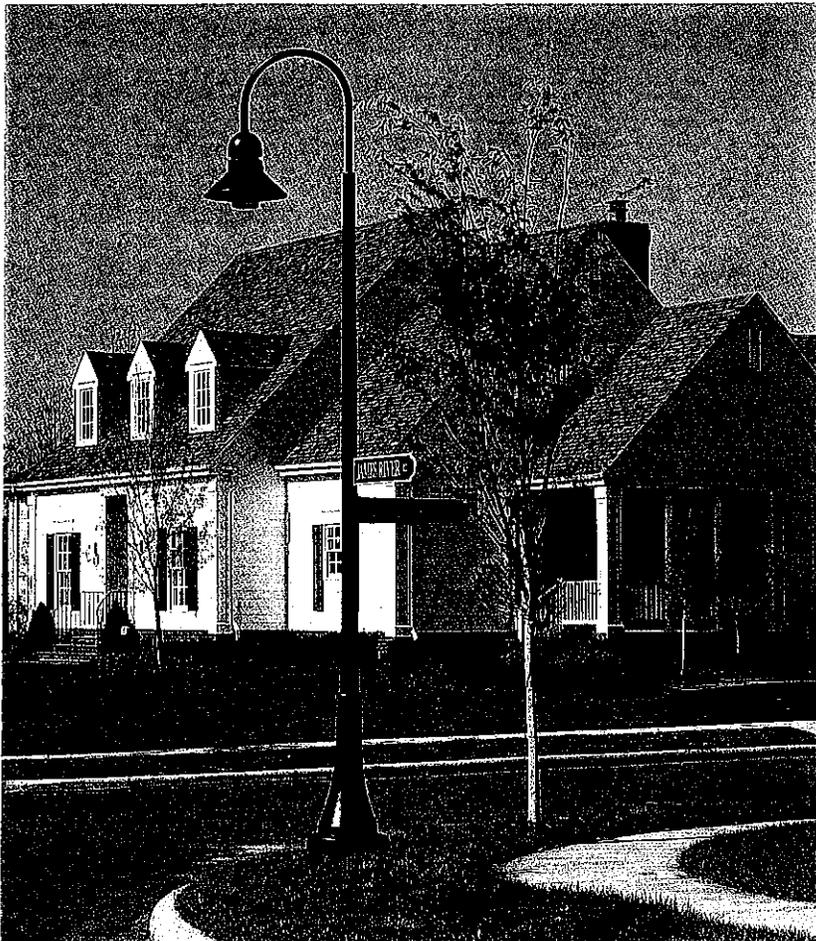
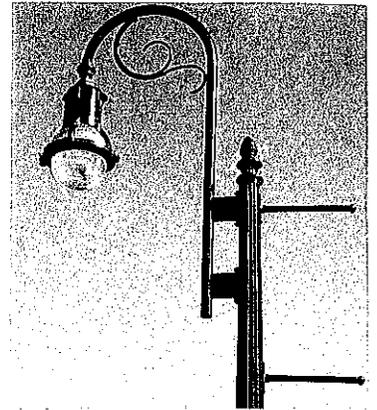
DESCRIPTION	QTY/FEET	COST EA	TOTAL COST	COMMENTS
<b>INSTALLATION</b>				
REMOVE EXISTING FIXTURES	23	LAB + MAT \$21.00	\$483.00	CONTRACTOR INSTALLED
PAINT EXISTING POLES	23	\$260.00	\$5,980.00	WIRE BRUSH, CLEAN, PRIME, PAINT
INSTALL NEW FIXTURES	15	\$1,900.00	\$28,500.00	TOS - PURCHASES FIXTURES
INSTALL BANNER ARMS & LTG.	15	\$566.00	\$8,490.00	BANNER NOT INCLUDED
REMOVE EXISTING TRIPLEX WIRE	1200	\$0.50	\$600.00	ESTIMATE BASED ON CMP PRICE
INSTALL NEW TRIPLEX WIRE #2 AWG	1200	\$2.03	\$2,436.00	ESTIMATE BASED ON CMP PRICE
CMP CHARGES/COORD.	1	\$400.00	\$400.00	
REWIRE POLES (CONNECTIONS)	15	\$145.00	\$2,175.00	ASSUMES METERING IS IN PLACE
PROJECT ADMIN. - MEETINGS	1	\$800.00	\$800.00	SUPERVISION - PROJECT ADMINISTRATION - MEETINGS
<b>TOTAL - 1</b>			<b>\$49,864.00</b>	
<b>MAINTENANCE</b>				
250 W MH LAMP	15	MAINT COST \$2,161.17	ANNUAL COST \$771.85	10% SPOT RELAMPING - BUCKET TRUCK
CLEANING/PAINTING FIXTURES/POLES (5YRS)	23	\$158.00	\$948.00	LAMP LIFE X 80% - GROUP RELAMPING
<b>TOTAL - 2</b>			<b>\$1,719.85</b>	15K LAMP LIFE - 4380HR/YR - 2.8 YRS
<b>ENERGY</b>				
250W/LAMP BALLAST	15	ANNUAL COST \$1,133.33	\$3.11	DAILY COST
175W/LAMP BALLAST	15	\$793.33	\$2.17	DAILY COST
LIGHTING DESIGN & ENGINEERING				CONSTRUCTION ADMIN. SERVICES DONATED \$1,500 -\$1,700
<b>TOTAL - 3</b>			<b>\$7,000.00</b>	\$1,200 FIXTURE CREDIT - BALANCE \$5,800 (ESTIMATE +/- 10%)
<b>TOTAL DESIGN AND INSTALLATION</b>			<b>\$56,864.00</b>	
<b>TOTAL 1 + TOTAL 3</b>			<b>\$7,480</b>	CONTRACTOR
<b>15% CONTINGENCY</b>				LABOR RATE - \$40/HR - MAT. AT COST
NOTES:				
1. PLEASE SEE SITE PLAN FOR PRELIMINARY LAYOUT				
2. THIS ESTIMATE IS BASED ON PRELIMINARY DESIGN - ACTUAL DESIGN MAY RESULT IN ADDITIONAL FIXTURES TO MEET IES CRITERIA.				
DOES NOT INCLUDE FIXTURE ARM				
CMP LEASE (FIX + MAINT - NO ARM)	15	COST EACH \$355	ANNUAL COST \$5,319	ANNUAL COST -- \$29.55/FIX/MONTH FOR 12 MONTHS
BUY FIXTURE WHOLESALE + MAINTENANCE	15	\$1,772	\$1,772	FIXED - BASED ON 0% INTEREST AND A 15 YEAR LIFE
BUY FIXTURE WHOLESALE + MAINT. (6% Financing)	15	\$2,738	\$2,738	FIXED - BASED ON 6% INTEREST AND A 15 YEAR LIFE



Crystalite (uplight)



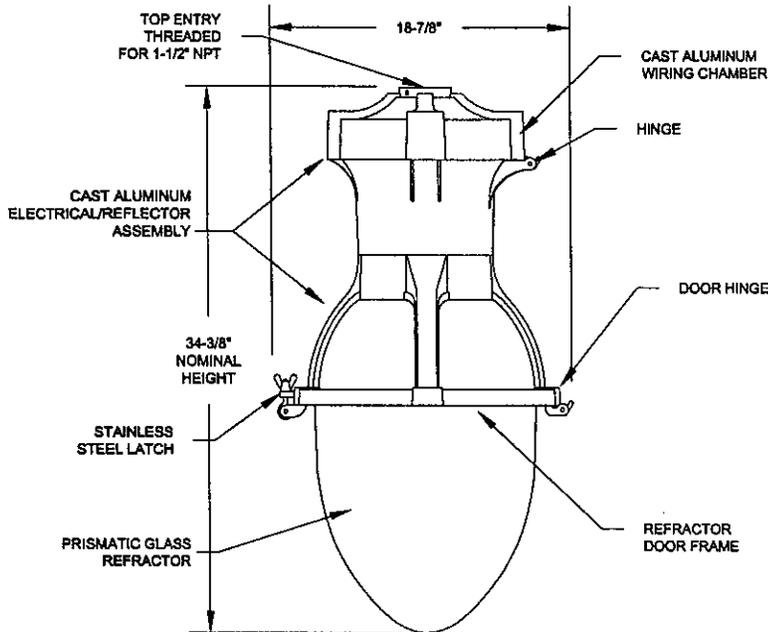
Atlanta (uplight)



PHOTOGRAPHS OF PROPOSED FIXTURES

# Esplanade® Luminaire

Teardrop Style  
 Maximum weight - 60 lbs  
 Maximum effective projected area - 2.0 sq. ft.



## Specifications

### DESCRIPTION

The Esplanade luminaire is styled to replicate the "teardrop" luminaires that lighted boulevards in the first half of this century. Designed for light control and ease of installation and maintenance, the Esplanade has a precision optical system for true street lighting performance.

### WIRING CHAMBER

The wiring chamber has a 1-1/2 inch NPT threaded entry for pendant mounting. A stainless steel set screw locks the unit in position. A three station terminal block will accept #14 through #2 wires and is prewired to one half of the plug assembly that connects to the removable electrical module.

### ELECTRICAL / REFLECTOR ASSEMBLY

The electrical / reflector assembly hinges down from the wiring chamber for ease in wiring and to facilitate the removal of the electrical module. The assembly is latched in place by a captive stainless steel hex head screw. The uninitialized electrical module consists of the ballast and socket mounted to a cast aluminum plate that is easily removed by loosening two screws in keyhole slots. The disconnect plug connects the ballast to the terminal block in the wiring chamber. The socket is street lighting grade with nickel plated lamp grip shell, center contact backed by a coiled spring and glazed porcelain body. The anodized and brightened reflector is formed with flutes to control voltage rise in the lamp and to work in conjunction with the refractor to provide the desired distribution of light.

### REFRACTOR / DOOR ASSEMBLY

The cast aluminum door cradles a teardrop shaped, thermal resistant borosilicate glass refractor that controls the light to provide an I.E.S. type IV cut off distribution. The combination of reflector, refractor and vertical burning lamp maximize efficiency and uniformity of illumination while controlling luminaire brightness. The refractor assembly hinges from the electrical / reflector assembly and is latched by a stainless steel, captive, wing nut assembly.

### BALLAST

(Refer to Ballast Data Sheet for specific operating characteristics)

150 watt and below 120 volt High Pressure Sodium (HPS) ballasts are High Power Factor Reactor type. All other 150 watt and below are High Power Factor Autotransformer type. 250 and 400 watt HPS ballasts are Lead type. All Metal Halide (MH) ballasts are Peak Lead Autotransformer type.

### FINISH / MATERIAL

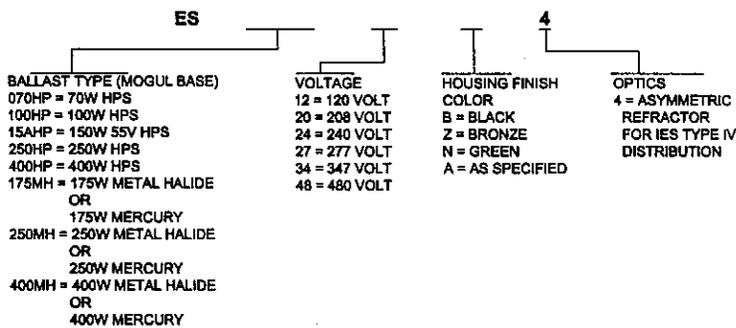
The luminaire is finished with polyester powder paint applied after a seven stage pretreatment process to insure maximum durability. All castings utilize alloy #356 copper free aluminum for maximum corrosion resistance and all exposed hardware is stainless steel.

### U.L. LISTING

U.L. listing suitable for wet locations - at 40 degrees C for 250 watt and below; at 25 degrees C for 400 watt.

### ORDERING INFORMATION

EXAMPLE: ES 070HP 12 B 4



OPTIONS  
 PR = BUTTON STYLE PHOTOCELL WITH PRISMASCOPE (NOT AVAILABLE WITH 480 VOLT)  
 PS = PROTECTED STARTER FOR HPS UNITS ONLY

ARCHITECTURAL OUTDOOR ORDER #:

TYPE:

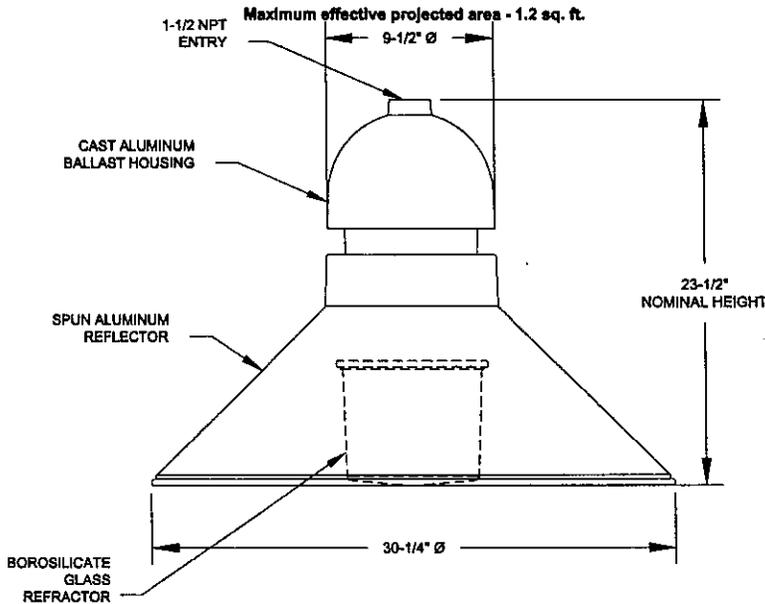
DRAWING NO: US-1255

SCALE: N/A  
 DRAWN: RAF  
 APP'D:  
 DATE: 05-02-02

# Glas Werks™

## Hallbrook® Extended Series Luminaire with Small Cylindrical Prismatic Glass Optics

Maximum weight - 31 lbs



### ORDERING INFORMATION

EXAMPLE: HB 100HP 12 B E 51

HB

**BALLAST TYPE (MOGUL BASE)**  
 050HP = 50W HPS (NOT AVAIL. W/ 347V)  
 070HP = 70W HPS  
 100HP = 100W HPS  
 15AHP = 150W 55V HPS  
 175MH = 175W MH  
 100MV = 100W MV  
 175MV = 175W MV

**VOLTAGE**  
 12 = 120 VOLT  
 20 = 208 VOLT  
 24 = 240 VOLT  
 27 = 277 VOLT  
 34 = 347 VOLT  
 48 = 480 VOLT  
 MT = 120/208/  
 240/277 VOLT

**HOUSING FINISH COLOR**  
 B = BLACK  
 Z = BRONZE  
 N = DARK GREEN  
 A = AS SPECIFIED

**EXTENDED REFLECTOR**

**BALLAST TYPE (MEDIUM BASE)**  
 50DHP = 50W HPS  
 70DHP = 70W HPS  
 10DHP = 100W HPS  
 15DHP = 150W 55V HPS  
 70DMH = 70W MH (NOT AVAIL. W/ 347V OR 480V)  
 10DMH = 100W MH (NOT AVAIL. W/ 347V OR 480V)  
 15DMH = 150W MH (NOT AVAIL. W/ 347V OR 480V)  
 17DMH = 175W MH

**OPTICS**  
 51 = ASYMMETRIC GLASS REFRACTOR  
 IES TYPE III DISTRIBUTION  
 55 = SYMMETRIC GLASS REFRACTOR  
 IES TYPE V DISTRIBUTION

#### OPTIONS

P = PROTECTED STARTER (HPS UNITS ONLY).  
 B = BUTTON STYLE PHOTOCONTROL IN BALLAST HOUSING (480 VOLT NOT AVAILABLE).  
 GWBANDX = DECORATIVE BAND, FACTORY INSTALLED BETWEEN HOUSING AND COVER. FOR "X" INSERT; B, Z, N OR A FOR COLOR.

## Specifications

### GENERAL DESCRIPTION

The Euro styled luminaire consists of a prismatic glass optical assembly shielded by a flared cutoff reflector and a top mounted cast aluminum ballast assembly with a circumferential 1-1/2 inch reveal.

### OPTICAL ASSEMBLY

The optical assembly consists of a thermal resistant annealed borosilicate glass refractor mechanically held in a formed aluminum door frame. The door frame is attached to the flared reflector assembly with three stainless steel screws. Three keyhole slots in the door frame and an internal safety cable allow easy removal for re-lamping. Light from a vertical lamp is distributed by precisely molded refracting prisms to maximize utilization, uniformity and luminaire spacing. The refractors are designed for asymmetric or symmetric distribution. This luminaire meets I.E.S. full cutoff classification.

### BALLAST ASSEMBLY

The ballast housing, cast of 356 aluminum alloy, has a smooth domed contour and a 1-1/2 inch circumferential reveal. This housing has an integrally 1-1/2 inch NPT threaded entry with stainless steel set screw. A terminal block is provided with a quick disconnect receptacle. The unitized ballast assembly, containing the ballast and other electrical components, plugs into the quick disconnect receptacle. The ballast plate is key holed for ease of installation into the ballast housing. A nickel plated lamp grip socket of street lighting grade with a glazed porcelain body and the center contact backed by a coiled spring, is positioned mechanically to the ballast plate, placing the lamp at the light center of the prismatic glass refractor.

### UL LISTING

This luminaire has earned the U.L. Listing mark. It is suitable for wet locations at a maximum of 25° C ambient temperature

### BALLASTS

(Refer to the Ballast Handbook for specific operating characteristics)

50 - 100 watt 120 bolt High Pressure Sodium (HPS) ballasts are High Power Factor Reactor type. All other HPS ballasts are High Power Factor Lag type.

175 watt Metal Halide (MH) ballasts are Peak Lead Auto-transformer type. 70, 100 and 150 watt MH units are High Power Factor Lag type ballasts.

All Mercury Vapor (MV) ballasts are High Power Factor Constant Wattage Autotransformer (CWA) type.

### FINISH

The luminaire is finished with polyester powder paint applied after a seven stage pretreatment process to insure maximum durability.

ARCHITECTURAL OUTDOOR ORDER #:

TYPE:

DRAWING NO: US-3328

THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE ON THE ORDER NOTED ABOVE. A UNIT OF SIMILAR DESIGN MAY BE SUPPLIED, BUT ONLY AFTER APPROVAL BY THE CUSTOMER IN WRITING. ON POLE ORDERS AN ANCHOR BOLT TEMPLATE PRINT WILL BE SUPPLIED WITH EACH ANCHOR BOLT ORDER TO MATCH THE POLE PROVIDED.

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**HOLOPHANE**  
 LEADER IN LIGHTING SOLUTIONS

**Holophane**

214 OAKWOOD AVENUE - NEWARK, OHIO 43055

SCALE: N/A  
 DRAWN: BHH  
 APP'D:  
 DATE: 10-09-01

# Grand Ledge Series Aluminum Crossarm

# Specifications

## DESCRIPTION

The arm assembly shall be of all aluminum construction consisting of a bent pipe arm with a bent aluminum pipe brace. Arm measures ~ 35" from clamp to luminaire center.

## MATERIALS

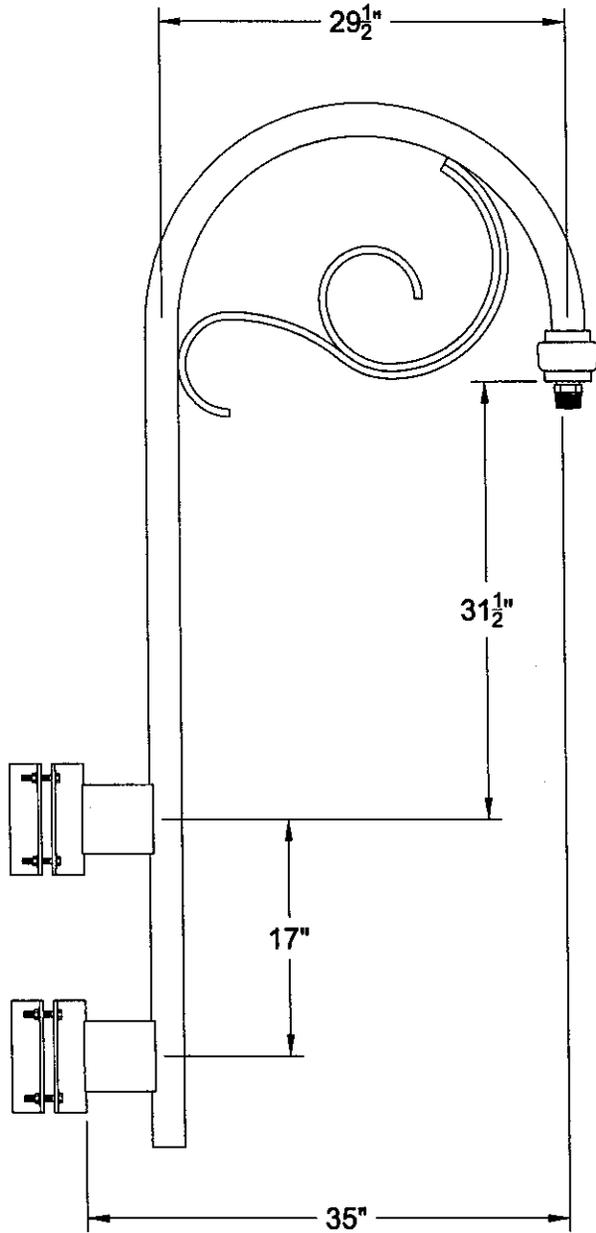
The arm shall be constructed of 2" schedule 40 aluminum pipe with aluminum plate, tubing and pipe, and a cast aluminum luminaire fitting (1½ NPT). All hardware shall be tamper resistant stainless steel.

## INSTALLATION

The arm shall clamp to existing post. Customer shall provide post diameter at clamp locations for proper sizing of clamps.

## FINISH

The post assembly shall be shipped with a black powder coat finish.



Catalog#

Grand Ledge Arm, Aluminum, Clamp-on

ARCHITECTURAL OUTDOOR ORDER #:

TYPE:

DRAWING NO: US-2023r1

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214 OAKWOOD AVENUE - NEWARK, OHIO 43055

SCALE: N/A  
DRAWN: SA  
APP'D:  
DATE: 2/11/03