Town of Milton

Village Lighting Enhancement Study

FINAL REPORT
November 20, 2002

Prepared by:

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Main Street and Historic Village Core Lighting Study

1. Introduction

1.1 Background

The goal of the Main Street and Historic Village Core Lighting Enhancement Study is to replace existing, rented CVPS street lighting with street lighting that enhances the appearance of the historic village, adds to the night time ambiance and provides enough illumination for the safety of vehicles, bicycles and pedestrians. The Village has proposed the installation of decorative lighting fixtures on portions of Main Street, School Street, Cherry Street and River Street.

Historic Main Street is clearly an important resource for Milton. The area between East Road and the River Street intersection is a National Register Historic District. School Street is home to the Milton Historical Society, the old elementary school, now used for elderly housing, and many older homes. Lower Cherry Street, which connects with River Street to complete the roadway loop of the project area, is also the site of a few older homes. The intersection of River St and Main Street was historically the commercial center or Milton until the 1960s. A few of these original buildings remain. Decorative street lighting will enhance the character and accentuate these streets and emphasize the significance of the Historic District.

The Town is presently engaged in several efforts to improve the image, multi-modal function and safety of Village streets. This lighting project, funded through the VTrans Enhancement Program, is the first of a three part study. It is central to achieving the Town’s goal of improving pedestrian facilities in the Village and improving multi-model services town-wide.

Related projects now in process include design of a new section of sidewalk to complete the sidewalk network on both sides of Main Street, renovation of below grade utilities and creation of a multi-modal center on Main Street near the railroad. A successful multi-modal center will necessitate good, comfortably illuminated pedestrian connections though-out the area.
1.2 Project Area

The project area is defined by Main Street between River Street and Railroad Street on the North, School Street on the East, Cherry Street between School Street and River Street on the South, and River Street between the Lamoille River bridge and Barnum Street on the West.

The project area was selected because it links the historic Village with the commercial center to the south, via River Street, and to the rail line and the planned multi-modal center on Main Street.
2. Purpose and Need

2.1 Local Concerns, goals and objectives
The goals of this project are the following:
- Improve pedestrian lighting
- Enhance the historic district of Milton
- Provide adequate roadway lighting

2.2 Pedestrian Routes, Milton Transportation Plan
Milton's Alternative Transportation Master Plan – May 2002 recommends that that the “Town Core Area” which includes the Village be a priority for multi-modal improvements including sidewalks. In the rating system used for the study to determine priorities, the Core received 30 points out of 33 available points.

2.3 Public Participation

Public Meetings
Public participation included three public meetings.
- The first, well-attended meeting was held on April 17, 2002 at the Town Offices. The agenda included a slide show and discussion of lighting terminology and lighting issues and ended with an evening site walk of the project area. On the site walk the consulted measured existing light levels and the participants discussed preferred lighting environments. In order to survey the lighting preferences of individual area residents, all attending were asked to fill out a questionnaire. (See below)
- At the second meeting held on August 20, 2002 the consultant team presented a selection of suitable lighting fixtures, two recommended fixtures and a proposed layout of fixtures. Those present voted to proceed with the recommendation of the consultants.
- A third meeting was held on October 22 in conjunction with a regular meeting of the Village Trustees. A draft of this report and a summation of the project to date was presented and approved by the trustees.

Questionnaire
A copy of the questionnaire and a table that tallies all completed responses are presented on the following pages.

In general the respondents stated that they often walk through the village during evening hours and that they found the pedestrian areas needed more illumination. A few people indicated that some parts of the project area were too bright. These were areas on River Street (US 7) where floodlights are used to light commercial parking lots and where a brightly lit gas station canopy competes with lower light levels on neighboring properties. A few residents of Main Street supported the project but did not wish to see poles located near their residence.

Trial Installation
The recommended fixtures will be installed for on a trial basis in the park on River Street for a limited period of time in November 2002. The public will have an opportunity to judge the appearance of the fixture by day and more importantly the quality of light produced by the fixtures at night.
Exhibits

Graphic materials including plans, sketches and product catalogue photographs will be on exhibit on Election Day, November 5th in the Town Offices. Residents will have an opportunity to view the exhibit and respond with their comments.
Main Street and Old Village Core Historic Lighting Study

The Village of Milton is currently studying the feasibility of adding historic/decorative lighting along portions of Main Street, River Street, Cherry Street, and School Street in the Village. Please take a moment to complete this brief survey to help us plan future lighting improvements in the Village.

Questionnaire

1. Overall, what do you think of the existing lighting in the Village on a scale of 1 to 5?
   Circle One: Poor 1 2 3 4 5 Excellent

2. Do you walk in the Village at night? Circle One: Y N

3. Typically how far do you walk?
   Circle One: less than ¼ mile ¼ to ½ mile ½ to 1 mile over 1 mile

4. Where do you walk to and from?

5. What area(s) of the Village do you feel most comfortable walking at night?

6. Are there areas in the Village that are too dark? Circle One: Y N
   Where?

7. Are there areas too bright at night? Circle One: Y N
   Where?

8. Are there other places/towns where you enjoy walking at night? Circle One: Y N
   Where? Why?

9. Do you have any other comments about lighting in the Village Milton:

Thank you for your time

Please bring your completed questionnaire to the public informational meeting for the Main Street and Old Village Core Historic Lighting Project on Wednesday April 17 at 7:00 PM at the Milton Municipal Building, 43 Bombardier Road, Milton, Vermont. An outdoor walking tour will also be provided after the meeting to review the existing lighting starting at 8:15 PM at the United Church on Main Street, weather permitting. Shuttle service will be provided.

If you are unable to attend, please mail your questionnaire to: Bob Lombard, 41 Baker Lane, Milton, VT 05468 or drop it off at the town clerk’s office.
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<thead>
<tr>
<th>Question</th>
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<th>12</th>
<th>13</th>
<th>14</th>
<th>TOTALS</th>
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<tbody>
<tr>
<td>1 Rate Existing Lighting (1= poor, 5= excellent)</td>
<td>avg</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
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<td>1</td>
<td>5</td>
<td>2.9</td>
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<td>2 Do you walk Village at night?</td>
<td>most walk</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>3 How far?</td>
<td>mile avg</td>
<td>1</td>
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<td>1+</td>
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<td>3/10</td>
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<td>4 Where do you walk?</td>
<td>most walk 1 mile or more</td>
<td>Main (9), Cherry (5), School (6), Maplewood (5), Railroad (4), River (4), Rugg (3) Kienle (3), Herrick (2) Barnum (1) Around village (2)</td>
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<tr>
<td>5 Where do you feel comfortable walking at night?</td>
<td>most walk</td>
<td>All of village (6), Main (6), School (2), River (1), Maplewood(1), Railroad(1), Herrick(1)</td>
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<td>6 Are some areas too dark?</td>
<td>10 - yes</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
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<td>Y</td>
<td>N</td>
<td>3 - No</td>
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<td>Where</td>
<td>Main (5), Cherry (5), School (4), River (2 - hill)</td>
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<td>7 Where is it too bright?</td>
<td>10 say no areas too bright</td>
<td>* Behind Oliver Seen * Mobil, Omega Auto * Rosario's when on * RR and Main</td>
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<td>8 Other places/towns you enjoy walking at night?</td>
<td>Railroad, ?, Barnum</td>
<td>3 - Church St - Burlington, Montreal, Newport</td>
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<td>Why?</td>
<td>Lighting, well lit but attractive, shops, architecture</td>
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<tr>
<td>9 Comments</td>
<td>Options for christmas decorations</td>
<td>7 - general supportive comments</td>
<td>*</td>
<td>2 - remove present lighting</td>
<td>Options for christmas decorations</td>
<td>*</td>
<td>Preserve existing trees</td>
<td>*</td>
<td>Consider the architecture of the village</td>
<td>*</td>
<td>Bury overhead lines</td>
<td>*</td>
<td>No new poles on North side of Main St</td>
<td>*</td>
<td>Would consider walking with better lighting</td>
<td></td>
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</table>
2.4 Public Support
The questionnaires indicated overwhelming support for the project. One resident cautioned that lighting on the north side of Main Street (near their residence) should not be increased such that it would change the park-like setting of this residential area.

2.5 Related/Supporting Town Projects
The Town of Milton is actively involved in planning several transportation and infrastructure improvements in the Main Street area. The Main Street Enhancement Project has been awarded grant funds through the Enhancement Program for Phase 1 – Main Street Scoping Study and Phase 2 – Multi-Modal Center Scoping Study. The Phase 1 Study has recently been completed and a preferred alternative design was approved by the Selectboard in October 2002. Phase 1 involved developing and selecting a conceptual design of bicycle and pedestrian improvements, various stormwater improvements, and realignment of the intersection of Main Street and Railroad Street.

The Phase 2 study is scheduled to commence after a consultant is selected in November 2002. Phase 2 involves the site selection and conceptual planning for a multi-modal transportation center in the Main Street area. Phase 3 will involve design and construction of the Main Street improvements and the Multi-Modal Center. Other infrastructure improvements planned for the area involve the reconstruction of municipal water and sewer along Main Street. These utility improvements will be coordinated with the enhancement program improvements as well as the Lighting Enhancement project.
3. Natural and Cultural Resources

3.1 Wetlands
April Moulaert, District Wetlands Ecologist for the VT Agency of Natural Resources, was contacted and asked to review the project. The Vermont Significant Wetland Inventory maps provided the basis of her review. She indicated that the project might be near a Class Two wetland. Although she suggested further that if the entire project is located within a previously disturbed road right-of-way, it may be unlikely that the State would have adverse comments regarding the project.

*A field inspection by the Trudell wetland staff has revealed that a portion of the project study area falls within 50-ft of potential wetland. For this reason, it is recommended that a wetland delineation be performed and a determination made as to the classification of the wetland.*

3.2 Water Bodies and Water Courses
Karl Jurentkuff of the Agency of Natural Resources’ Water Quality Division responded to an inquiry regarding the project location’s floodplain status. He did not feel that resources under the State’s jurisdiction would be affected by the project and no permit would be needed to address floodplain district requirements.

3.3 Flora and Fauna
Everett Marshall with the Vermont Non-Game Heritage Program has confirmed that the project will not impact threatened or endangered species.

3.4 Stormwater
The project will not result in any new impervious area and therefore would not be subject to a stormwater discharge permit. Erosion control measures should be implemented during construction to prevent any discharge of sediment to Waters of the State. The construction practices should conform to the Vermont Erosion Control and Sediment Handbook.

3.5 Hazardous Waste
A letter received from Peter Marshall, chief of the Hazardous Waste Management and Prevention Section of the Vermont Agency of Natural Resources indicated that no permit would be required from the Hazardous Waste Section to install historic lighting in Milton. Resources under the State’s jurisdiction would not be affected and no measures would need to be taken to receive a sign-off from their office. With this in mind, Mr. Marshall cautioned, “During projects of this nature, occasionally Underground Storage Tanks (USTs) are found...should this occur, please contact the State for assistance with the proper removal and closure of the tanks”.

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1 *September 26, 2002 E-mail from Peter Marshall, Chief – Hazardous Waste Management & Prevention Section, VT Department of Environmental Conservation.*
3.6 Historic/Archeological Resources

At this point, no response has been received from the State Historical Society of Archaeologists or Division of Historic Preservation regarding the areas outside the Main Street ARA study area.

*Given the historic nature of the project area it is recommendation that the Division of Historic Preservation review and provide written approval of all final contract plans.*

Historic Resources

The area between East Road and the River Street intersection is a National Register Historic District. Main Street’s wide right-of-way and generous planted greenbelts, which remain substantially intact reflect an urban design trend called the “City Beautiful” movement that occurred at the turn of the last century. Such main street designs reflected the pride that the citizens of past eras felt for their town. Such improvements were also a statement of a town’s economic standing and an investment in the town’s future.

![Milton Falls Map](image)

This graphic shows the project area, marked in red, superimposed on an 1869 Beers Atlas map of Milton.

The broader area now known as Milton Village was originally called Milton Falls. It has a rich history that predates the Revolutionary War. Waterpower captured from the Lamoille River brought mills and industry to this part of Milton, and in turn a collection of commercial buildings and homes, many of which are still in place and in good condition.
Archaeological Resources
An Archeological Resource Assessment was performed in conjunction with the Milton Main Street Enhancement – Phase 1 study. The study concluded that there was one potentially archeologically sensitive area along the Main Street Corridor, this area was east of Railroad Street and therefore outside the scope of the lighting study. The remaining areas of the Village Lighting Study including Route 7, School Street and Cherry Street were not included in the aforementioned report. At this point, no response has been received from the State Historical Society of Archaeologists or Division of Historic Preservation regarding the areas outside the Main Street ARA study area.

3.7 Highway Requirements
This project is funded by the Agency of Transportation through the Enhancement Program. Rob Hall of the AOT was contacted to determine the level of AOT involvement in a lighting project of this nature. River Street (also know as US 7) through the Village of Milton is under the jurisdiction of the State of Vermont Agency of Transportation, and therefore the Village will need an Agency permit for any work done within the State highway right-of-ways.

- The Village will need to submit an Agency permit application along with a detailed plan to this unit.
- The plan should show the US 7 highway rights-of-way limits, topographic information, typical details, and proposed improvements.
- Any plans showing proposed curbing should include profiles and cross sections that show the affects of drainage.
- Right-of-way information can be obtained from Judy Lewis at the Agency’s Right-of-Way Section.

3.8 Act 250
A project review sheet was completed by the Agency of Natural Resources and Environmental Board (Act 250) to determine if and what kind of permit would be required from the District Environmental Office prior to commencement of construction. Permit Specialist Susan Haitsma stated that the proposed project is not development pursuant to EBR 2(A)(2) and therefore does not trigger jurisdiction – an Act 250 permit would not be required.

A permit or approval is not required from the Wastewater Management Division Regional Office as long as there is no relocation of any sewer or water lines. It is unlikely that this will be necessary due to the nature of the project, however, if sewer or water lines will be affected, the Division will need to be contacted and a permit obtained.

The Department of Labor and Industry will need to be contacted for a permit to assure that the electrical installation are in compliance with the appropriate electrical codes.

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2 October 2, 2002 E-mail from Rob Hall, Project Supervisor-Utilities and Permit Unit, VT Agency of Transportation.

Trudell Consulting Engineers Inc & Kathleen Ryan Landscape Architect

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3.9 Parks and Public Lands
The park on River Street is owned by CVPS. It appears that there are no public lands that will be affected by this project outside the road rights-of-way.

3.10 Agricultural Lands.
Not applicable
4. Findings/Existing Conditions

4.1 Width - Survey data
Main Street - Base plans were prepared using a survey prepared by Trudell Consulting Engineers Inc. dated 2/08/02.

River Street (US 7), School Street and Cherry Street - Base plans for these streets were compiled using water and sewer plans prepared by Webster-Martin Inc. dated 1980, 1984 and 1994, aerial photographs provided by the State of Vermont; dated 1995, field inspection and field photography. Plans for the park area were not obtained.

4.2 ROW Conditions
Main Street - The Trudell survey includes all above grade physical features in the roadway corridor, however the right-of-way line was not established. Right-of-way limits were understood to be one foot behind the existing sidewalk, putting the assumed ROW width at approximately 75 ft. Most of Main Street has a wide, curbed greenbelt that varies between 7 feet to 20 feet in width. This greenbelt is ideal for locating pole lights. The greenbelt is the site of many street trees, several of which are small caliper, recently planted trees. There are intermittent uncurbed greenbelts on the Main Street block east of Sawmill Road and the railway. There are existing sidewalks on both sides of Main Street in the project area. Utility poles are on the south side of the street.

River Street (US 7) - The Webster-Martin water-sewer plans for this roadway corridor show the right-of-way but due to poor quality of the prints, line quality was unclear in some areas. By interpreting these drawings in conjunction with on site evidence, the width was assumed to vary from 60 to 66 ft (4 rods). The roadway appears to be located in the center of the ROW for most of the corridor. River Street has a storm drainage system in place. This system functions well on the block between Main Street and Ritchie Avenue. The block between Ritchie Avenue and Barnum Street experiences storm drainage problems due to grade conditions at the south end of the block, at the top of the hill. There is an existing sidewalk on both sides of the roadway except for the hill section of River Street between Cherry and McKay Street where the sidewalk is only on the east side. Curbs and greenbelts are in poor condition or have been paved over.

Cherry Street - The Webster-Martin water-sewer plans show a 3-rod, (49.5 foot) ROW, with the roadway centered approximately in the middle of the ROW. This steep section of Cherry Street has a recently installed sidewalk with integral curb, on the north side of the street without a greenbelt. There appear to be drainage problems on the south side of the road that have been address with a paved swale.

School Street - The Webster-Martin water-sewer plans clearly show a 3-rod, (49.5 foot) ROW, with the roadway centered approximately in the middle of the ROW. This relatively level road has a sidewalk on the east side of the roadway. The southern half of block has no greenbelt and no grade change between the sidewalks the roadway. The northern half of the block has a narrow (approximately 3 foot) greenbelt and no curb.
4.3 Requirements for Pole Locations

Installation of Village lighting will require suitable locations for poles. Lighting standards call for poles to be placed at very regular intervals along each block in the study area. Poles must be located in a curbed greenbelt or sidewalk where it will be protected from possible vehicle and snowplow damage. Placing poles behind the sidewalk near outside edge of the ROW is another option if such a location is close enough to the traveled way to allow adequate light distribution and be conspicuous enough to serve the goal or enhancing the streetscape.

On US 7, where Vermont Agency of Transportation guidelines apply, the poles must be placed at least 2 foot 6 inches behind a curb or be placed a specified distance from a non-curbed roadway so that poles do not create a hazard to vehicles. Set backs or “clear zone distance” requirements are based on the permitted speed and the roadway classification. US 7 is classified as a *Minor Arterial (Urban)* and has a speed limit less than 45 mph. The required clear distance from the traveled way would be from 12 to 16 feet depending on traffic volume and side slopes. At this location the decorative fixtures would be less noticeable and would not visually improve the historic district. Such a setback would also create problems for effectively lighting Rt. 7. New curbed greenbelts and/or wide sidewalks will be required in US Route 7 to support the installation of streetlights.

4.4 Roadway, Greenbelt, Drainage etc

Main Street – Greenbelt, curb and drainage facilities are in place on Main Street from River Street to Sawmill Road (approximately 2000 feet). The greenbelt provides a ideal location for proposed poles. Poles will be setback approximately 5 feet from the edge of curb to prevent conflicts with snow plowing, snow storage and future curb replacement.

Greenbelt and curb improvements will be required on the 500 feet of Main Street from Sawmill Road to Railroad Street where uncurbed greenbelt exists.

Typical Main Street greenbelt west of the railroad.

Typical Main Street greenbelt east of the railroad.
School Street - Because this block lacks suitable, curbed greenbelts, it is recommended that curb and greenbelts improvements be made or pole lights be located at the edge of the right-of-way approximately 7 feet from the edge of the traveled way on this low traffic, local road. On the east side of the street proposed lighting plans show 4 poles installed in the green space between the sidewalk and edge of the ROW. On the west side of the street, where there is no sidewalk, plans show three poles in the green edge of the ROW and one pole on the lawn of the Milton Historical Society, a town owned property. Pole locations should be carefully coordinated with homeowners to avoid light spill into residential windows and should consider sidewalk plowing conflicts.

Cherry Street - This block has a recently installed sidewalk on the north side of the street but no greenbelt. The plan recommends that four pole lights will be located between the sidewalk and the edge of the right-of-way. There are no drainage issues anticipated. Pole locations should be carefully coordinated with homeowners to avoid light spill into residential windows and consider sidewalk plowing issues.
River Street (US 7) - Greenbelts and curbs are intermittent on River Street. As noted in section 4.2 a drainage system is in place. Installation of curbs and greenbelts or wide sidewalks will be required to create suitable sites for pole lights. Installation of curbing will require that existing undefined access drives to some businesses be defined and or narrowed.

River Street Park – The treed riverside park off of US Route 7 has many potential pole locations and few conflicts. The proposed lighting plan show three poles.

River Street looking north

4.5 Related Underground Utilities, planting, and signage conflicts
While it is possible that underground utility conflicts may exists, a more comprehensive survey of the installation area will be necessary to pinpoint their location. With detailed topographic survey information, underground electric, water, and gas lines can be mapped, and lighting locations chosen to avoid these potential conflicts. Other concerns such as conflicts with existing street/highway signage and tree preservation can be addressed once an in-depth survey is performed.

4.6 Electrical - Existing
A total of thirty-five (35) - 70 watt (5,800 lumens), high-pressure sodium (HPS), cobra-style fixtures, rented from Central Vermont Public Service Corporation (CVPS), are located in the project area. Each light is mounted on an existing utility pole, at mounting heights that range from 20 to 30 feet. Rental cost of each fixture is $152.21 per year, for
a total cost to the Village of $5327.35 per year. Several landowners rent high power (250 w?) HPS fixtures from CVPS for parking area illumination or other purposes.

4.7 CVPS Coordination
Central Vermont Public Service Department was contacted to determine possible conflicts and coordination that would improve the lighting project. Electrical costs and installation requirements are discussed in Section 5.5.

Pole Height and Wires – Poles made of conductive material must be at least 4 feet distant from electric lines.

Lighting on Dam – The CVPS dam at the edge of the project area is currently illuminated with several flood lights directed south toward the intersection of Main Street and River Street. The CVPS district engineer has indicated a willingness to redirect and/or modify these lights as needed so that they do not interfere or conflict with the proposed decorative light recommended near the bridge and the gateway to the Village.

River Street Park
Three light poles are planned for the Town park located on River Street on property owned by CVPS. Coordination with CVPS will be required before pole locations are finalized.

4.8 Existing Light Levels
Existing light levels throughout the project area were determined early in the project schedule. A light level survey of the area was conducted using and illuminance meter (Minolta TL-1) which measures light levels down to one hundredth of a footcandle. All existing street lights in the projects area use 70 watt high pressure sodium lamps in non cut-off fixtures.

Main Street – Illumination on Main Street is very soft and park-like but too dark in some areas to clearly see sidewalk conditions. Existing streetlights line the south side of Main Street and provide a low level of light for the roadway and south side sidewalk. The lights, mounted on utility poles, about 20 feet high, are spaced at approximately 200 to 300 foot intervals. The illumination level directly under each light is about 1.3 to 2 footcandles but diminishes to less than 1/4 footcandle thirty feet away from the pole. Between poles, light levels fall to below one hundredth of a footcandle. Little light (approximately .02 footcandles, similar to full moon conditions) falls on the north side sidewalk. There is some ambient light from residential porch lights and signage, parking and entry lights of two churches on the east side on Main Street contribute to pedestrian lighting. Commercial uses and a new residential complex also add illumination to the Main Street block east of the railroad tracks.

River Street – Illumination on River Street (US 7) is characterized by very uneven light levels. Streetlights are located on the west side of the street. As on Main Street the illumination level directly under each light is about 1.5 to 2 footcandles but diminishes to less than 1/4 footcandle thirty feet away from the pole. Ambient light from commercial
uses between Main Street and Cherry and between McKay and Barnum Street increases light levels along the street to as high as 25 footcandles in some locations. Several high-pressure sodium (orange-pink color) flood lights, used to light several parking lots, produce glare when viewed from some vantage points. The highly uneven light levels and the orange/pink lamp color of existing street lights and flood lights, distorts the look of the evening landscape and diminishes the potential historic character of the street.

**River Street Park** – There is no existing light in the park. An internally lit sign used to advertise town events sheds some light on the edge of the park. The town should consider relocating this useful sign when the park is lit to ensure that the new luminaires are visible from the street and allowed to create the desired affect within the park.

**Cherry Street** – This one short block (500 ft) is illuminated by one light located mid-block. As on Main Street the illumination level directly under the light is about 1.5 to 2 footcandles but diminishes to less than ¼ footcandle thirty feet away from the pole. There is some ambient light at the west end of the road from the Verizon building parking lot

**School Street** – Illumination on School Street, as on Main Street is soft and park-like but dark enough between streetlights to make sidewalk visibility difficult. Some wall-mounted fixtures at the elderly housing facility on the south end of the block add ambient light but also create glare. Existing fixtures are located on the east side of the street.
5. Proposed Lighting

5.1 Historic background
Research conducted at the Milton Historical Society showed very little evidence of historic street lighting used in the Village. Several photos of Main Street dated around 1909 show a tree-lined street, utility poles but no lights. One photo (shown below) did show a drop style fixture with a so-called radial wave shade typically used first half of the 1900’s. This photo, shown below, of the business district on River Street was probably taken circa 1950’s. The radial wave fixture can be seen above the Mobil sign.

![River Street in the 1950s](image)

River Street in the 1950s (?) Note “radial wave” fixture to the left

Since there was not a strong historic precedent to copy a certain fixture style, the selection was influenced by the general period of the Village architecture.

The Milton Falls area was settled in the early 1800’s and grew over the years. Much of the historic architecture that remains today is from the later part of the 1800’s and the early 1900’s. For this reason it seems appropriate to select a fixture that represents a later period and not the Colonial period of Milton’s first settlers.

5.2 Design Criteria
Other factors that were considered were pole height, pole placement and light levels.

Pole Height
In general higher pole heights allows wider and more even light distribution to be achieved, especially when cut-off lights (an Act 250 requirement) are used. Pole heights set the level from which the light fall and therefore defines the night time “ceiling height” of the area being illuminated. In the same way stage lights create a setting in a theatre, outdoor light can define the “scale” for the area. This scale should relate to the surrounding architecture and the users of the space.
Main Street
A pole height of 15 feet was selected for Main Street. This height is compatible with the architect and the wide road and greenbelt and will spread light to both sidewalk and roadway. Poles will be located in the greenbelt approximately 35 to 40 feet from the residential facades. Cut-off fixtures which shed most of the light downward at an 80 degree angle will not shine directly into windows.

School and Cherry Streets
A pole height of 15 feet was also selected for School and Cherry Streets. Although residences are somewhat smaller on this street the 15-foot height is still compatible with the architecture. Lower pole heights (10-12 ft) might be considered when the final plans are developed.

River Street (U.S. Route 7)
A pole height of 20 feet was selected for River Street to be compatible to the wider, street and to make it easier achieve wider light distribution to meet stringent lighting guidelines for federal roadways.

Pole Placement
In most instances a staggered placement of poles is desirable for street lighting. Lights placed on both sides of the roadway frame the road and emphasize the symmetrical roadway corridor and bordering street trees. Using a staggered lighting pattern makes it easier to create and even lighting pattern and create better visibility. A staggered pattern allows wider spacing of fixture on both sides thereby avoiding the airport landing strip effect.

Main Street
Poles will be placed both sides of the street in a staggered pattern approximately 130 feet apart. Although following the current pattern of placing fixtures only on the south side of the Main Street was considered, the team concluded that, among other reasons, the decorative effect of the new historic fixtures would be diminished if all the new fixtures viewed against the clutter of existing utility lines.

Poles will be located no less than 5 feet back from the face of curb to avoid damage from snowplows. Most existing trees are planted on residential lawn so that conflicts with mature vegetation are not anticipated.

School and Cherry Streets
Poles will be located in the right-of-way next to residential lawns. Exact spacing will be somewhat determined by available space and will be spaced more widely than those on Main Street to achieve a lower, softer light level. Cut-off fixtures which shed most light downward at an 80-
degree angle will be located away from residential windows in a manner that does not shine directly into windows. One fixture will be located on the lawn of the Milton Historical Society building to highlight its location and its architectural detail. The Town of Milton owns this property.

River Street
Poles will be located in newly constructed, curbed greenbelts in a staggered pattern where possible. It may be possible to change the pattern where driveways cannot be closed and greenbelts cannot be established. In such instances the poles can be shifted to the west side of the street. Initial light level calculations indicate that a staggered pole spacing of 120 feet on center (240 feet on center each side) should create the required light levels.

5.3 Light Levels
General
Light levels are often selected using guidelines created by of the Illuminating Engineering Society of North America (IES), a professional association of lighting engineers, designers, manufacturers and researchers. Recommendations are establish for various uses including roadways. The IES recommendations have been accepted by State and Federal highway officials for use in reviewing roadway lighting improvements. Two important criteria specified by IES are illumination level and uniformity ratio. Illumination level sets the average light level or brightness of the area between the highest and lowest level. The uniformity ratio specifies how even the light must be (usually stated as average light level over the minimum light level). The lower the number the more uniform the light level must be. Uniformity is important for good visibility, especially for drivers who pass quickly from the bright to dark sections along a roadway. Pedestrians travel more slowly, which gives their eyes a better chance to adapt to different light levels.

River Street (US 7)
Because River Street is a Federal Highway, lighting improvements on this roadway must follow Federal guidelines for light levels and uniformity. The final lighting design must be approved by Vermont Agency of Transportation, the Traffic Operations Division of Project Development section. Guidelines follow Illuminating Engineering Society standards as stated in their document RP-8-00 Roadway Lighting, which recommend that light levels correspond to a roadway’s classification and land use activity adjacent to the roadway. US 7 through the Village is classified as a Minor Arterial (Urban). Adjacent land uses are mostly residential with some commercial uses that primarily have daytime hours. As a result, pedestrian activity is currently low.

VTrans has recommended that light levels follow Table 2 of RP-8-00 Roadway Lighting; that the road be categorized as “Major” and the pedestrian conflict be rated as low. These criteria result in the following recommended standards:
<table>
<thead>
<tr>
<th>Average Luminance</th>
<th>Uniformity Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9 footcandles</td>
<td>Average/minimum</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

An email memorandum from the Utilities Division, describing the selected criteria is included in the Appendix.

The uniformity requirement of the federal recommendation will be difficult to meet and may result in additional fixture being needed.

It is recommended that the final lighting design process include further discussion with the VTrans Utilities Division. The final categorization of US Route 7 for lighting purposes should examine the specific traffic and land use conditions in this Village section of the roadway and the lighting requirements set as appropriate. Considering that the category of MAJOR in *RP-8-00 Roadway Lighting* is one category below EXPRESSWAY. The category of MAJOR may be intended for this Village street.

In addition the *Route 7 Corridor Study* (MPO – 2001) recommends that River Street’s function of providing direct access to adjacent land uses suggest a reclassification as Collector.

The recommended values for Collector, shown below, will be much easier and less costly to meet. These light levels would be compatible with the existing and future land uses of the Village blocks in the project area and make a better lighting transition to Main Street.

<table>
<thead>
<tr>
<th>Minimum Maintained Average Illuminance</th>
<th>Uniformity Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6 footcandles</td>
<td>Average/minimum</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

**Main Street**

Main Street is a Class II local highway and an Urban Collector. As such this roadway is not directly subject to federal requirements. However, reasonable standards should be followed. RP-8-00 suggests and average illumination level of .6 footcandles for Collector roads with low pedestrian activity and a uniformity ratio of 4 avg./min. For Local roads with low pedestrian activity an average illumination level of .4 footcandles and a uniformity ratio of 6 avg./minimum is recommended. These national recommendations should be considered in the context of Vermont, which is generally more rural than most of the country and the context of existing lighting conditions in Milton.

Light level that average .4 to .3 footcandles would create an illumination levels higher than the existing level but still be park-like in character. The uniformity level should not necessarily be held to the 4 avg./min. level recommended in RP-8-00 as this may require many more fixtures than is aesthetically desirable.
Average Luminance | Uniformity Ratio
---|---
.3 to .4 footcandles | 6-8 footcandles

School Street and Cherry Street
Light levels for these two residential streets are not subject to State or Federal guidelines however, as stated above, reasonable levels should be followed. Average light levels could match those used on Main Street but more flexibility on uniformity would be appropriate. Location of fixtures on this narrow street should be respectful of homes located close to the sidewalk.

5.4 Electrical – Metering, Maintenance, etc
Trudell Consulting and Kathleen Ryan met with Paul Sweeney a Senior Energy Consultant from Central Vermont Public Service Corporation (CVPS) to discuss the role CVPS might have in a future lighting enhancement project in the Study Area.

CVPS will not own any new metal halide fixtures for pedestrian lights. Utilities have historically used high-pressure sodium (HPS) due to its balance between efficiency and color rendering. Metal Halide is the more preferred type of lighting due to its better color rendering and aesthetic quality. Metal halide is slightly less efficient and bulb life is shorter than high pressure sodium. MH typically has a lamp life of 15,000 hours versus 20,000 hours for HPS results in higher maintenance costs. The recommended MH fixtures would be owned and maintained by the Village and electricity would be metered for purchase from CVPS. Existing pole-mounted transformers would be utilized and CVPS would be responsible for any transformer upgrades that might be needed to supply the necessary amount of power to the new lighting fixtures.

The meter would be mounted on a relatively low profile 5-ft pedestal as seen in the typical meter pedestal figure below. 100 and 175-Watt lamps will be used. It was determined that two different metering locations would be required for the entire study area. The meter for Phase I will be located on

![Typical Meter Pedestal](image-url)
the corner of Main and School St. This will power fixtures on Main, Cherry, and School Streets. When Phase II is underway, a second meter will be placed near the intersection of River and Cherry Street. Phase III lighting will utilize the same meter as Phase II. The map below illustrates the potential meter pedestal locations. The placement of meter pedestals should address their visual impact on the streetscape. Vegetative screening and/or a structured enclosures might be considered.

Paul Sweeney from CVPS estimated that the cost to supply power to the Village owned historic lighting fixtures would be $6,100.00 per year, based on 13kw/3900 kilowatt-hours (kwhs) per month. This account would be under CVPS rate 2d tariff.

In addition to the yearly cost to operate the fixtures, there will be a cost to maintain the fixtures and replace lamps. The lamps will likely need to be changed every five to seven years by public works staff – which is recommended by CVPS as the more cost effective method. This translates into roughly $700.00 per year, using a 7-year lamp changing cycle and not including inflation. Below is a table comparing current rental and operating costs of the CVPS owned cobra style fixtures with operating costs for Village owned lighting fixtures, assuming all 37 new fixtures are installed.

<table>
<thead>
<tr>
<th></th>
<th>Rental Fee/ Operating Cost</th>
<th>Maintenance Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobra-Style Fixtures</td>
<td>$5300/yr</td>
<td>Covered by CVPS</td>
</tr>
<tr>
<td>Historic Fixtures</td>
<td>$6,100/yr</td>
<td>$700/yr</td>
</tr>
</tbody>
</table>

Subtracting the current rental cost from the proposed operating and maintenance cost leaves a $1500/year operation and maintenance cost in addition to what is presently being paid for lighting.
6. Recommended Fixtures

6.1 Alternatives

Fixture Style - The consultant team researched various lighting manufactures to find appropriate styles that were attractive, durable, easy to maintain and met Act 250 cut-off requirements. Three historic styles were considered.

Colonial – This style of fixture, based on early gaslights, was included for consideration by the community, but not recommended by the consultants. Although the charter for the Town was dated 1763, the gas light period, most of the remaining architecture in the Historic District is from a later period.

Acorn – This fixture style was developed after the light bulb was introduced in the late 1800’s a period compatible with most buildings in the Historic District. This style was recommended for Main Street where most of the historic buildings are still intact. The size of most manufacturers’ acorn style fixtures is in scale with the 15 foot pole height planned for Main Street.

Drop – The drop, or shepherd’s crook style of fixture, is typical of the early 1900’s and reminiscent of the fixture type used on River Street in the 1950’s, and shown in the photo in Section 5 of this report. This fixture type is in scale with the higher, 20 pole height planned for River Street. The more stringent lighting requirements for US 7 will be easier to meet with a 20-foot pole that sheds light evenly over a wide area.

6.2 Selected Design

Selected fixtures

Approximately 9 fixtures from several different manufacturers were short listed and their light distribution patterns compared. Distribution comparisons was based on photometric analysis using LitePro software.

Two fixtures out of the 9 considered were recommended and approved by the Village. The fixtures were chosen for their capacity to achieve even light distribution, their ability to light the project with the least number of fixtures and their capacity to minimize glare. The fixtures are shown below.

Main Street, School Street and Cherry Street.

The acorn style fixture selected for these streets is the Washington Contracline manufactured by Moldeast. This fixture will be mounted at a height of 15 ft
Moldcast's louver system has been found to effectively control glare.

Recommended pole design is the Washington pole available in cast iron from Moldcast or in Fiberglass from Shakespeare pole company.

The local representative for both these products is Robin Lawson of Swaney Lighting Associates. Phone: 658-

River Street
The tear drop style fixture selected for River Street is manufactured by Holophane. This fixture will be mounted at a height of 20 ft.

The teardrop selected is an Esplanade luminaire. This is the fixture represented in the photo to the right

The recommended pole is the Columbia post with a West Liberty cast aluminum cross arm (not the style shown) that extends the fixture over the roadway. Final pole and cross arm selection may vary (within the manufacturers choices) as necessary to meet lighting and cost requirements for River Street.

The local representative for both fixture and pole is Robert Pustis, Londonderry, NH
Phone 879-6331.
6.3 Lamp type

Metal Halide - The lamp type used for all project fixtures is Metal Halide. This lamp gives a more accurate color rendering of surrounding elements in the landscape. The Milton Zoning Ordinance requires the use of lamps that have true color rendering. Wattage - 175 watt metal halide lamps were used to calculate the required light levels on all roadways. The final design may determine that this lamp power can be reduced for School and Cherry Streets where the fixtures are close to residences. On River Street it will be preferable to continue the use of 175 wt lamps and avoid the possible glare higher watt lamps. If higher light levels are required it is preferable to install additional fixture, and maintain an even distribution of low level light.

Induction Lamps - Induction lamps are a recent advance in lamp technology, not used for street lighting in Vermont to date, but a technology that could be considered when the final engineering for this project is completed. At least one manufacturer (Philips) makes a globe shape induction lamp that is suitable for acorn fixtures. Induction lamps have the following advantages: Extremely long lamp life - 100,000 hours, Low glare, Instant start, High quality white light, Function in a wide temperature range. Disadvantages are; an initially high cost, narrow range of lamp power and the lamp shape limits its suitability for many fixtures.

6.4 Light control and cut-off

Act 250 requires that most outdoor lighting fixtures installed in Vermont be either full cut-off, cut-off. Both of these shed most of the light they generate down to the ground thereby diminishing skyglow.

The recommended Moldcast fixture meets the Act 250 cut-off criteria. The Holophane Tear Drop series is currently not available in a cut-off design. However, a cut-off fixture is in the testing phase and will be available in 2003.
### 6.4 Poles
The following chart outlines additional information on pole types:

<table>
<thead>
<tr>
<th>Material</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Consider for Milton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ductile Cast Iron/Gray Cast Iron</td>
<td>Strength and durability  Many decorative options</td>
<td>Relatively high cost  Heavy  Rusts over long period  Requires repainting where chipped</td>
<td>River Street  Main St  Cherry St  School St</td>
</tr>
<tr>
<td>Cast Aluminum</td>
<td>Does not rust  Higher strength than extruded  Lighter than cast iron and steel.</td>
<td>Not as strong as cast iron  Paint can chip, requiring repainting</td>
<td>River Street  Main St  Cherry St  School St</td>
</tr>
<tr>
<td>Extruded Aluminum</td>
<td>Does not rust</td>
<td>Lowest strength. Will dent  Differing strengths and durability</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>Stronger than aluminum  Low cost</td>
<td>Less decorative options -  Straight/fluted poles only  Rusts, Painting required.</td>
<td></td>
</tr>
<tr>
<td>Spun Concrete/Reinforced cast concrete</td>
<td>Strength  Salt may deteriorate  Painting not required  Some choice of color and texture  Low maintenance  Direct burial - lower installation cost an option</td>
<td>Heavy  Reinforcing can rust if concrete cracks and steel exposed to moisture.</td>
<td></td>
</tr>
<tr>
<td>Combination Cast Iron Base/Steel Pole</td>
<td>Strength in base where needed  Lighter than all cast iron  Steel pole stronger than aluminum  Cost savings over cast iron.</td>
<td>See related material</td>
<td>River Street</td>
</tr>
<tr>
<td>Fiberglass</td>
<td>Light  Moderate Cost  Direct burial - lower installation cost an option</td>
<td>Reacts to and can deteriorate in sunlight  Develops chalky surface  Does not hold paint as well as other materials  May be affected by low temperature.</td>
<td>Main St  Cherry St  School St</td>
</tr>
</tbody>
</table>
7. Lighting Plan

7.1 Selected Plan

The Village has selected the consultant’s recommended lighting plan that employs two fixture and pole styles and two lamp wattages to achieve a hierarchy of light levels compatible with the uses, pedestrian activity and traffic on each block in the project area.

The plans are shown schematically on the following pages.

Pole locations are schematic and can shift slightly as required to avoid utility conflict or to meet the concerns of residents, however an even spacing pattern should be followed in order to create an even lighting pattern.

Plans are presented on the following pages.
8. Preliminary Estimate of Costs

A schedule showing the engineer’s detailed opinion of probable cost is presented in the Appendix that is part of this report. The estimate divides the costs into four segment of roadway to be illuminated. In summary the estimates are as follows.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase One</td>
<td>Main Street</td>
<td>$129,235</td>
</tr>
<tr>
<td></td>
<td>Cherry and School Streets</td>
<td>$62,936</td>
</tr>
<tr>
<td></td>
<td>Infrastructure (Separate Contract)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td><strong>$192,171</strong></td>
</tr>
<tr>
<td>Phase Two</td>
<td>River Street (US 7) Bridge to Cherry Street</td>
<td>$104,400</td>
</tr>
<tr>
<td></td>
<td>Infrastructure (curb, greenbelt)</td>
<td>$49,000</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td><strong>$153,400</strong></td>
</tr>
<tr>
<td>Phase Three</td>
<td>River Street (US 7) Cherry to Barnum Street</td>
<td>168,699</td>
</tr>
<tr>
<td></td>
<td>Infrastructure (Future Contract)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total lighting costs</strong></td>
<td></td>
<td><strong>$514,300</strong></td>
</tr>
</tbody>
</table>

These costs include some infrastructure improvements that may be required, such as curbs and greenbelts for the location of poles, before fixtures can be installed.
7. Priorities and Phasing

7.1 Priorities
The Village is very committed to completing lighting improvements for the entire project area. However they recognize that there are infrastructure improvements (curbs and greenbelts) that must be completed for some portions of the roadway, thereby increasing the cost and complexity of the original scope. Phasing the project will allow the Village to complete the more straightforward portions of the lighting project and create a model for subsequent phases that will be completed later. The Village has phased the project as follows.

7.2 Phasing

Phase 1 – Main Street, School Street and Cherry Street
Main Street
The existing, wide greenbelt on most of this 1/2 mile segment of Main Street provides an existing, satisfactory location for lamp poles and fixtures. This is not the case on other blocks in the study area. This section of Main Street is in the heart of the village that is well traveled by both pedestrians and vehicles. To begin the lighting project on this substantial length of roadway, will serve a broad segment of the town and will demonstrate the potential benefit of the larger project.

School Street and Cherry
Both these streets currently lack the curbed greenbelts commonly used for the location of light poles. However, there is space within the right-of-way, and sufficient lawn area at the side of the road the may be appropriate for poles and fixtures. Future design and engineering will require coordination with property owners on these blocks as some pole locations will directly abut residential lawns. Sidewalk, curb and greenbelt improvements on Cherry Street would facilitate in installation of light fixtures.

It is anticipated that this Phase 1 of the project will require approximately 40 fixtures and cost in the vicinity of $193,000 dollars.

Phase 2 - River Street (US Route 7) – Lamoille River Bridge to Cherry Street
This one block section of the project can proceed when improvements have been made to the roadway that include the installation of curb and greenbelt, and the definition of curb cuts to some businesses. Although an examination of the storm sewer system was not part of this study, existing storm drainage appears to be functioning and will support the addition of curbs.

It is anticipated that this phase of the project will require approximately 11 fixtures and cost in the vicinity of $153,400 dollars.
Phase 3 - River Street (US Route 7) – Lamoille River Bridge to Cherry Street
This final segment of the lighting project will be able to move ahead when on-going drainage issues on Route 7 have been solved and the curbs and greenbelts needed to locate lamp poles have been installed. To date solutions for these problems have not been engineered, nor is the funding for the required engineering part of the current Chittenden County Metropolitan Planning Organization’s Transportation Improvement Plan. The Town should continue to press for these US Route 7 deficiencies to be addressed.

It is anticipated that this phase of the project will require approximately 19 fixtures and cost in the vicinity of $169,000 dollars.
Appendix

- Letters from state review
- Questionnaire forms
- Meeting agenda
- Detailed Cost Estimates
- Catalogue Cuts for Selected Fixtures.
APPENDIX
Ms. Pettersen - In response to your letter of September 20 concerning the Town of Milton street lighting project, my response to the questions in your letter appear below:

Q. Are resources under your jurisdiction affected by this project?
A. No.

Q. What needs to be done to receive a sign off from your office?
A. None needed.

Q. Is a permit required and what are the requirements to file that permit?
A. None needed.

Having said that, please be aware that during projects of this nature, occasionaitionally Underground Storage Tanks (USTs) are found. Should this occur, please contact June Middleton or Ted Unkles of this office for assistance with the proper removal and closure of the tanks. June Middleton can be reached at (802) 241-3871, or junem@dec.anr.state.vt.us, and Ted Unkles can be reached at (802) 241-3882, or tedu@dec.anr.state.vt.us. Please let me know if you have any questions concerning this email. Thank you.

--

Peter W. Marshall
Chief, Hazardous Waste Management & Prevention Section
Vermont Department of Environmental Conservation
103 S. Main Street/West Office Bldg
Waterbury, Vermont 05671-0404
(802) 241-3868 or email at peterm@dec.anr.state.vt.us
--- [This E-mail scanned for viruses by ANR]
Abby Lisius

From: "Nyquist, Bruce" <Bruce.Nyquist@state.vt.us>
To: <abby@trudellconsulting.com>
Sent: Thursday, August 22, 2002 12:05 PM
Subject: Lighting Levels - US 7 Milton

Abby -

John Perkins gave me your letter requesting confirmation of lighting design criteria for US 7 in Milton. I agree with all of your criteria except one. I believe that this stretch of US 7 should be classified as a "major" roadway not a "collector." US 7 functions as the main artery for traffic in Milton and should be classified as such.

If you have any questions, please let me know.

Bruce

Bruce T. Nyquist, P.E.
VTrans
Traffic Design Project Manager
National Life Building - Drawer 33
Montpelier, VT 05633-5001
(802) 828-2696
Fax:(802) 828-2437
e-mail:bruce.nyquist@state.vt.us
Karen Pettersen  
Trudell Consulting Engineers  
PO Box 308  
14 Blair Park Road  
Williston, VT 05495

RE: Village of Milton Street Lighting, Project #2002-376

Dear Karen:

I have received your letter dated September 20, 2002 regarding the above captioned project. You asked whether any permits would be required for this project from our office. It appears that your project may be near a Class Two wetland based on my review of the Vermont Significant Wetland Inventory maps for your project area. I recommend that you do an inspection of the project area to determine whether your project will impact Class Two wetlands or their 50-foot buffer zones. Please contact me once this is done so that we can discuss any proposed impacts and whether a Conditional Use Determination will be required.

If the entire project is located within a previously disturbed road right-of-way, it is unlikely that our office will have adverse comments regarding the project. Please contact me at 241-1418 if you have any questions regarding this letter.

Sincerely,

April J. Moulaeart, PWS  
District Wetlands Ecologist
September 20, 2002

Karl Jurentkuff
Water Quality Division
Agency of Natural Resources
103 So. Main Street, Building 10N
Waterbury, Vermont 05671

RE: Village of Milton Street Lighting

Dear Karl:

The Town of Milton received an Enhancement Grant from the Vermont Agency of Transportation, and has hired Trudell Consulting Engineers, Inc. to undertake a conceptual scoping study (Phase I) on street lighting in the Village of Milton. Our scope of work includes determining the project feasibility, the location and type of light fixtures, and contacting all relevant agencies/departments to ask if this project will impact the resources under their respective jurisdictions. A future Phase II study will include the construction drawings.

The project area includes Main Street, School Street, Cherry Street and River Street (Route 7) to Barnum Street (see the attached location map). The Town wishes to remove the existing street lights, and replace and add new lights which fit the historic character of the neighborhood. The light poles will be located within the existing road right-of-ways, and are shown on the enclosed reduced site plans. In addition to the placement of new poles, the project will involve trenching between the poles to lay the electric service lines, and replacing paving in some locations with a green strip, and curbs.

Please respond by mail, fax or email to the following questions.

Are resources under your jurisdiction affected by this project?  No

What needs to be done to receive a sign off from your office? Karl Trudell

Is a permit required and what are the requirements to file that permit? No

Thank you for your prompt attention, and please don't hesitate to contact me for further assistance. I can also be reached via email at Karen @ trudellconsulting.com.
Dear Karen:

In response to your September 20, 2002 letter:

This is a Town of Milton project that is funded by the Agency of Transportation. Therefore, the Town will need an Agency permit for any work they plan to do in the State highway rights-of-way. The following are answers to your letter's questions.

1. US 7 in the Town of Milton is under the State of Vermont, Agency of Transportation's control.
2. The Town will need to submit an Agency permit application along with a detailed plan to this unit. The plan should show the US 7 highway rights-of-way limits, topo, typical details and the proposed changes (improvements.) Any plans showing proposed curbing should include profiles and cross sections that show the affects on drainage. If you need any right-of-way information for US 7, I suggest you call Judy Lewis of the Agency's Right-of-Way Section at: Tel (802) 828-2617.
3. Yes, a permit is required. I believe Trudell Engineering has become familiar with the requirements of this specific permit, which are more or less stated above.

If you have any further questions, please feel free to contact me.

Rob Hall
Project Supervisor
Utilities and Permit Unit
Agency of Transportation
Karen Pettersen

From: Everett Marshall <everett.marshall@anr.state.vt.us>
To: <karen@trudellconsulting.com>
Sent: Tuesday, October 29, 2002 1:24 PM
Subject: Street Lighting - Village of Milton Phase I

Karen Pettersen
Trudell Consulting Engineers, Inc.

Dear Karen,

A search of our database reveals no known occurrences of significant natural communities or rare, threatened, or endangered animals or plants at this site. We do not anticipate any conflict with this project.

Everett Marshall
Biologist/Data Manager
Nongame & Natural Heritage Program, VT Dept. of Fish & Wildlife
103 S. Main St., Waterbury, VT 05671-0501
Email: marshalle@anr.state.vt.us
Tel: 802-241-3715 Fax: 802-241-3295

10/29/02
AGENCY OF NATURAL RESOURCES (ANR) AND ENVIRONMENTAL BOARD (ACT 250)
PROJECT REVIEW SHEET
THIS IS NOT A PERMIT

TOTAL DEC PERMITS
RESPONSE DATE
DISTRICT 4, 6, or 9
TOWN MILTON
OWNERS OF PROJECT SITE:
NAME: TOWN OF MILTON
ADDRESS:
TELEPHONE:

APPLICANT OR REPRESENTATIVE:
NAME: TRUDELL CONSULTING ENGINEERS
ADDRESS: P.O. BOX 306
WILLISTON, VT 05495
TELEPHONE: 879-6311

Project Name: STREET LIGHTING REPLACEMENT

Based on a written or oral request and/or information provided by KAREN PEITERSSEN received on 10/29/02 a project was reviewed on a tract/tracts of land of _______ acres, located on MAIN SCHOOL, CHERRY, ETC. The project is generally described as: VTRANS ENHANCEMENT GRANT FOR REPLACEMENT OF EXISTING STREET LIGHTS ALONG MAIN, CHERRY, SCHOOL, AND RIVER STREETS TO BARNUM ST. REPLACE AND ADD LIGHTS IN EXISTING ROAD RIGHTS-OF-WAY INCLUDING NEW POLES, TRENCHING BETWEEN POLES FOR ELECTRIC LINES, AND REPLACE SOME PAVING WITH GREEN STREET CURBS

PERMITS NEEDED FROM THE DISTRICT ENVIRONMENTAL OFFICE PRIOR TO COMMENCEMENT OF CONSTRUCTION

[ ] hereby request a jurisdictional opinion from the District Coordinator or Assistant District Coordinator regarding the jurisdiction of 10 V.S.A. Chapter 151 (Act 250) over the project described above. SUSAN HATTINGH

Landowner/Agent, Permit Specialist, Other Person—(Circle one)

1. ACT 250: THIS IS A JURISDICTIONAL OPINION BASED UPON AVAILABLE INFORMATION, AND A WRITTEN REQUEST FROM THE ANR PERMIT SPECIALIST, THE LANDOWNER/AGENT, OR OTHER PERSON. ANY NOTIFIED PARTY OR INTERESTED PERSON AFFECTED BY THE OUTCOME MAY APPEAL TO THE ENVIRONMENTAL BOARD (ACT 250) WITHIN 30 DAYS OF THE ISSUANCE OF THIS OPINION (10 V.S.A. SEC. 6007(C)).

Commercial, residential or municipal project: Has the landowner subdivided before? _____ When/where/# of lots ______ AN ACT 250 PERMIT IS REQUIRED: YES [ ] NO; Copies sent to Statutory Parties: YES [ ] NO
BASIS FOR DECISION:

[ ] LETTER FROM TRUDELL CONSULTING ENGINEERS DATED 10/10/02

The proposed project is not development permit by ESR 2(A)(2) and therefore has not trigger jurisdiction.

SIGNATURE: [ ]
District Coordinator
Telephone: 802 879-5614
ADDRESS: Environmental Commission, Districts #4, 6 & 9
111 West Street, Essex Junction, VT 05452

2. WASTEWATER MANAGEMENT DIVISION REGIONAL OFFICE: PERMIT/APPROVAL REQUIRED YES [ ] NO
____ Water Supply & Wastewater Disposal ______ Deferral language required in deed ______ Floor Drains to a UIC well

REGIONAL ENGINEER ASSIGNED: Ernest Christianson (879-5675), Jessanne Wyman (879-5673), William Zabitoski (879-5672)

AS LONG AS THERE IS NO RELOCATION OR ANY SECURED OR WATER LINES

SIGNATURE: [ ]
Environmental Assistance Division, Permit Specialist, 802 879-5676
Wastewater Management Division, Telephone: 802 879-5656

ADDRESS: Agency of Natural Resources
Dept. of Environmental Conservation
111 West Street, Essex Junction, VT 05452

OVER>>>>>>>>>
3. WASTEWATER MANAGEMENT DIVISION, ANR (802-241-3922)  Contact: __________ Indirect Discharge Permits __________ Residuals Management
   Discharge Permit; pretreatment permits; industrial, municipal

4. AIR POLLUTION CONTROL DIVISION, ANR (888-520-4879)  Contact: __________ Wood Chip Burners (>90 HP) __________ Diesel Engines (>450 HP)
   __________ Construction/Modification of Source __________ Open Burning
   __________ Furnace Boiler Conversion/Installation __________ Industrial Process Air Emissions

5. WATER SUPPLY DIVISION, ANR (802-241-3400) (800 823-8500 in VT)  Contact: __________ Bottled Water __________ Capacity Review for Non-transient non-community water systems (NTNC)
   __________ New Hydrants =500' of wateline construction __________ Community Water System (CWS)
   __________ Transient Non-Community water system (TNC)

6. WATER QUALITY DIVISION, ANR  Contact: __________ Stormwater Permits (state and federal) (241-4320)
   __________ River Management (241-3770)
   __________ Shoreland encroachment (241-3777)
   __________ Wetlands (241-3770)
   __________ Stream Alteration (751-0129/879-5631/786-5906)
   __________ Aquatic nuisance control (241-3777)
   __________ Section 401 Water Quality Certificate (241-3770)
   __________ Water Withdrawal (241-3770)

7. WASTE MANAGEMENT DIVISION, ANR  Contact: __________ Underground Storage Tanks (241-3888)
   __________ Notification of Regulated Waste Activity (241-3888)
   __________ Lined landfill; transfer stations, recycling facilities, drop off (241-3444)
   __________ Disposal of inert waste, untreated wood & stumps (241-3444)
   __________ Waste oil burning (241-3888)
   __________ Asbestos Disposal (241-3444)
   __________ Composting Facilities (241-3444)
   __________ Used septic system components/stone

8. FACILITIES ENGINEERING DIVISION, ANR  Contact: __________ LP Gas Storage
   __________ Dam operations (greater than 500,000 cu. ft.) (241-3451)
   __________ State funded municipal water/sewer extensions/upgrades and Pollution Control Systems (241-3750)

9. POLLUTION PREVENTION & MERCURY DISPOSAL HOTLINE (1-800-974-9559)
SMALL BUSINESS AND MUNICIPAL COMPLIANCE ASSISTANCE
RECYCLING HOTLINE (1-800-932-7100)

10. DEPARTMENT OF FISH & WILDLIFE, ANR (802-241-3700)  Contact: Judy Mirro or John Daly 802 241-3745
    __________ Nongame & Natural Heritage program (Threatened & Endangered Species)
    __________ Stream Obstruction Approval

11. DEPARTMENT OF LABOR AND INDUSTRY (802-828-2106) or District Office 879-2300  Contact:
    __________ Construction Permit fire prevention, electrical, plumbing, accessibility (Americans with Disabilities Act)
    __________ Storage of flammable liquids, explosives
    __________ Plumbing in residences served by public water/sewer with 10 or more customers
    __________ LP Gas Storage
    __________ Boilers and pressure vessels

12. DEPARTMENT OF HEALTH (800-439-8550 in VT) (802-863-7221) (Lab 800-660-9997) Contact:
    __________ Food, lodging, bakeries, food processors
    __________ Children's camps
    __________ Program for asbestos control & lead certification (Phil Cormick)
    __________ Hot Tub Installation & Inspection - Commercial

13. AGENCY OF HUMAN SERVICES  Contact:
    __________ Child care facilities (1-800 649-2642 )
    __________ Nursing Homes (241-2345)
    __________ Residential care homes (241-2345) (Dept. of Aging & Disabilities)
    __________ Therapeutic Community Residence (241-2345)

14. AGENCY OF TRANSPORTATION  Contact:
    __________ Access to state highways (residential, commercial) (828-2653)
    __________ Signs (Travel Information Council) (828-2651)
    __________ Railroad crossings (828-2710)
    __________ Development within 500' of a limited access highway (828-2653)
    __________ Airports and landing strips (828-2633)
    __________ Construction within state highway right-of-way (Utilities, Grading, etc.) (828-2653)

15. DEPARTMENT OF AGRICULTURE (800 675-9873)  Contact:
    __________ Use/sale of pesticides (828-2431)
    __________ Milk processing facilities (828-2433)
    __________ Goat courses (828-2431)
    __________ Greenhouses/Nurseries (828-2431)
    __________ Slaughter houses, poultry processing (828-2426)
    __________ Animal shelters/ pet merchant/fleas livestock dealers (828-2421)
    __________ Weights and measures, Gas Pumps, Scales (828-2436)
    __________ Retail Sales/Milk/Meat/Poultry/Frozen Dessert/Class "C" Pesticides (828-2436)

16. PUBLIC SERVICE DEPARTMENT Energy Efficiency Division (800-642-3281 in VT; 802-828-4056)  Contact: __________ VT Building Energy Standards

17. DIVISION FOR HISTORIC PRESERVATION (802-828-3211)  Contact: __________ Historic buildings
    __________ Archaeological sites

18. DEPARTMENT OF LIQUOR CONTROL (1-800-832-2339)  Contact: __________ Liquor licenses
    __________ General Info (1-800-842-3134)

19. SECRETARY OF STATE (1-802-828-2386)  Contact: __________ Professional Boards (1-800-439-8883)
    __________ Business registration

20. DEPARTMENT OF TAXES (802-828-2251)  Contact: __________ Business taxes (sales, meals & rooms, amusement machines)
    __________ Fuel taxes; commercial vehicle

21. DEPARTMENT OF MOTOR VEHICLES (802-828-2074)  Contact: __________ Franchise tax/solid waste
    __________

22. LOCAL PERMITS (SEE YOUR TOWN CLERK, ZONING ADMINISTRATOR, PLANNING COMMISSION, OR PUBLIC WORKS)

23. FEDERAL PERMITS U.S. ARMY CORPS OF ENGINEERS, 8 Carmichael St. Suite 205, Essex Junction, VT 05452 (802) 872-2893

24. OTHER:

Sections #3-#24 above have been completed by Permit Specialist Susan Haltisma  Date: ________________________________ I may be reached at 476-0195

Copies have been mailed to: ____________________________________________________________

REVISED 9/2002
Main Street and Old Village Core Historic Lighting Study

The Village of Milton is currently studying the feasibility of adding historic/decorative lighting along portions of Main Street, River Street, Cherry Street, and School Street in the Village. Please take a moment to complete this brief survey to help us plan future lighting improvements in the Village.

Questionnaire

1. Overall, what do you think of the existing lighting in the Village on a scale of 1 to 5?  
   Circle One: Poor 1 2 3 4 5 Excellent

2. Do you walk in the Village at night?  
   Circle One: Y N

3. Typically how far do you walk?  
   Circle One: less than ½ mile ½ to ¾ mile ¾ to 1 mile over 1 mile

4. Where do you walk to and from?

5. What area(s) of the Village do you feel most comfortable walking at night?

6. Are there areas in the Village that are too dark?  
   Circle One: Y N  
   Where?

7. Are there areas too bright at night?  
   Circle One: Y N  
   Where?

8. Are there other places/towns where you enjoy walking at night?  
   Circle One: Y N  
   Where?  Why?

9. Do you have any other comments about lighting in the Village Milton:

   __________________________________________________________

   __________________________________________________________

   __________________________________________________________

   __________________________________________________________

   __________________________________________________________

   __________________________________________________________

   __________________________________________________________

Thank you for your time

Please bring your completed questionnaire to the public informational meeting for the Main Street and Old Village Core Historic Lighting Project on Tuesday August 20, 2002 at the Milton Municipal Building, 43 Bombardier Road, Milton, Vermont. This form and more information about this project can also be found on the web at http://trudellconsulting.com

If you are unable to attend, please mail your questionnaire to: Bob Lombard, 41 Baker Lane, Milton, VT 05468 or drop it off at the town clerk's office.
Main Street and Old Village Core Historic Lighting Study

Public Informational Meeting
Tuesday August 20, 2002

Agenda

INTRODUCTION – PROJECT TEAM

- Village of Milton Trustees
- Town of Milton
- Trudell Consulting Engineers
- Kathleen Ryan Landscape Architect

OVERVIEW OF LIGHTING ALTERNATIVES

RECOMMENDED LIGHTING ALTERNATIVES

DESIGN ISSUES AND CONSTRAINTS

PRELIMINARY COST ESTIMATES

PROJECT PHASING

DISCUSSION – QUESTIONS AND ANSWERS

WHAT’S NEXT? PROJECT SCHEDULE / TIMELINE

More information about this project can also be found on the web at http://trudellconsulting.com
Click on:

!!NEW!! Village of Milton Historic Lighting Enhancement Project
### Main Street

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<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Price</th>
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<td>20.70</td>
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<td>LF</td>
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<td>EA</td>
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<td>66.95</td>
<td>133.90</td>
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<td>2.5&quot; Dia. Conduit Elbow</td>
<td>EA</td>
<td>2</td>
<td>11.35</td>
<td>22.70</td>
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<tr>
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<td>3.68</td>
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**Total** $192,172.59
2. **River St. (US 7) North of Cherry St.**

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3. **River St. (US 7) South of Cherry St.**

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<th>Unit</th>
<th>Quantity</th>
<th>Unit Price</th>
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<td>EA</td>
<td>19</td>
<td>880.00</td>
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<td>Concrete Base w/ wiring</td>
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<td>19</td>
<td>506.00</td>
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<tr>
<td>3&quot; Conduit (lamp to lamp)</td>
<td>LF</td>
<td>1935</td>
<td>4.09</td>
<td>7,914.15</td>
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<td>4/0 cable, 15 KV, ungrounded neutral #1</td>
<td>LF</td>
<td>3960</td>
<td>5.07</td>
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<td>Trench (6&quot; wide, 36&quot; deep w/ backfill - 40hp chain trench)</td>
<td>LF</td>
<td>1965</td>
<td>0.63</td>
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<td>Horizontal Bore - (3&quot; dia rocky soil)</td>
<td>LF</td>
<td>60</td>
<td>15.65</td>
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<tr>
<td>Seed/Mulch</td>
<td>LS</td>
<td>1</td>
<td>1500.00</td>
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<tr>
<td>Trench (1&quot; bucket) over driveways</td>
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<td>1935</td>
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<td>1,935.00</td>
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<tr>
<td>Sidewalk &amp; Driveway Repair</td>
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<td>1935</td>
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<td>Mobilization</td>
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<td>Design Fees</td>
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<td><strong>Total</strong></td>
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<td><strong>166,699.60</strong></td>
</tr>
</tbody>
</table>

**Grand Total**

|                   |      | 514,281 |

**Source:**
- MO = Moldcast
- HO = Holophane
- VT = Vermont AOT Unit Price List
- M = RS Means
- W = Wesco

**Assumptions**
1. Two meter posts: One at the corner of School and Main
   One at the corner of US 7 and Cherry
2. Phasing done in listed order
3. 0.60 multiplier on list price for Ho Poles and Fixtures
4. Wire sized by e-consult, prior to construction
5. Conduit only be used under roads/parking/ driveways
6. No new green belt or curbs included in cost estimate
Tear Drop Series

The Tear Drop Series' simplistic elegance goes beyond outside appearance. At the heart of the Tear Drop luminaries's classic beauty is a highly engineered mechanical system which outperforms even the most utilitarian fixture.

Tool-less entry to the optical system makes lamp changes easy. A unique beveled latch insures the optical door is securely held even if the wing nut is not fully tightened.

A unitized electrical module allows removal of the entire assembly by simply loosening two screws and rotating the module.

Installation is easily accomplished by first installing the lightweight mounting assembly and wiring into the terminal block. Then, the electrical housing and optical door can be hung on the hinge assembly expeditiously.

Memphis

Esplanade

Crystallite (uplight)

Atlanta (uplight)

Eight Types of Luminaires
**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 utilized 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 disconnected 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 reflector to provide the desired distribution of light.

**REFRACTOR / DOOR ASSEMBLY**

The cast aluminum door cradles a teardrop shaped, thermal resistant borosilicate glass reflector 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.

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**ARCHITECTURAL OUTDOOR ORDER #:**

**TYPE:**

**DRAWING NO:** US-1255

**SCALE:** N/A

**DRAWN:** RAF

**APPPD:**

**DATE:** 05-02-02
Typical Configurations and Dimensions

Twin Grand Ledge luminaires with uplight on a North Yorkshire post with custom arms

Twin Boardwalk luminaires on a North Yorkshire post with Camden arms

Memphis luminaire on a Columbus post with a Boston Harbor arm

Esplanade luminaire on a North Yorkshire post with Camden arm

TEAR DROP SERIES
### Availability

#### Tear Drop Units with IES Cutoff Optics

<table>
<thead>
<tr>
<th>Styles</th>
<th>Optics</th>
<th>Pole Heights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esplanade</td>
<td>Tear Drop</td>
<td>15-39</td>
</tr>
<tr>
<td>Memphis</td>
<td>Tear Drop</td>
<td>15-39</td>
</tr>
<tr>
<td>Boardwalk</td>
<td>Bowl</td>
<td>15-39</td>
</tr>
<tr>
<td>Port Huron</td>
<td>Bowl</td>
<td>15-39</td>
</tr>
</tbody>
</table>

#### Tear Drop Units with Uplight Optics

<table>
<thead>
<tr>
<th>Styles</th>
<th>Optics</th>
<th>Pole Heights</th>
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</thead>
<tbody>
<tr>
<td>Crystalite</td>
<td>Tear Drop</td>
<td>15-39</td>
</tr>
<tr>
<td>Atlanta</td>
<td>Tear Drop</td>
<td>15-39</td>
</tr>
<tr>
<td>Starshell</td>
<td>Bowl</td>
<td>15-39</td>
</tr>
<tr>
<td>Grand Ledge</td>
<td>Bowl</td>
<td>15-39</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Distribution</th>
<th>Lamp Type and Wattage</th>
<th>Colors</th>
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</thead>
<tbody>
<tr>
<td>IES Type II</td>
<td>Metal Halide 175-400W</td>
<td>Black</td>
</tr>
<tr>
<td>IES Type III</td>
<td>HPS 70-400W</td>
<td>Bronze</td>
</tr>
<tr>
<td>IES Type IV</td>
<td>Mercury 175-400W</td>
<td>Green</td>
</tr>
<tr>
<td>IES Type V</td>
<td>Incandescent</td>
<td>As specified</td>
</tr>
</tbody>
</table>

#### Options and Accessories
- Button Stylized Photocell
- NEMA Twist Lock Photocell
- Receptacle
- Protected Starter
- Fusing

For detailed ordering information, specifications, and photometrics refer to the appropriate technical data sheet.

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**HOLOPHANE**

**LEADER IN LIGHTING SOLUTIONS**

214 Oakwood Ave., Newark, OH 43055 / Holophane Canada Inc., 9040 Leslie Street, Units 8 and 9, Richmond Hill, ON L4B 3M4 / Holophane Europe Limited, Bond Ave., Milton Keynes MK1 1XG, England / Holophane, S.A. de C.V., Aparciado Postal No. 586, Nezahualcóyotl de Juarez, 53000 Edo. de Mexico

Contact your local Holophane sales representative for application assistance, and computer-aided design and cost studies. For information on other Holophane products and systems, call the Inside Sales Service Department at 740-345-9631, In Canada call 905-707-5630 or fax 905-707-5605.

**Limited Warranty and Limitation of Liability**

Refer to the Holophane limited material warranty and limitation of liability on this product, which are published in the "Terms and Conditions" section of the current price schedule, and is available from our local Holophane sales representative.

Visit our web site at [www.holophane.com](http://www.holophane.com)
# Moldcast ContraCl ine™

## How to Order

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixture</strong></td>
<td><strong>Mounting</strong></td>
<td><strong>Lamp/Ballast</strong></td>
<td><strong>Color</strong></td>
<td><strong>Options</strong></td>
<td><strong>Base/Pole</strong></td>
</tr>
<tr>
<td>WCC</td>
<td>PM</td>
<td>400MH</td>
<td>BLK</td>
<td>TA3</td>
<td></td>
</tr>
<tr>
<td>WCC</td>
<td>TRA-55</td>
<td>250HPS</td>
<td>VGR</td>
<td>HSS</td>
<td></td>
</tr>
</tbody>
</table>

### 1. Fixture—Washington

- **WCC**: Post top mount, slips over a 4”/100mm o.d. pole
- **WT**: 35 lbs./16kgs  
  - **EPA**: 2.0  
  - **IP**: 54.

### 2. Mounting

- **TRA-1L**: 17” cast scroll arm for post mounting
- **WMA-1L**: 17” cast scroll arm for wall mounting
- **TRA-55**: 21” cast arm for post mounting
- **WMA-55**: 21” cast arm for wall mounting

### 3. Lamp/Ballast

- **100 MH**: Metal halide 120/208/240/277 volt, medium base ED-17
- **150 MH**: Metal halide 120/208/240/277 volt, mogul base ED-28
- **175 MH**: Metal halide 120/208/240/277 volt, mogul base ED-28
- **250 MH**: Metal halide 120/208/240/277 volt, mogul base ED-20
- **400 MH**: Metal halide 120/208/240/277 volt, mogul base ED-28
- **70 HPS**: High pressure sodium 120/208/240/277 mogul base ED-23
- **100 HPS**: High pressure sodium 120/208/240/277 mogul base ED-23
- **150 HPS**: High pressure sodium 120/208/240/277 mogul base ED-23
- **250 HPS**: High pressure sodium 120/208/240/277 mogul base ED-18
- **400 HPS**: High pressure sodium 120/208/240/277 mogul base ED-18

### 4. Color

- **BLK**: Black, TGIC powder coat finish
- **DBZ**: Dark Bronze, TGIC powder coat finish
- **DGN**: Dark Green, TGIC powder coat finish
- **VGR**: Verde Green, TGIC powder coat finish

**RAL colors and custom colors are available on request.**

### 5. Options

- **FS1**: Single fusing (120/277/347V) specify voltage
- **FS2**: Double fusing (208/240/480V) specify voltage
- **347V**: 347V ballast (120/277/347V)
- **ASY**: Assymetric reflector—field installed
- **HSS**: House side cutoff—field installed
- **TA3**: Tenon adapter slips over a 2 3/8” to 3” o.d. (125mm to 75mm) tenon, 4 0” (100mm) long. Secures to the pole with six stainless steel set screws.
- **ALF**: Cast filigree basket (see page 10)
- **PSB**: Pulse start ballast for 175MH, 250MH and 400MH (120/208/240/277 volt) metal halide lamps
- **DSS**: Dark skies shield, allows for zero upright
- **PHC**: Photo control kit. Not available for use with 347V ballast. Specify line voltage when ordering this option.

*Decorative arm options for wall and pole mounting, see page 10.*
HOW TO ORDER

1. FIXTURE
   WCC

2. MOUNTING
   WMA-55

3. LAMP/BALLAST
   400MH

4. COLOR
   BLK

5. OPTIONS
   TA3

6. BASE/POLE

Standard

1. FIXTURE
   Post top mount, slips over a 4"/100mm o.d. pole

2. MOUNTING
   TRA-11 17" cast scroll arm for post mounting
   WMA-1L 17" cast scroll arm for wall mounting
   TRA-55 21" cast arm for post mounting
   WMA-55 21" cast arm for wall mounting

3. LAMP/BALLAST
   100 MH Metal halide 120/208/240/277 volt, medium base ED-17
   150 MH Metal halide 120/208/240/277 volt, mogul base ED-28
   175 MH Metal halide 120/208/240/277 volt, mogul base ED-28
   250 MH Metal halide 120/208/240/277 volt, mogul base ED-28
   400 MH Metal halide 120/208/240/277 volt, mogul base ED-28
   70 HPS High pressure sodium 120/208/240/277 mogul base ED-23 1/2
   100 HPS High pressure sodium 120/208/240/277 mogul base ED-23 1/2
   150 HPS High pressure sodium 120/208/240/277 mogul base ED-23 1/2
   250 HPS High pressure sodium 120/208/240/277 mogul base ED-18
   400 HPS High pressure sodium 120/208/240/277 mogul base ED-18

4. COLOR
   BLK Black, TGIC powder coat finish
   DBZ Dark Bronze, TGIC powder coat finish
   DGN Dark Green, TGIC powder coat finish
   VGR Verde Green, TGIC powder coat finish
   RAL standard and custom colors are available on request.

5. OPTIONS
   FS2 Double fusing (208/240/480V) specify voltage
   347V 347V Ballast (120/277/347V)
   ASY Assymmetric reflector--field installed
   HSS House side cutoff--field installed
   TA3 Tenon adapter slips over a 2 3/8" o.d. to 3" o.d. (125mm to 75mm) tenon, 4.0" (100mm) long. Secures to the pole with six stainless steel set screws.
   ALF Cast filigree basket
   PSB Pulse start ballast for 175MH, 250MH and 400MH (120/208/240/277 volt) metal halide lamps
   DSS Dark skies shield, allows for zero upright
   PHC Photo control kit. Not available for use with 347V ballast. Specify line voltage when ordering this option.
WASHINGTON FIXTURES

Decorative, cast aluminum fitter shall support the lamp base, reflector assembly and luminaire housing. The slip fitter shall slip over a 4" (100mm) o.d. pole as standard and secure with stainless steel set screws. The following mounting configurations shall be available as options. A Tenon adapter that slips over a 2 3/8' (60mm) or 3' (76mm) o.d. tenon x 4" (100mm) high tenon and secured with stainless steel set screws. A 17" and 21" cast arms shall be available for post and wall mounting. The lens shall consist of a one-piece rotationally molded, non-yellowing acrylic acorn globe. Luminaire housing shall be gasketed and secured between the fitter assembly base and cast aluminum finial top by means of an internal threaded rod. Top section of luminaire housing shall be removable for relamping, fully gasketed and include a 5/8" decorative aluminum accent band. Finial and decorative accent band shall be painted to match the fitter assembly. Luminaire housing design shall provide tool-less access. Ballast shall be mounted to a tray, enclosed within the slip fitter and accessible by means of a cast aluminum access door, secured to the fitter by two captive stainless steel fasteners.

ELECTRICAL

Fixture shall be U.L. listed and CSA approved for use in outdoor wet locations. Ballast shall be high power factor multi-tap style (120/208/240/277V). Sockets shall be pulse rated porcelain. The electrical assembly shall be factory wired and installed in the fixture. Quick electrical disconnects shall be provided as standard.

OPTICAL SYSTEM

Optical system shall consist of the ContraCline® reflector assembly, a multi-tiered reflector assembly composed of seven reflective elements, that surrounds the lamp. Individual reflectors that comprise the optical system shall consist of spun aluminum with a specular Alzak® finish. Peak candelas shall be from 65° to 70° and cutoff at 75°. Lamp (by others) shall be vertical burning, base down.

FINISH

Finish shall consist of cleaning, etching and rinsing followed by a protective polymer primer, deionized water rinse, oven dry off and top coated with a thermoset TGIC super polyester powder coat finish. Finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance.

WARRANTY

The fixture shall be warranted for three years. The ballast shall carry the ballast manufacturers limited warranty.