C·V·R·D

ENVIRONMENT COMMISSION

NOVEMBER 17, 2011
6:00 PM – CVRD Boardroom, 175 Ingram Street

AGENDA

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2.	**ADOPTION OF MINUTES:**		
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	B1	Light pollution at our facilities - LEED standard for lighting – Kate Miller	7-23
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4.	**CORRESPONDENCE** –		
	C1	Funding request by email from Ted Van der Gulik, BC Ministry of Agriculture, dated	24-25
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	R1	Land Committee	
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6.	**INFORMATION** – none		
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	NB1	Environment Commission Work Plan – Justin Straker	30-32
8.	**ADJOURNMENT:**		
9.	**NEXT MEETING:** December 15, 2011		

Distribution:

CVRD Director Gerry Giles (Co-Chair)
CVRD Director Rob Hutchins
CVRD Director Tom Walker
CVRD Director Phil Kent
Bruce Fraser
Rodger Hunter
Dave Polster
Peter Keber
Judy Stafford
Justin Straker (Co-Chair)
Kevin Visscher
Larry George, Cowichan Tribes
Chris Wood
Roger Wiles

As Well As:
Warren Jones, CAO, CVRD
Director Morrison
Director Duncan
Director Kuhn
Brian Dennison, General Manager, Engineering and Environment Services
Kate Miller, Manager, Regional Environmental Policy Division

Agenda Cover Only:
Director G. Seymour
Director M. Marcotte
Director D. Haywood
Director M. Dorey
Director T. McGonigle
Director B. Harrison
Director K. Cossey
Director L. Iannidinardo
Tom Anderson, General Manager, Planning and Development Services

Minutes of the regular meeting of the ENVIRONMENT COMMISSION held in the CVRD Boardroom, 175 Ingram Street, Duncan, on October 20, 2011 at 6:05 pm.

PRESENT:	Director Giles	Alternate Director Duckworth
	Director Walker	Director Kent
	Roger Wiles	Pete Keber
	Rodger Hunter	Bruce Fraser
	Judy Stafford	Chris Wood
	Janna Jorgensen	Kevin Visscher
	Bruce Fraser	John Morris

ALSO PRESENT: Kate Miller, Manager, Regional Environmental Policy Div
Warren Jones, CAO, CVRD
Jacob Ellis, Manager, Corporate Planning
Tom Anderson, Gen. Manager, Planning & Development
Brian Dennison, Gen. Manager, Engineering/Environment
Directors Duncan and Morrison
Dyan Freer, Recording Secretary

REGRETS: Justin Straker, Dave Polster

Chair introduced and welcomed the new member of the Environment Commission, Janna Jorgensen.

APPROVAL OF AGENDA

It was moved and seconded that the agenda be approved as presented.

MOTION CARRIED

ADOPTION OF MINUTES

It was moved and seconded that the minutes of the June 16, 2011, Environment Commission meeting be adopted as presented.

MOTION CARRIED

DELEGATIONS

Corporate Plan and Commission Work Plan Discussion - with Jacob Ellis, Warren Jones, Tom Anderson, and Brian Dennison. Discussion on which of the Corporate Strategic Plan initiatives would be of particular interest to the Environment Commission. These were:

a) Initiate a Regional Sustainability planning process;
b) Update background technical studies to inform the planning process;
c) Recommendations to the Agricultural Land Commission;
d) Develop a long-term land use strategy/policy for forestry lands;
e) Continue working towards full implementation of the Solid Waste Management Plan;
f) Update the South and Central Sectors Liquid Waste Management Plans;
g) Develop liquid waste management plans for all areas of the Regional District;
h) Develop regional watershed management strategies;
i) Develop water planning policies to guide community planning;
j) Identify and map areas of high conservation value to protect sensitive areas;
k) Develop an air shed protection strategy;

l) Promote the development of a regional multi-modal transportation plan;
m) Develop an environmental education plan with a focus on water, biodiversity and climate change;
n) Develop a regional energy strategy to identify regional sources of green energy; and
o) Develop a comprehensive external communications plan

ACTION: Jacob Ellis will compile a list from this meeting's discussion of items that he, Warren Jones, Brian Dennison and Tom Anderson feel would be of merit and be of interest to the Environment Commission to have input on.

8:05 pm — Jacob Ellis, Warren Jones, Tom Anderson and Brian Dennison left the meeting.

BUSINESS ARISING OUT OF MINUTES

B1 — Motion regarding the work of the Green Team and surplus funding was accepted by the Regional Board on October 12th, 2011.

B2 — Location for Environment Commission meetings – tabled to 2012 when new members join.

B3 — **Building Sustainable Communities Conference in Kelowna** – February, 2012. Judy Stafford, Peter Keber, Roger Wiles have requested to go to this conference. New members might also be interested. Web site for info is: http://www.freshoutlookfoundation.org/events/bsc/2012/2012-building-sustainable-communities-conference . Funding to be set aside from the current EC budget to attend and register in the early bird period.

B4 — **Update on the joint EDC/EC meeting** – Phil Kent stated that there is value to holding a joint meeting to discuss the definition of sustainability. It will be postponed until at least December. Kate Miller will schedule a date with Chair's approvals.

REPORTS

R1 — **Land Committee** – no report

R2 — **Communications Committee** – Video Contest – Kate Miller explained the criteria of the contest, with a deadline of December 1, 2011, and prizewinners to be announced before Christmas. Plan to have a public screening at end of contest.

It was moved and seconded to approve the plan for the video contest as presented by Kate Miller, with the subject being the environment of the Cowichan Valley, and with a budget of $5000.

MOTION CARRIED

Information will be given regarding the video contest to the CVRD Board of Directors and heads of the local governments.

R3 **Water Committee** – Bruce Fraser explained his paper regarding a proposal to the Commission for stimulating development of a collaborative watershed governance mechanism along the lines of the Cowichan Stewardship Round Table, Cowichan Watershed Board and Technical Committee. The Watershed Board agreed to work on this issue.

R4 **Agriculture** – Judy Stafford explained that partnerships are available to support more research on irrigation, to help create a tool to learn what happens with water used in irrigation, and how to best use our water resources. The project involves mapping agricultural lands and irrigation methods in the CVRD. The project is larger in scope than just the CVRD; partners include the Province of BC's Ministry of Agriculture, Nanaimo Regional District, CAVI, and CVRD Economic Development. Necessary funds ($20,000) are required for the CVRD to participate in this initiative on behalf of the Environment Commission Agricultural Committee. Judy Stafford requests that the Environment Commission contribute dollars ($10,000) as one of the partners, which will help with the project and with the engagement of the farmers. The other local partners identified are the CVRD Agricultural Commission (2012 supplemental request $10,000) and the Cowichan Watershed Board (unknown contribution). Additional program funds are also requested to support the work of the Environment Commission Agricultural Subcommittee, to communicate program and program objectives to the agricultural community ($8,000).

A handout titled "BC Irrigation Scheduling Calculator" from the Waterbucket website was distributed as background material.

It was moved and seconded to contribute $18,000 for the research into best agricultural practices and the subsequent communication strategy, subject to the money being available in 2011.

Motion tabled until further information is available at next meeting

CORRESPONDENCE

C1 Email from Director Iannidinardo dated October 14, 2011, regarding over-lighting at CVRD facilities. Director Giles will ask the manager of the Water Management Division to explain why the lighting is so strong overnight at pump stations and other facilities, and if we could reduce light pollution and also reduce energy by having facilities' lighting be more environmentally cautious, be less intrusive, or be motion sensitive.

ACTION: Kate Miller will bring a report on LEED standards on lighting to the next meeting as an example of new policy direction with regards to lighting and dark sky issues.

C2 Email from Rosemary Quinlan, dated October 19th, 2011, regarding air quality. It will be referred to the Town of Lake Cowichan.

RESOLVE INTO CLOSED SESSION 9:00 pm

It was moved and seconded that the meeting be closed to the public in accordance with the Community Charter, Part 4, Division 3, Sections 90 {(1) (a)}.

MOTION CARRIED

RISE FROM CLOSED SESSION 9:10 pm

It was moved and seconded that the Committee rise without report.

MOTION CARRIED

ADJOURNMENT The meeting adjourned at 9:12 pm.

NEXT MEETING November 17th, 2011

_____ _____

Chair Recording Secretary

Dated: _____

Subject: FW: Street lighting

From: David Leitch
Sent: Tuesday, November 08, 2011 3:39 PM
To: Kate Miller
Subject: Street lighting

Kate,
We have no specific lighting requirements at any of our facilities other than what I would call traditional lighting. If and when there is a specification for lighting at our buildings and facilities, please let us know and we will gladly implement them.

Dave Leitch, AScT
Division Manager
Water Management
Cowichan Valley Regional District
Engineering and Environment
Tel: 250-746-2530
Email: dleitch@cvrd.bc.ca

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LIGHT POLLUTION REDUCTION

Credit	SS Credit 8	SS Credit 8
Points	1 point	1 point

INTENT

To minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction and reduce development impact from lighting on nocturnal environments.

REQUIREMENTS: NC & CS

Project teams must comply with 1 of the 2 options for interior lighting AND the requirement for exterior lighting.

FOR INTERIOR LIGHTING

OPTION 1

Reduce the input power (by automatic device) of all non-emergency interior luminaires with a direct line of sight to any openings in the envelope (translucent or transparent) by at least 50% between the hours of 11 p.m. and 5 a.m. After-hours override may be provided by a manual or occupant-sensing device provided the override lasts no more than 30 minutes.

OR

OPTION 2

All openings in the envelope (translucent or transparent) with a direct line of sight to any non-emergency luminaires must have shielding (controlled/closed by automatic device for a resultant transmittance of less than 10% between the hours of 11 p.m. and 5 a.m.).

FOR EXTERIOR LIGHTING

Partially or fully shield all exterior luminaires with 1000 initial lamp lumens or more to meet the Full Cutoff IESNA Classification so they do not emit light directly to the night sky.

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Light areas only as required for safety and comfort. Do not exceed 80% of the Lighting Power Densities for exterior areas and 50% for building facades and landscape features as defined in ANSI/ASHRAE/IESNA Standard 90.1-2007 for the classified zone.

Classify the project under 1 of the following zones, as defined in IESNA RP-33, and follow all of the requirements for that zone:

LZ1 — Dark (developed areas within national parks, provincial parks, forest land and rural areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.11 horizontal and vertical lux (0.01 horizontal and vertical footcandles) at the site boundary and beyond. Document that 0% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2 — Low (primarily residential zoning, neighbourhood business districts, light industrial with limited nighttime use and residential mixed use areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 1.1 horizontal and vertical lux (0.10 horizontal and vertical footcandles) at the site boundary and no greater than 0.11 horizontal lux (0.01 horizontal footcandles) 3 metres (10 feet) beyond the site boundary. Document that no more than 2% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ3 — Medium (all other areas not included in LZ1, LZ2 or LZ4 such as commercial/industrial, high-density residential)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 2.2 horizontal and vertical lux (0.20 horizontal and vertical footcandles) at the site boundary and no greater than 0.11 horizontal lux (0.01 horizontal footcandles) 4.6 metres (15 feet) beyond the site. Document that no more than 5% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ4 — High (high-activity commercial districts in major metropolitan areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 6.5 horizontal and vertical lux (0.60 horizontal and vertical footcandles) at the site boundary and no greater than 0.11 horizontal lux (0.01 horizontal footcandles) 4.6 metres (15 feet) beyond the site. Document that no more than 10% of the total initial

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designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2, LZ3 & LZ4 — For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

FOR ALL ZONES

Illuminance generated from a single luminaire placed at the intersection of a private vehicular driveway and public roadway accessing the site, is allowed to use the centerline of the public roadway as the site boundary for a length of 2 times the driveway width centered at the centerline of the driveway.

INTERPRETATIONS

It is acceptable to have a higher light level above LEED requirements (in Lighting Zones 3 and 4) for the areas at entrance or exit doors at the site boundary.under the following conditions:

a. the lighting source is provided only at points required for emergency egress purposes;

b. that light only trespasses onto public sidewalks and streets and right-of-ways;

c. the building door illuminated by the non-compliant lighting source is within 4.6 metres of the site boundary;

d. the luminance values meet the LEED 4.6 metre requirements at 4.6 metres beyond the site boundary; and

e. fixtures are full cut-off.

Lighted signage that is required by local Code for safety reasons (such as in the case of a Police Station) may be excluded from the credit calculations, provided the other fixtures and signage follow all of the other credit requirements for illuminance, light trespass, and ambient illumination. While the code requirements may prevent applicants from completely meeting the credit requirements, the applicant should try to address the credit intent as much as possible. This does not exempt all local code requirements.

Light spillage onto public roadways for safety provisions at vehicular entrances and egresses to the site are permissible for hospital occupancies. Measures must be taken to minimize the trespass, and the lighting strategy must continue to address the other requirements pertinent to the Credit for the remainder of the project area.

Light from uplighting that is fully contained within a soffit or within a canopy is not considered uplighting for the purposes of this credit. However uplighting of trees is considering uplighting and must be included in the calculations.

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Light trespass from walkway lighting is acceptable where pedestrian walkways cross the site boundary. Note that this lighting must meet all other credit requirements.

LEASED TENANT SPACE

For NC certification, mandatory lease agreements must either list in detail all requirements of the credit including the lighting analysis that must be done by the tenants or mandate prescriptive lighting measures that align with the base building and owner fit-up tenant spaces.

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1. BENEFITS AND ISSUES TO CONSIDER

ENVIRONMENTAL ISSUES

Outdoor lighting is important for human safety. Illuminating connections between buildings and support facilities such as sidewalks, parking lots, roadways, and community gathering places is necessary for twilight and nighttime use. However, light trespass from poorly designed outdoor lighting systems can affect a site's nocturnal ecosystem, and light pollution limits night sky observations. Through thoughtful design and careful maintenance, outdoor lighting can address night sky visibility issues and site illumination requirements, while minimizing negative impacts on the environment.

Sensitively and creatively designed lighting systems promote a unique appreciation for a place at night. Yet even with the best of luminaries—those designed to reduce light pollution and requiring the lowest wattage—the added light will be reflected off surfaces and into the atmosphere. Using the minimum amount of lighting equipment, limiting or eliminating all landscape lighting, and avoiding light pollution through the careful selection of lighting equipment and controls enables nocturnal life to thrive while still providing for human nighttime activity.

ECONOMIC ISSUES

The initial cost and ongoing operational costs for exterior lighting can be greatly reduced by eliminating luminaries that do not enhance safety. Additionally, using the most efficacious light sources, luminaries, and controls will further reduce the energy costs of these systems. Long-life lamps can further increase operational savings by requiring a less frequent re-lamping cycle. However, the initial cost per luminaire may be somewhat higher because of increased costs associated with internal reflectors and shielding, more efficient lamp and ballast combinations, and controls.

2. RELATED CREDITS

This credit requires adherence to the lighting power densities of ASHRAE 90.1–2007. Any energy savings beyond this baseline, as well as savings stemming from integrated automatic controls, may contribute to achieving the following credit:

- EA Credit 1: Optimize Energy Performance

Automatic occupancy controls to shutoff interior perimeter lighting should be coordinated with occupant controllability objectives, as rewarded under this credit:

- IEQ Credit 6.1: Controllability of Systems—Lighting

3. SUMMARY OF REFERENCED STANDARDS

ANSI/ASHRAE/IESNA Standard 90.1–2007, Energy Standard for Buildings Except Low-Rise Residential Lighting, Section 9 (without amendments)
American Society of Heating Refrigeration, and Air-Conditioning Engineers
http://www.ashrae.org

Standard 90.1–2007 was developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), under an American National Standards Institute (ANSI) consensus process. The Illuminating Engineering Society of North America (IESNA) is a joint sponsor of the standard. Standard 90.1 establishes minimum requirements for the energy-efficient design

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of buildings, except those that are low-rise residential. The provisions of this standard also do not apply to single-family houses; multifamily structures of 3 habitable stories or fewer above grade; mobile and modular homes; buildings without electricity or fossil fuel consumption; or equipment and portions of building systems that use energy primarily for industrial, manufacturing, or commercial processes. The standard provides criteria in the following general categories: building envelope (Section 5); heating, ventilating, and air-conditioning (Section 6); service water heating (Section 7); power (Section 8); lighting (Section 9); and other equipment (Section 10). Within each section there are mandatory provisions as well as additional prescriptive requirements. Some sections also contain a performance alternate. The energy cost budget option (Section 11) allows the user to exceed some of the prescriptive requirements provided energy cost savings are made in other prescribed areas. However, in all cases, the mandatory provisions must still be met.

Section 9 of the standard provides requirements for the lighting of buildings. Only the exterior lighting requirements apply to this credit. Table 1 lists the ASHRAE 90.1–2007 allowable building exterior lighting power densities.

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TABLE 1. LIGHTING POWER DENSITIES FOR BUILDING EXTERIORS

	APPLICATIONS	LIGHTING POWER DENSITIES
Tradable Surfaces (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas may be traded.)	**UNCOVERED PARKING AREAS**	
	Parking Lots and drives	1.6 W/m² (0.15W/ft²)
	BUILDING GROUNDS	
	Walkways less than 3 metres (10 feet) wide	3.3 W/linear metre (1.0W/linear foot)
	Walkways 3 metres (10 feet) wide or greater Plaza areas Special Feature Areas	2.2W/m² (0.2W/ft²)
	Stairways	10.8W/m² (1.0W/ft²)
	BUILDING ENTRANCES AND EXITS	
	Main entries	98W/linear metre of door width (30W/linear foot of door width)
	Other doors	66W/linear metre of door width (20W/linear foot of door width)
	CANOPIES AND OVERHANGS	
	Canopies (free standing and attached and overhangs)	13.5 W/m² (1.25W/ft²)
	OUTDOOR SALES	
	Open areas (including vehicle sales lots)	5.4 W/m² (.5W/ft²)
	Street frontage for vehicle sales lots in addition to "open area" allowance	66 W/linear metre (20W/linear foot)
Non-Tradable Surfaces (Lighting power density calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.)	Building Facades	2.2 W/m² (0.2W/ft²) for each illuminated wall or surface or 16.4 W/linear metre (5.0W/ linear foot) for each illuminated wall or surface length
	Automated teller machines and night depositories	270W per location plus 90W per additional ATM per location
	Entrances and gatehouse inspection stations at guarded facilities	13.5 W/m² (1.25W/ft²) of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
	Loading areas for law enforcement, fire, ambulance and other emergency service vehicles	5.4 W/m² (0.5W/ft²) of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
	Drive-up windows at fast food restaurants	400W per drive-through
	Parking near 24-hour retail entrances	800W per main entry

Source: Table 9.4.5, ANSI/ASHRAE/IESNA 90.1–2007.

4. IMPLEMENTATION

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INTERIOR BUILDING LIGHTING

OPTION 1

All nonemergency interior lighting fixtures must be automatically controlled and programmed to turn off or have their input power reduced by at least 50% following regular business hours. Controls can be automatic sweep timers, occupancy sensors, or programmed master lighting control panels. The design can also include manual or occupancy based override capabilities that enable lights to be turned on after hours.

Twenty-four-hour operation projects are exempt from the after-hours override automatic shutoff, and thus must follow Option 2.

OPTION 2

All exterior openings, such as windows, must have shielding that can be automatically controlled and programmed to close from 11:00 p.m. to 5:00 a.m. Shielding options include automatic shades that have less than 10% transmittance.

An example is a timer-controlled automated rolling shade with the appropriate light transmittance.

In core and shell buildings, these requirements are limited to the core and shell lighting. This typically includes lobby and core circulation spaces. If no light is provided to tenant spaces as part of the core and shell development, those spaces are exempt from these requirements. Core and shell projects that do not install any interior lighting as part of the project scope have met this requirement.

EXTERIOR LIGHTING POWER DENSITY

Design the project's exterior lighting to meet lighting power densities that are equal to or less than the requirements set forth in SS Credit 8, Figure 1, ASHRAE 90.1–2007, Section 9, Table 9.4.5., Lighting for Exterior Areas.

Projects should light areas only as required for safety and comfort, provide only the light levels necessary to meet the design intent, and select efficient fixtures using efficacious sources to meet the lighting requirements of the site while minimizing light pollution.

EXTERIOR LIGHT DISTRIBUTION

Design the project's exterior lighting to comply with the light pollution requirements for the project's zone. The lighting requirements address the site illumination level at and beyond the site boundary and the luminaire distribution relative to up-lighting. The exterior lighting must meet the light pollution requirements under both pre-curfew and post-curfew conditions. Curfew timers and controls can be effective parts of the overall lighting strategy, but controls cannot be used to make otherwise noncompliant exterior areas comply with the credit.

Consider using low-intensity shielded fixtures and curfew controllers to turn off nonessential site lighting after 10:00 p.m. or immediately after closing (whichever is later) to further reduce the

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effects of light pollution. Minimize the lighting of architectural and landscape features. Where lighting is required for safety, security, egress, or identification utilize down-lighting techniques rather than up-lighting."

For example, in environments that are primarily dark (LZ1), no landscape features should be illuminated and architectural lighting should be designed only when other strategies cannot provide the minimum amount of required lighting. In places with medium or high ambient brightness (LZ3 and LZ4), some low-level lighting of features, facades, or landscape areas may be appropriate in pedestrian areas, or for identifying and marking pedestrian paths in areas where light trespass is not likely to be an issue. However, even in areas of high ambient brightness, all nonessential lighting (including landscape and architectural lighting) should be minimized or turned off after hours. All adjustable luminaires should be properly aimed so that light from the luminaires does not cross project boundaries. Use controls wherever possible to turn off nonessential lighting after normal operating hours or after curfew.

At a minimum, consider the following strategies when designing the exterior lighted environment:

- Employ a lighting professional to assess the project's lighting needs and provide recommendations based specifically on lighting for a sustainable built environment.
- Carefully review and respond to any applicable lighting ordinances or bylaws that might affect the lighting design for the project site.
- Determine the environmental zone that the project falls under from Dark (LZ1) to High Ambient Brightness (LZ4). Understand the design implications of the environmental zone that is determined and study neighbouring areas to identify potential light trespass problems.
- In most cases, it is better to have 2 luminaires with lower light output and good glare control than 1 higher-output luminaire.
- Select all lighting equipment carefully. Any type of luminaire, whether it is full cutoff, semi-cutoff or non-cutoff, can produce excessive brightness in the form of glare. For example, horizontal lamp positions in full cutoff luminaires tend to produce much less glare than vertical lamps.
- Design exterior lighting to produce minimal upward illumination from the luminaire and reflected light off of adjacent surfaces. Select luminaire locations carefully to control glare and contain light within the design area. Pay special attention to luminaires that are located near the property line to ensure that minimal measurable light from these luminaires crosses the LEED project boundary.
- Use the minimum amount of light necessary. Design and develop a control scheme to minimize or turn lighting off after hours or during post-curfew periods.
- Create a computer model of the proposed electric lighting design and simulate system performance. Use this model to calculate the specified illuminances demonstrating that illuminance values are as required at the project site boundary and at the required distance beyond the site boundary. Calculate the vertical light levels along and above the site boundary to a height of at least the highest luminaire on the site.
- After the lighting system is constructed, commission it to make sure that it is installed and operating properly. Perform maintenance on the system on a regular basis to make sure that it continues to operate properly and that light pollution is minimized.

5. TIMELINE AND TEAM

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Once the environmental zone is determined by the lighting designer, often in the schematic design phase, the design can move forward. Consider local light level requirements and the unique aspects of the site in relation to the light pollution thresholds of this credit.

As the exterior lighting is designed, a photometric analysis of the site should be performed at intervals to verify the project's continued compliance with the credit requirements. During the construction documents phase, the landscape architect, civil engineer, lighting designer, architect, electrical engineer, and others as appropriate should coordinate to verify the layout and compliance of the exterior fixtures.

6. CALCULATIONS

INTERIOR BUILDING LIGHTING

There are no calculations associated with this portion of the credit.

EXTERIOR LIGHTING POWER DENSITY

Calculate the exterior lighting power density in accordance with ANSI/ASHRAE/IESNA 90.1–2007 Section 9 (see Table 1) and determine whether it is less than the allowable densities for the project site. Note that individual luminaire wattages must be input watts (not just lamp watts), including all ballast losses.

EXTERIOR SKY GLOW AND LIGHT TRESPASS

To measure compliance with the light trespass requirements, use lighting design software and develop a site illumination model (i.e., photometric site plan). The model should show the full extent of the site and all installed exterior lighting fixtures. Set up a horizontal calculation grid to measure the site illumination at the ground plane (the grid should extend to the property line and 3 metres (10 feet) beyond the site boundary for LZ2, and 4.6 metres (15 feet) beyond the site boundary for LZ3 and LZ4). Set a vertical calculation grid at the property boundary and at the extents of the LZ requirements (3 metres (10 feet) beyond the site boundary for LZ2, and 4.6 metres (15 feet) beyond the site boundary for LZ3 and LZ4) to measure vertical illumination. The calculation grid spacing should be a maximum of 3 metres x 3 metres (10 feet x 10 feet) and should exclude building interior areas.

Using manufacturers' fixture data, determine the initial lamp lumens for each luminaire. Additionally, from photometric data, determine the number of initial lamp lumens that are emitted at or above 90 degrees from nadir. Use these data to determine the percentage of lumens at or above 90 degrees.

Luminaires without photometric distribution data must be assumed to have 100% of their initial lamp lumens at or above 90 degrees. Luminaires with limited field adjustability must be assumed to have maximum tilt applied, and lumens at or above 90 degrees must be calculated from maximum tilted orientation. Luminaires with full range of field adjustability (those that can be aimed above 90 degrees from nadir) must be assumed to have 100% of the emitted fixture lumens at or above 90 degrees.

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7. DOCUMENTATION GUIDANCE

As a first step in preparing to complete the LEED documentation requirements, work through the following measures. Refer to LEED Letter Templates for the complete descriptions of all required documentation.

INTERIOR LIGHTING

- If automatic controls are used for interior lighting, prepare drawings showing their locations. Incorporate the sequence of operation for lighting into drawings and specifications or the building operation plan.
- If automatic shading devices are used to control interior lighting, prepare drawings of the devices, assembly specifications, or product data showing that they block at least 90% of the light, and incorporate the sequence of operation for automatic shading devices into drawings and specifications, or the building operation plan.

EXTERIOR LIGHTING

- Determine the zone classification for a project site.
- Acquire manufacturer's data for lamps used on a project site.
- Prepare a description of the light trespass analysis procedure conducted to determine credit compliance.
- Develop a photometric site plan of parking areas that includes lux or footcandle summary tables for light ratio.

8. EXAMPLES

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EXAMPLE 1. Exterior Lighting Power Density and Trespass Assessment

Table 2 shows an example of how exterior lighting power density calculations are performed, and Table 3 demonstrates the data required to calculate the percentage of lumens emitted at or above 90 degrees from nadir.

TABLE 2. SAMPLE EXTERIOR LIGHTING POWER DENSITY CALCULATION

SITE LIGHTING POWER DENSITY CALCULATION						
SITE LIGHTING FIXTURE	**FIXTURE POWER (WATTS)**	**TOTAL FIXTURES (QTY)**	**TOTAL FIXTURE POWER (WATTS)**	**SITE LOCATION**	**SITE AREA (m^2)**	**LPD (W/m^2)**
Pole Fixture 1	250	14	3,500	Parking 1	3,200	1.1
Pole Fixture 1	250	8	2,000	Parking 2	1,800	1.1
Pole Fixture 2	115	1	115	Walkways 1	88	1.3
Bollard Fixture 1	40	4	160	Walkways 1	88	1.8
Bollard Fixture 1	40	6	240	Courtyard 1	150	1.6
Wall Washer 1	50	5	250	Building Façade N	250	1.0
SITE AREAS						
Identification	Area (m^2)	ASHRAE 90.1.2007 Allowable LPD (W/m^2)	Actual LPD (From Site Lighting Table)	Actual LPD Reduction (%)	Required LPD Reduction (%)	Complies (Yes/No)
Parking 1	3,200	1.6	1.1	31%	20%	YES
Parking 2	1,800	1.6	1.1	31%	20%	YES
Walkways 1 (3 m wide)	88	2.2	1.6	27%	20%	YES
Courtyard 1	150	2.2	1.6	27%	20%	YES
Building Façade N	250	2.2	1.0	55%	50%	YES

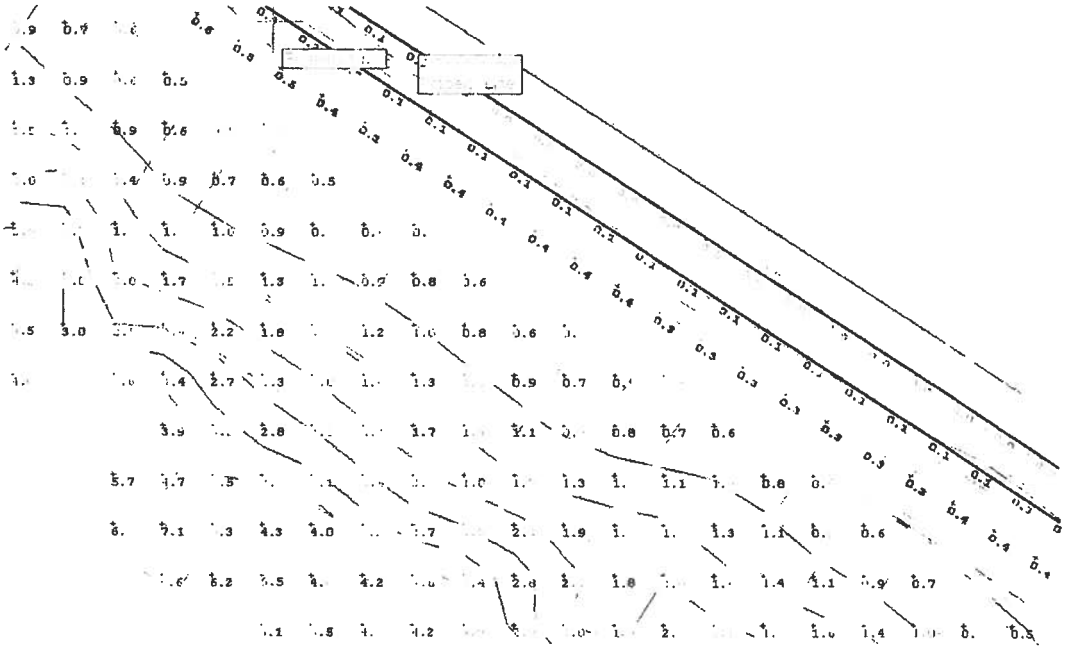
TABLE 3. LAMP LUMEN CALCULATION

LUMINAIRE TYPE	**QUANTITY OF INSTALLED LUMINAIRES**	**INITIAL FIXTURE LUMENS PER LUMINAIRE**	**TOTAL FIXTURE LUMENS (COLUMN 2 X COLUMN 3)**	**INITIAL FIXTURE LUMENS FROM LUMINAIRE ABOVE 90 DEGREES (FROM NADIR-STRAIGHT DOWN)**	**TOTAL FIXTURE LUMENS ABOVE 90 DEGREES (COLUMN 2 X COLUMN 5)**
A	10	4,600	46,000	100	1,000
B	20	11,900	238,000	0	0
C	5	2,000	10,000	2,000	10,000
Total			294,000		11,000

SS	
NC	Credit 8
CS	Credit 8

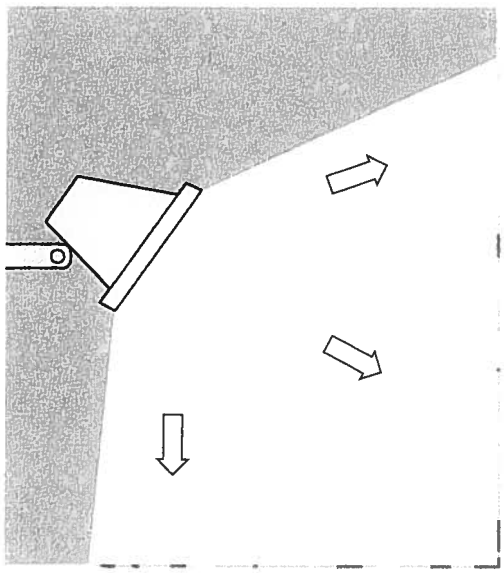
Figure 1 shows the photometric site plan generated by an illumination model. The example is in compliance with the credit requirements for a project located in LZ3: The light level at the property line does not exceed 2.2 lux or 0.2 footcandles, and the light level 4.6 metres (15 feet) beyond the property line does not exceed 0.11 lux or 0.01 footcandles.

FIGURE 1. SAMPLE ILLUMINATION MODEL



Figures 2–5 show how a shielded light can prevent light trespass and light pollution of the night sky.

FIGURE 2. UNSHIELDED FLOODLIGHT



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NC	Credit 8
CS	Credit 8

FIGURE 3. TASK AREA FROM UNSHIELDED FLOODLIGHT

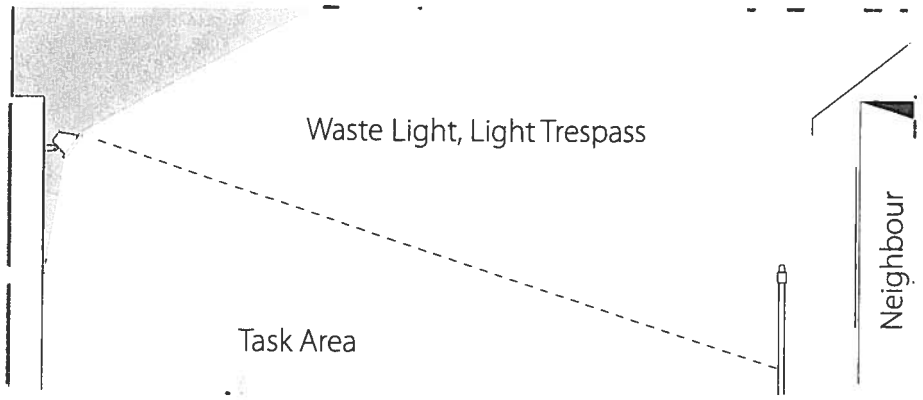


FIGURE 4. SHIELDED FLOODLIGHT

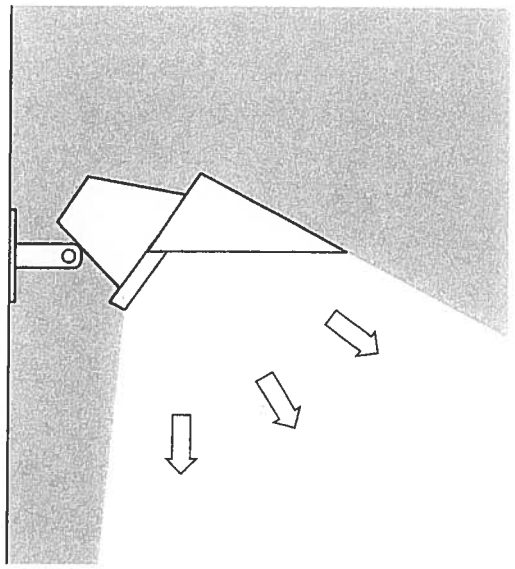
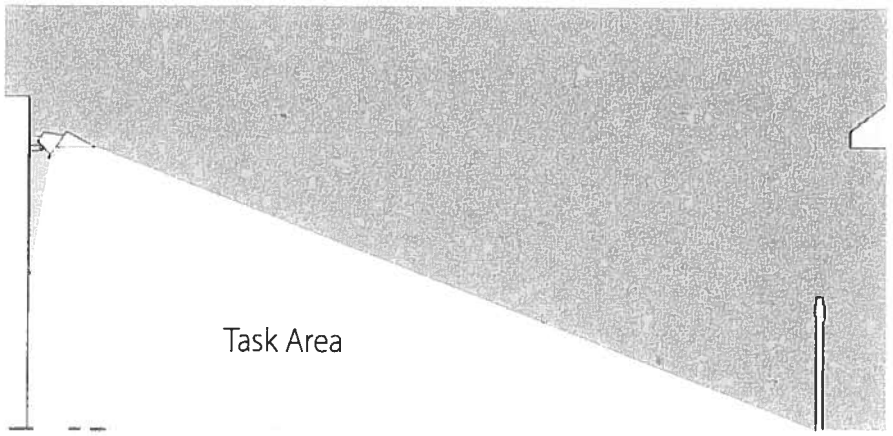


FIGURE 5. TASK AREA FROM SHIELDED FLOODLIGHT



SS	
NC	Credit 8
CS	Credit 8

9. EXEMPLARY PERFORMANCE

This credit is not eligible for exemplary performance under the Innovation in Design section.

10. REGIONAL VARIATIONS

There are no regional variations associated with this credit.

11. OPERATIONS AND MAINTENANCE CONSIDERATIONS

Exterior luminaires must be periodically cleaned and re-lamped to maintain optimal light levels. Depending on the number of exterior luminaires, it may be beneficial to implement a schedule and policy for group re-lamping to help avoid lamp burnouts and to minimize the labour costs associated with spot re-lamping. Additionally, if group re-lamping is identified as an operational strategy during the design phase, the initial light levels can often be reduced while still maintaining the design illuminance. A rule of thumb to determine whether group re-lamping is likely to be economically feasible is if the labour cost to change a lamp exceeds the cost per lamp.

12. RESOURCES

WEBSITES

American Society of Heating, Refrigeration, and Air-Conditioning Engineers
http://www.ashrae.org

ASHRAE advances the science of heating, ventilation, air conditioning, and refrigeration for the public's benefit through research, standards writing, continuing education, and publications. To purchase ASHRAE standards and guidelines, visit the bookstore on the ASHRAE website.

Illuminating Engineering Society of North America
http://www.iesna.org

The mission of IESNA is to benefit society by promoting knowledge and disseminating information for the improvement of the lighted environment.

International Dark-Sky Association
http://www.darksky.org

This non-profit agency is dedicated to educating about and providing solutions to light pollution.

Lighting Research Center
http://www.lrc.rpi.edu

A leading university-based research centre devoted to providing objective information about lighting technologies, applications and products to aid facility managers, utilities, lighting designers, engineers and electrical contractors. The web site includes the National Lighting Product Information Program (NLPIP), which provides free publications about lighting topics (such as light pollution) and products.

Royal Astronomical Society of Canada, Light Pollution Abatement Program
http://www.rasc.ca/light/

This program's goal is to reduce levels of light pollution in urban and rural areas by advising governments, businesses and citizens on taking action to reduce unnecessary glare, uplight and light trespass.

SS	
NC	Credit 8
CS	Credit 8

PRINT MEDIA

The IESNA Lighting Handbook, ninth edition, by Illuminating Engineering Society of North America (IESNA, 2000).

Lighting for Exterior Environments RP-33-99, by IESNA Outdoor Environment Lighting Committee (IESNA, 1999).

Concepts in Practice Lighting: Lighting Design in Architecture, by Torquil Barker (B.T. Batsford Ltd., 1997).

The Design of Lighting, by Peter Tregenza and David Loe (E & FN Spon, 1998). ASNI/ASHRAE/IESNA Standard 90.1–2007 User's Manual, effective 2008.

13. DEFINITIONS

Curfew hours are locally determined times when lighting restrictions are imposed. When no local or regional restrictions are in place, 10:00 p.m. is regarded as a default curfew time.

A **footcandle (fc)** is a measure of light falling on a given surface. One footcandle is defined as the quantity of light falling on a 1-square-foot area from a 1 candela light source at a distance of 1 foot (which equals 1 lumen per square foot). Footcandles can be measured both horizontally and vertically by a footcandle meter or light meter.

A **full-cutoff luminaire** has zero candela intensity at an angle of 90 degrees above the vertical axis (nadir or straight down) and at all angles greater than 90 degrees from straight down. Additionally, the candela per 1,000 lamp lumens does not numerically exceed 100 (10%) at an angle of 80 degrees above nadir. This applies to all lateral angles around the luminaire.

Horizontal footcandles occur on a horizontal surface. They can be added together arithmetically when more than 1 source provides light to the same surface.

Light pollution is waste light from building sites that produces glare, is directed upward to the sky, or is directed off the site. Waste light does not increase nighttime safety, utility, or security and needlessly consumes energy.

Light trespass is obtrusive light that is unwanted because of quantitative, directional, or spectral attributes. Light trespass can cause annoyance, discomfort, distraction, or loss of visibility.

Luminaire is a lighting fixture assembly, including lamp, housing, reflector, and ballast (if applicable).

Safety and comfort light levels meet local code requirements and must be adequate to provide a safe path for egress without overlighting the area.

Shielding is a nontechnical term that describes devices or techniques that are used as part of a luminaire or lamp to limit glare, light trespass, or sky glow.

Sky glow is caused by stray light from unshielded light sources and light reflecting off surfaces that then enter the atmosphere and illuminate and reflect off dust, debris, and water vapour. Sky glow can substantially limit observation of the night sky, compromise astronomical research, and adversely affect nocturnal environments.

Vertical footcandles occur on a vertical surface. They can be added together arithmetically when more than 1 source provides light to the same surface.

Subject: FW: your site

From: Kris Rasmussen [mailto:krisueras@gmail.com]
Sent: Friday, November 04, 2011 10:41 PM
To: Kate Miller
Subject: your site

Hi

l Just got of the page at http://www.12things.ca/12things/contact.php and thought it ws very much in line with what I believe. But I do wonder how much weight the environment actually carries in Cowichan. Is there a place I could look to get more info? I mean, it is great to post such a wonderful page, with 12 wonderful ideas, but is anyone with more authority actually listening?

Respectfully, Kris Rasmussen, of the Mill Bay Rasmussens!

Dyan Freer

From: John Cummings
Sent: Wednesday, November 09, 2011 7:13 AM
To: ALL CVRD
Subject: Cowichan Lake Recreation Play book

Good morning all

We are currently putting together the Cowichan Lake Recreation, Winter 2011 Play book.

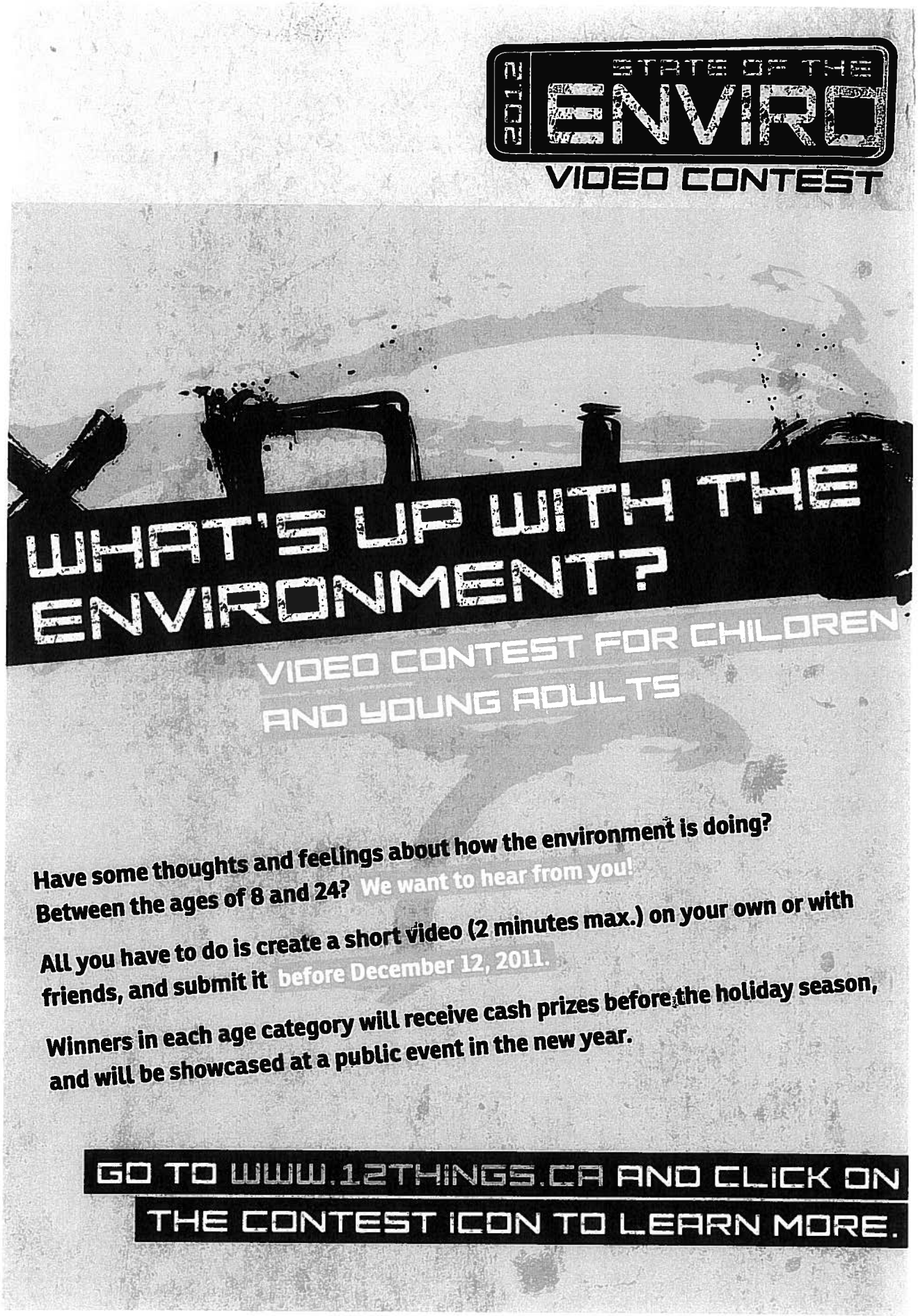
We would like to be able to advertise your departments for maximum exposure and education about what we, the CVRD, offer as a group.

Please respond with your ad in pdf format for compilation and a financial code for billing purposes.

Our rates are very reasonable and your info will reach 1800 homes.

I look forward to growing our programs together.

John Cummings
Recreation Programmer
Cowichan Lake Recreation
Ph: 250-749-6742
Fax: 250-749-6341
www.cvrd.bc.ca



This youth video contest is sponsored by the Cowichan Valley Regional District Environmental Policy Division and its Environment Commission, which provides advice to The Regional District politicians about environmental matters. Information gathered in this contest will be used to help guide both the Commission and the Regional District in developing a plan that has your voice and ideas in it.

Cowichan Valley Regional District Environment Commission | 175 Ingram Street | Duncan, BC | 250.746.2500

CVRD

ENVIRO VIDEO CONTEST

NEWS RELEASE

Date: November 7, 2011 **For Immediate Release**

New video contest asks Cowichan youth: "What's up with the environment?"

COWICHAN, BC – The Cowichan Valley Regional District's Environment Commission wants to hear what the region's young people have to say about how the environment is doing. Their new video contest is open to children and young adults between the ages of 8 and 24. Winners in each age category will receive cash prizes and local fame.

"Last year the Environment Commission completed a whopping 226 page detailed science-based report on the state of the region," explains CVRD Regional Environmental Policy Manager, Kate Miller. "We want to add to this knowledge by giving children and young adults a chance to express their opinions about the state of Cowichan's environment."

Contest entrants can work solo or in teams, and have from now until December 12, 2011 to make a short video (2 minutes maximum) and upload it to www.12things.ca. Video submissions should try to answer questions like: What makes you hopeful? What makes you worried? How can you help? How can we help? Entries will be judged by a panel of Environment Commission members and CVRD staff.

"We want to know what is important to young people and how they think we should get there," continues Miller. "We want them to make us think!"

Information gathered in this contest will be used to help guide both the Commission and the Regional District in developing a plan that includes the voices and ideas of Cowichan's children and young adults.

Gerry Giles, CVRD chair and co chair of the Environment Commission adds, "Our future decision makers are our youth. There is no greater way to move forward than to involve our young people in the decisions we make today. We want future generations to enjoy the environment. Help us do the right thing now."

The contest website is easy to use, and contains tips on how to make and upload videos. The winners and their winning videos will be showcased at the CVRD Environment Commission meeting on December 15, 2011 at 7pm.

For more information: visit www.12things.ca and look for the video contest icon.

Kate Miller, Manager
Regional Environmental Policy
Engineering and Environmental Services
Cowichan Valley Regional District
Email: kmiller@cvrd.bc.ca
Phone: 250-746-2530

- 30 -

Draft Elements of a 2011-2012 Workplan for the CVRD Environment Commission

Straker – Nov-8-11

tem	Budget	Leader	Partners	Timeline	Notes
1. Continue to act as the monitoring committee for the Solid Waste Management Plan	N/A, covered by CVRD	Form sub-committee to interface; make recommendations to Commission	CVRD staff; MoE	Sub-committee in place for Jan. 2012	Schedule meeting with B. Dennison, B. McDonald, K. Miller
2. Continue to act as the monitoring committee for the Central Sector Liquid Waste Management Plan	N/A, covered by CVRD	Form sub-committee to interface; make recommendations to Commission	CVRD staff; MoE	Sub-committee in place for Jan. 2012	Unknown role with respect to South Sector; schedule meeting with B. Dennison, D. Leich, K. Miller
3. Continue to act as the monitoring committee for the Local Advisory Water Protection Committee					Status of VI Watershed Protection Committee uncertain; and relationship with Cowichan Watershed Board and South Cowichan Watershed program; coordinate with K. Miller
4. Support CVRD staff in development of a Regional Environmental Strategic Plan, as directed/requested	Budget required to support Commission's activities (outreach, research)	CVRD (K. Miller) – mechanism of Commission involvement to be determined with K. Miller	CVRD staff, community	Based on CVRD workplan development	CVRD workplan approval by March 2012 at latest
5. Monitor and advance implementation of the CVRD Regional Environmental Strategic Plan, and report to Board (annually or as required)	n/a	Sub-committee or individuals given responsibility to report to Commission on advancement to date with respect to environmental items	CVRD staff		n/a until RESP is developed; could report to the Board on strategic priorities for programming (relates to item below); review advancement of the CVRD Corporate Strategic Plan to date

Item	Budget	Leader	Partners	Timeline	Notes
6. Support CVRD staff on further development and implementation of the CVRD Corporate Strategic Plan	TBD, following completion of item #5	Co-chairs and W. Jones	CVRD staff	Meeting between co-chairs, Jones, J. Ellis, and K. Miller Jan. 2012	Review Oct. session; request identification of priority items by CVRD staff for December for review and incorporation in Commission's priorities and workplan
7. Support CVRD staff on development of the CVRD Integrated Regional Sustainability Plan	n/a	Co-chairs and Tom Anderson	CVRD staff	Meeting between co-chairs, Anderson, W. Jones, and K. Miller Jan. 2012	Clarification of the role of the Commission
8. Continue to work with the EDC on developing a working relationship between the commissions		Commission co-chairs and delegated CVRD staff (G. Millar and K. Miller)	CVRD staff	Q1 2012	Chairs of commissions to meet to explore how best to develop a working relationship; brief on each other's workplans
9. Follow-up and update CVRD State of Environment reporting	Consider allocating surplus funds into account to fund this activity; facilitation budget for workshop and food/drink	Environment Commission co-chairs	CVRD Environmental Policy Division	2 workshops in 2012 to review and set targets; consider facilitation; 2014-2015 SoE update	Steps to pursue: 1) set targets based on 2010 SoE; 2) monitor performance with respect to these targets; 3) report out on performance on 5-year cycle. Targets may be set and pursued in partnership with other organizations, e.g. CVRD, Cowichan Watershed Board; workshops can have current sub-committees come with suggestions for targets, and include external partners

Item	Budget	Leader	Partners	Timeline	Notes
10. Continue to communicate to the public about the 12 big ideas and what they mean	~$10k	As required		As required	Develop additional supporting materials for each of the themes; Keep the "brand active"; Continue to report back to the community on how the commission is moving this agenda forward for public and political discourse; Discuss most effective modes of communication – newspaper, fairs, direct presentations?
11. Request referral from CVRD staff and board on major decisions with environmental implications	N/A at this time	Co-chairs	TBD	Not initiated	As part of workplan presentation to Board in ~Feb, remind Board members of opportunity to consult with EC
12. Develop 5-yr plan based on 2012 workplan, CVRD initiatives (CSP, ISP, RESP), and targets/SoE work		Co-chairs		Q3 2012	Based on availability of relevant documents