APPENDIX I LIGHT ENVIRONMENT STUDY

Tel: 519.823.1311
Fax: 519.823.1316

RWDI AIR Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada
N1K 1B8

Treasury Metals Inc. - Goliath Gold Project

Dryden, Ontario

Final Report

Baseline Light Assessment

RWDI #1300747
August 14, 2013

SUBMITTED TO:

Mark Wheeler, P.Eng.
Senior Mining Engineer
mark@treasurymetals.com

Treasury Metals Inc.
130 King Street West, Suite 3680
PO Box 99, The Exchange Tower
Toronto, ON M5X 1B1

T: (416) 214-4654

SUBMITTED BY:

Nicole Korba, d.E.T.
Project Manager
Nicole.Korba@rwdi.com

John DeYoe, B.A., d.E.T.
Senior Consultant
John.DeYoe@rwdi.com

Carol McClellan, GISP
Intermediate Scientist
Carol.McClellan@rwdi.com

CONSULTING ENGINEERS & SCIENTISTS

TABLE OF CONTENTS

1. INTRODUCTION 1
2. STUDY AREA 1
3. ASSESSMENT CRITERIA 2
3.1 Illuminance Criteria 2
3.2 Relative Brightness Criteria 3
4. METHODS 3
5. EXISTING CONDITIONS 3
5.1 Illuminance 3
5.2 Conclusion 4
6. SUMMARY 4
7. REFERENCES / LITERATURE CITED 4

Tables

Table 1: Illuminance Criteria (LEED)
Table 2: Sample Relative Brightness Measurements
Table 3: Baseline Maximum Illuminance Measurements at Receptors

Figures

Figure 1: Typical Landscape in the Study Area
Figure 2: Monitoring Locations
Figure 3: Receptor/Sampling Site #1
Figure 4: Receptor/Sampling Site #2
Figure 5: Receptor/Sampling Site #3
Figure 6: Receptor/Sampling Site #4
Figure 7: Receptor/Sampling Site #5
Figure 8: Receptor/Sampling Site #6
Figure 9: Receptor/Sampling Site #7
Figure 10a: Receptor/Sampling Site #8
Figure 10b: Receptor/Sampling Site # 8 (Nighttime)
Figure 11a: Receptor/Sampling Site # 9
Figure 11b: Receptor/Sampling Site # 9 (Nighttime)
Figure 12a: Receptor/Sampling Site # 10
Figure 12b: Receptor/Sampling Site # 10 (Nighttime)
Figure 13a: Receptor/Sampling Site # 11
Figure 13b: Receptor/Sampling Site # 11 (Nighttime)
Figure 14a: Receptor/Sampling Site # 12
Figure 14b: Receptor/Sampling Site # 12 (Nighttime)

Appendices

Appendix A: Light Meter Calibration Certificates
Appendix B: Field Notes from Light Meter Measurements

1. INTRODUCTION

The Treasury Metals Inc. (Treasury) Goliath Gold project (the Project) is located in northwestern Ontario, approximately 125 kilometres (km) east of the City of Kenora, 20 km east of the City of Dryden and 325 km northwest of the City of Thunder Bay. The total area of the Project is 4,991 hectares (50 km²) covering portions of Hartman and Zealand townships east of the City of Dryden, Ontario. The purpose of this report is to determine and document the baseline conditions to be used for a light assessment that will be undertaken to evaluate the potential effects of the Project lighting on nearby residences and/or receptors of interest.

As a part of the Project, exterior lighting will be installed for operations, safety and security. The light that escapes the Project site (known as light trespass) can be regarded as a nuisance by property owners immediately adjacent or in relatively close proximity to the Project. The following concepts and definitions are important for this assessment:

- Illuminance – the total luminous flux (the perceived power of light) incident on a surface per unit area. Illuminance is measured in lux (luminous power per square metre) and can be thought of as the amount of incident light available to read the text on a piece of paper at a specific location. A casual reading area in the home should reach between 300 and 500 lux, whereas workshop areas or places of intensive reading should reach between 500 and 1,200 lux. Detailed work areas should reach levels of 1,100 to 2,100 lux.
- Relative brightness – While illuminance levels can be low at a particular location, bright lights in the distance can still be objectionable to people looking at the light (this issue is also typically discussed as “glare”). Brightness however, is subjective and does not have an accepted industry standard procedure for its measurement in this context. As such, “relative brightness” is used to bring an approximate measure of quantification to this subject. Relative brightness is based on luminance which is a measurable quantity that closely corresponds to brightness as both parameters are significantly dependent on the area and angle from which the light is emitted. Luminance is the luminous intensity (i.e., the power of light energy emitted) per unit area projected in a given direction and a direct line of sight is required for this issue to be of importance. Luminance is measured in candela per square metre (cd/m²).

For the baseline light assessment, only measurements of illuminance were taken, which is the appropriate measurement to assess baseline conditions. Note that for this baseline light assessment, relative brightness was not measured as currently exterior lighting for the Project site is not installed.

2. STUDY AREA

The Project is located in northwestern Ontario, approximately 125 km east of the City of Kenora, 20 km east of the City of Dryden and 325 km northwest of the City of Thunder Bay. The total area of the Project is 4,991 hectares (50 km²) covering portions of Hartman and Zealand townships east of the city of Dryden, Ontario.

The area surrounding the Project site is a mix of mostly forested and some open rural land cover. The topography in the area is generally low, rolling hills, with elevation decreasing along the shoreline of Thunder Lake to the west of the project site, and again along Wabigoon Lake to the west/southwest of the Project site. The closest residences are located along East Thunder Lake Road, which runs along the western edge of the Project property boundary. Additionally, there are other pockets of houses/cottages along the shore of Thunder Lake and Wabigoon Lake further away from the Project site. There does not appear to be any residences located close to the Project site on the east side of the property boundary. Generally, the surrounding area is sparsely populated with land that is heavily treed.

Occupied areas such as residences and cottages in close proximity to the Project are considered to be receptors of interest that could potentially be affected by the light emitted from the Project. Because light intensity decreases significantly with increasing distance (the intensity of light diminishes inversely with the square of distance), receptors farther than 1 km from the Project are generally not considered to be affected. Light impacts (in regard to illuminance and relative brightness) beyond 1 km are typically comparable to general lighting in the vicinity of the receptor (e.g., streetlights, garage lights, etc). Consequently, a light study area (LSA) extending 1 km from the Project boundary area was selected to determine receptors/sampling sites that could be directly impacted by the Project. Additionally, representative receptors on the far side of Thunder Lake were also sampled since the lake body provides an unobstructed line of sight to the Project. Note that this study area refers to the more geographically immediate issues of illuminance, which is the relevant measure for a baseline assessment. Figure 1 is a photograph depicting the typical landscape in the study area.

A total of 12 receptor locations were determined for the purpose of the baseline light assessment. Receptors R1 through R3 are located on / within the Project site boundary, while receptors R4 through R8 and R12 are neighbouring residences or cottages within 1 km of the property boundary on the shoreline of Thunder Lake. Receptors R9 through R11 are the representative receptors for clusters of cottages located on the far (west) shoreline of Thunder Lake from the Project Site, and were grouped for reasons of sharing similar view-scapes and topographic features. The selected receptor/sampling locations are depicted in Figure 2.

3. ASSESSMENT CRITERIA

Criteria are typically established by regulatory agencies to specify acceptable levels of a specific parameter (e.g., contaminant levels or lighting levels). In Ontario, there are no provincial guidelines or regulations governing light trespass. Therefore, this assessment relies on information researched from other sources (as described in the following paragraphs).

3.1 Illuminance Criteria

Lighting criteria for illuminance are available from the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED), Reference Guide for New Construction, Version 2.2 (see Table 1). To put these numbers in context, the Illuminating Engineering Society (IES) of North America recommends a minimum lighting level of 5.4 lux for safety. They also recommend 5 to 22 lux for outdoor pedestrian walkways, and about 100 lux for interior stairways (malls). Interiors of buildings typically measure in the hundreds of lux.

3.2 Relative Brightness Criteria

Although criteria similar to LEED do not exist for relative brightness, estimated Project lighting levels can be compared with levels familiar from daily experience, (e.g., comparing an estimated relative brightness value to that from a full moon or a street light). See Table 2 for sample relative brightness values for familiar light sources.

4. METHODS

Existing (baseline) conditions represent the current light levels within the LSA. To assess these conditions at the receptors, illuminance data were measured at 12 selected receptor locations as described in Table 3. One sample was taken at each of the 12 sites on July 2, 2013 and again on July 3, 2013 (total of 2 samples per site) between the hours of 10:40pm and 1:00am. Sample site photographs are shown in Figures 3 through 13b. Illuminance measurements were taken in two ways at each location – in a regular/general standing position, and secondly with the light meter directly pointed at any local source of light (i.e.: streetlights or exterior house lighting). Relative brightness measurements in cd/m² (based on luminance) were not specifically collected or assessed for the baseline assessment.

Considering the Project does not currently operate, measured light levels for a baseline assessment are associated with other existing sources.

The area surrounding the Project mainly comprises heavy forest. However, terrain features (e.g., changes in topography) are also common, and can reduce the amount of light reaching the receptor locations.

5. EXISTING CONDITIONS

To provide an indication of existing conditions, illuminance levels were measured at the selected receptors (see Table 3). Fieldwork in the Project area was conducted overnight on July 2 and July 3, 2013 under a clear sky with light cloud coverage (< 10% cloud cover). The ambient temperature was 22ºC on July 2 and 19°C on July 3. The moon visibility was 21% and 14% for each sample date respectively [2]. An International Light Technologies IL1400A light meter was used to record the lighting levels. The light meter unit was rented directly from the manufacturer, and calibrations were performed by the manufacturer prior to the field work. The Calibration Certificate is provided in Appendix A.

5.1 Illuminance

Baseline illuminance measurements at the selected receptors (see Table 3) were all below the LEED criteria for rural residential areas (1.1 lux) with the exception of sample sites that were directly influenced by a local light source such as a street light or exterior house light near the measurement location. Any areas, including the three sample sites that were on the Project property, that were away from these types of direct sources were generally measured to be 0.0 lux.

5.2 Conclusion

In conclusion, baseline illuminance measurements at the selected receptors were all below the LEED criteria for rural residential areas (1.1 lux) with the exception of those measurements taken near or directly pointing the light meter at nearby sources of light. Any areas away from local light sources were at or close to a lux value of 0.0.

6. SUMMARY

Illuminance was assessed for residential receptors located within about 1 km of the expected Project primary light area as well as some representative receptors located across Thunder Lake from the Project site. Current illuminance levels at the receptors are below LEED criteria for rural residential areas with the exception of any sample sites that were located in direct proximity to light sources such as exterior home light or street light.

Illuminance levels decrease rapidly with distance from the light source and, as all the selected receptors are expected to be beyond 500 m of the expected primary Project light sources, it is expected that they will not experience a measurable increase in illuminance levels. Additionally, the surrounding terrain and vegetation (forest) will likely block most, if not all of the direct views of the Project from the various receptors.

7. REFERENCES / LITERATURE CITED

1. Leadership in Energy and Environmental Design (LEED). Green Building Rating System for New Construction and Major Renovations. Version 2.2: Sustainable Sites, Credit 8. October, 2005.
2. Moon calendar July 2013. http://www.calendar-365.com/moon/moon-calendar.html. Accessed on July 2 and 3, 2013.

TABLES

Table 1: Illuminance Criteria (LEED)

Item	Description	Maximum Illuminance (Lux)
Intrinsically dark landscape	Parks	0.0
Low ambient brightness	Outer urban and rural residential areas	1.1
Medium ambient brightness	Urban residential areas	2.2
High ambient brightness	Urban areas with residential and commercial areas	6.5

Table 2: Sample Relative Brightness Measurements

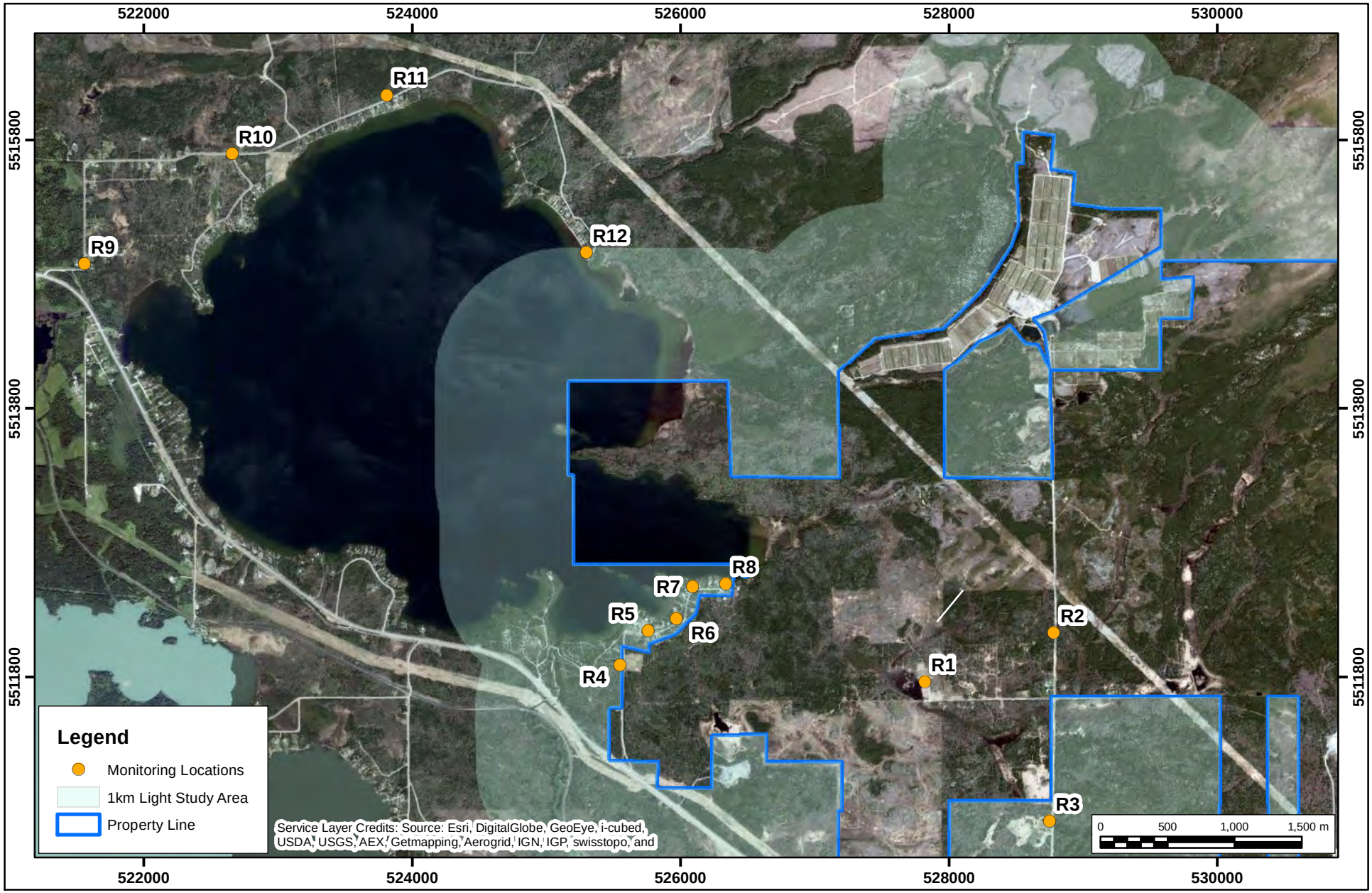
Item	Relative Brightness (cd/m^2)
Street lamp	23,000
Full moon	400
Typical Industrial Facility at 2 km	<10
Car with high beams at 1 km	60

Table 3: Baseline Maximum Illuminance Measurements at Receptors

Receptor ID	Observation #	X	Y	Illum (lux) July 2, 2013	Illum (lux) Direct July 2, 2014	Illum (lux) July 3, 2013	Illum (lux) Direct July 3, 2014	Type	Description
R1	1	527822	5511764	0.00	0.00	0.00	0.00	Goliath Gold Site	Center of Proposed Pit
R2	2	528782	5512129	0.00	0.00	0.00	0.00	Goliath Gold Site	East of Proposed Pit
R3	3	528751	5510726	0.00	0.00	0.01	0.00	Goliath Gold Site	Nystrom House on Tree Nursery Road
R4	4	525549	5511888	0.00	0.00	0.01	0.00	Receptor	Field to east of E Thunder Lake Road (Noise Site #1)
R5	5	525760	5512145	2.40	4.00	2.70	4.30	Receptor	249 E. Thunder Lake Road, next to street light on road, edge of pavement and gravel
R6	6	525969	5512235	0.21	3.00	0.21	3.20	Receptor	Measured ~14m from road near the hydro station (SW2), next to street light near location 1A
R7	7	526092	5512473	0.00	0.00	0.00	0.03	Receptor	352 E. Thunder Lake Road
R8	8	526338	5512493	0.00	0.50	0.00	0.00	Receptor	At Noise Site # 2, light from resident, front door light on house
R9	9	521559	5514880	0.00	15.20	0.00	15.10	Receptor	65 Thunder Lake Road. Edge of road pavement to gravel. Pointed at streetlight.
R10	10	522658	5515699	4.40	0.00	4.10	0.00	Receptor	Taken under street light corner of North Shore and Thunder Lake Road (Stop sign)
R11	11	523810	5516134	0.03	0.22	0.02	0.19	Receptor	North side of Thunder Lake, pointed at residence,measured from edge of road, approximately 12m from light source
R12	12	525296	5514963	0.05	0.19	0.02	0.17	Receptor	Johnsons Beach (by Noise Site 3)

FIGURES

Figure 1: Typical Landscape in the Study Area



Monitoring Locations

Map Projection: NAD 1983 UTM Zone 15N.

True North

Goliath Gold Mine, Kenora Mining Division, Ontario

Project #1300747

Drawn by: CAM	Figure: 2
Approx. Scale:	1:40,000
Date Revised:	July 25, 2013

RWDI

Figure 3: Receptor/Sampling Site #1

Figure 4: Receptor/Sampling Site #2

Figure 5: Receptor/Sampling Site #3

Figure 6: Receptor/Sampling Site #4

Figure 7: Receptor/Sampling Site #5

Figure 8: Receptor/Sampling Site #6

Figure 9: Receptor/Sampling Site #7

Figure 10a: Receptor/Sampling Site #8

Figure 10b: Receptor/Sampling Site #8 (Nighttime)

Figure 11a: Receptor/Sampling Site #9

Figure 11b: Receptor/Sampling Site #9 (Nighttime)

Figure 12a: Receptor/Sampling Site #10

Figure 12b: Receptor/Sampling Site #10 (Nighttime)

Figure 13a: Receptor/Sampling Site #11

Figure 13b: Receptor/Sampling Site #11 (Nighttime)

Figure 14a: Receptor/Sampling Site #12

Figure 14b: Receptor/Sampling Site #12 (Nighttime)

APPENDIX A

International Light TECHNOLOGIES

CALIBRATION CERTIFICATE

ELECTRICAL INSTRUMENTATION CALIBRATION REPORT

R3693

This document states that the instrument described below meets or exceeds all manufacturer specifications. The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI). ILT is Accredited to ISO 17025:2005. Calibration conforms to ANSI/NCSI Z540.1-1994 and ANSI/NCSI Z540.3-2006.

Date: 28-Mar-13 Certificate #: 1303281112E SO#: 142603

Temp: 23 Degrees C Humidity: 23 % Procedure: TP-0112:09MAY2012

Rendered To: Ashtead Technology Rentals

InstrumentModel-S/N: IL1400A #5335

Calibration/Repair Remarks: None

Parts (If Needed): None

As Found Tolerance In	As Found Tolerance Out	As Found Readings	As Found Permissible Tolerance	Applied Current	Adjusted Readings	Permissible Adjustment Error	As Left Tolerance In	As Left Tolerance Out
☑	☐	302 uA	-0.7% to 1.3%	300 uA	302 uA	+/- 4 uA	☑	☐
☑	☐	100.2 uA	+/-0.3%	100.0 uA	100.0 uA	+/- .2 uA	☑	☐
☑	☐	10.02 uA	+/-0.3%	10.00 uA	10.00 uA	+/- .02 uA	☑	☐
☑	☐	1.001 uA	+/-0.4%	1.000 uA	1.000 uA	+/-.002 uA	☑	☐
☑	☐	97.9 nA	+/-3.0%	100.0 nA	100.0 nA	+/- .2 nA	☑	☐
☑	☐	9.86 nA	+/-3.0%	10.00 nA	10.07 nA	+/- .2 nA	☑	☐
☑	☐	0.98 nA	+/-4.0%	1.00 nA	1.00 nA	+/- .02 nA	☑	☐

Tolerance after repair and/or calibration: ☑ In ☐ Out

Measurement Uncertainty: 300uA=±0.20%, 100uA=±0.068%, 10uA=±0.062%, 1uA=±0.064%, 100nA=±0.065%, 10nA=±0.12%, 1nA=±0.22%

The above Instrument was compared to the Keithley Current Calibrator/Source Model 263 S/N 0621350 calibrated on 12/19/2012 which is traceable to NIST. Calibration Due: 12/19/2013

Calibrated By: _____

Electrical Calibration Tech. Paul DeLauri

Authorized Original Unless Marked "Copy"

"For authorized copies of this certificate please contact International Light, Inc."

Form F-094A Rev E

ilac-MRA PJLA Calibration Accreditation# 66765

International Light Technologies, Inc.
10 Technology Drive, Peabody, MA 01960 USA
978-818-6180 / 978-818-6181 *fax*
intl-lighttech.com

InternationalLight Gilway Technical Lamp

InternationalLight TECHNOLOGIES

CALIBRATION CERTIFICATE

OPTICAL CALIBRATION CERTIFICATE

International Light Technologies certifies that the calibration results published in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI). ILT is Accredited to ISO/IEC 17025:2005. Calibration conforms to ANSI/NCSI Z540.1-1994 and ANSI/NCSI Z540.3-2006.

Rendered-to: ASHTEAD TECHNOLOGY RENTALS R7955

Detector: SCL110 #1975 Input Optic N/A #

Filter: N/A # Misc.: N/A #

Calibrated With: IL1400A #7668

(NIS) ILLUMINANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 28-Mar-2013

6.09E-10 (A)(lux-1) assuming 3215 K Color Temperature

-0.49% *Change In Sensitivity From Previous Calibration Dated: 13-Jan-2012

Tolerance As Found: ☑ In ☐ Out Tolerance As Left: ☑ In ☐ Out

Unit will read directly in lux when used with an IL1400A and the Sensitivity Factor Above.

REFERENCE PLANE: Front

*difference includes intrinsic detector change, NIST recertification updates, lab experimental error or modifications to the hardware adjustments.

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response I219 - November 2005 - NIST Test No. 844/272521-05 : U1023 - January 1997 - NIST Test No. 844/257423-96/2 : D204 - January 1997 - NIST Test No. 844/257423-96/1

ILT Transfer Uncertainty to Customer = +/- 4.3% plus NIST Uncertainty of: +/- 0.5%

LIGHT SOURCE: 1F 1000W QTH LAMP OUTPUT: 2.30E+3 lux

INSTRUMENTATION: #6400/Y PROCEDURE: LP-0036 Rev A

TEMPERATURE: 22.8 degrees C HUMIDITY: 21%

CALIBRATED BY: C Olson

Calibration Technician: Cathy Olson

Calibration Date: 3/28/2013 Certificate No: 303283329 Sales Order #: 142603

International Light Technologies, Inc.
10 Technology Drive, Peabody, MA 01960 USA
978-818-6180 / 978-818-6181 *fax*
intl-lighttech.com

ilac-MRA PJLA Calibration Accreditation# 96295 InternationalLight Gilway Technical Lamp

APPENDIX B

Light Measurement Observations

Project Name/Number: Treasury Metals / 13007~~4~~47
Location: Wabigoon Area - Thunder Lake
Measurement Description: (receptor, line, flare) Receptors
Mac Potter (Treasury Env. Tech.)

Name: R. Jean
Date: July 2/13
Time: 10:40-1:00 am

Area Description (field, forest, urban, rural, buildings): Field, Forest, Ruam
Ground Conditions (wet, snow, grass, pavement): sand, pavement, gravel (location dependant)
Cloud Cover and Precipitation (% cover, rain): Clear sky w some clouds. (<10%)
Moon: 21% visible (according to calendar - 365.com) Temp: 22°C
Other:

Obs. #	Photo #	Description	UTM E	UTM N	Lum 1 (cd/m²)	Lum 2 (cd/m²)	Lum 3 (cd/m²)	Illum (lux)
1		Goliath Site.	527869	5511437				0.0
Comment: ~~CENTER~~ CENTER OF PROPOSED PIT								
2		Goliath Site	528809	5511869				0.0
Comment: EAST OF PROPOSED PIT (Nursery Rd)								
3		GOLIATH SITE	528778	5510392				0.0
Comment: WYSTROM HOUSE ON TREE NURSERY RD.								
4		RECEPTOR ~~GOLIATH SITE~~	525596	5511688				0.0
Comment: FIELD TO EAST OF E. THUNDER LAKE RD (NOISE SITE #1)								
5		RECEPTOR	525787	5511885	4.0	POINTED AT LIGHT		2.4
Comment: ~~351~~ 249 E. THUNDER LAKE RD., NEXT TO STREET LIGHT ON RD.								
6		RECEPTOR	525996	5511975	3.0	UNDER LIGHT		0.21
Comment: NEAR THE HYDROSTATION (SW2), NEXT TO STREET LIGHT, NEAR LOCATION 1A MEASURED 14M FROM RD.								
7		RECEPTOR	526119	5512213				0.0
Comment: 352 E. THUNDER LAKE RD.								
8	1	RECEPTOR	526358	5512240	0.5	POINTED AT RESIDENCE	AT LE	0.0
Comment: ~~AT NEAR~~ LOCATION 2, LIGHT FROM RESIDENT, FRONT DOOR ~~PHOTO~~ LIGHT ON HOUSE [PHOTO 1]								
Comment:								
Comment:								

Light Measurement Observations

Project Name/Number: TREASURY METALS / 13004~~94~~747
Location: WABIGOON AREA - THUNDER LAKE
Measurement Description: (receptor, line, flare)

Name: R. JEAN
Date:
Time: 02/07/13 ~~10:40~~

Area Description (field, forest, urban, rural, buildings): RURAL / FOREST
Ground Conditions (wet, snow, grass, pavement):
Cloud Cover and Precipitation (% cover, rain): CLEAR W SOME CLOUDS
Moon:
Other: THUNDER LAKE RD. Temp:

→ Ø AMBIENT LIGHT UNLESS SOURCE SEEN

Obs. #	Photo #	Description	UTM E	UTM N	Lum 1 (cd/m²)	Lum 2 (cd/m²)	Lum 3 (cd/m²)	Illum (lux)
9	2	RECEPTOR	521586	5514620	15.20			
Comment: POINTED AT STREETLIGHT, 65 THUNDER LAKE RD.								
10	3	RECEPTOR	522692	5515466				4.4 STOP SIGN
Comment: ~~POINTED AT~~ TAKEN UNDER STREET LIGHT CORNER OF (STOP SIGN) NORTH SHORE + THUNDER LAKE RD.								
11	4	RECEPTOR	523837	5515874	0.22			~~0.3~~ 0.05
Comment: NORTH SIDE OF T-LAKE, POINTED AT RESIDENCE, MEASURED FROM EDGE OF RD. APPROX 12m FROM LIGHT SOURCE								
12	5, 6	RECEPTOR	523303	5514730	.19			0.05
Comment: JOHNSONS BEACH, LIGHT AT LOCATIONS (COTTAGERS)								
Comment:								
Comment:								
Comment:								
Comment:								
Comment:								
Comment:								

- APPROX 4-5 STREET LIGHTS ON THUNDER LAKE RD.
- ROUGHLY 0.0 LUX EVERYWHERE W/NO SOURCE.

Light Measurement Observations

Project Name/Number: Treasury Metals / 1300747
Location: Wabigoon Area / Thunder Lake.
Measurement Description: (receptor, line, flare) Receptors

Name: R. Jean / M. Potter (Treasury)
Date: July 3 / 13
Time: 10:40 - 12:00

Area Description (field, forest, urban, rural, buildings): Field, Forest, Rural
Ground Conditions (wet, snow, grass, pavement): sand, pavement, gravel
Cloud Cover and Precipitation (% cover, rain): Clear sky w some clouds.
Moon: 14% visible. (website) Temp: 19°C
Other: - NO STARS VISIBLE INITIALLY TRANSITIONING TO HAZY W NO MOON VISIBLE, T-STORM ROLLING IN (stars visible by 11:00pm)

Obs. #	Photo #	Description	UTM E	UTM N	Lum 1 (cd/m^2)	Lum 2 (cd/m^2)	Lum 3 (cd/m^2)	Illum (lux)
1		Goliath Site	527869	5511437				0.0
Comment: Center of Proposed Pit								
2		Goliath Site	528809	5511869				0.0
Comment: East of Proposed Pit (Nursery Rd)								
3		Goliath Site	528778	5510372				0.0 - 0.01
Comment: Nystrom House on Tree Nursery Rd.								
4		Receptor	525596	5511688				0.0 - 0.01
Comment: Field to East of E. Thunder Lake Rd. (Noise Site #1)								
5		Receptor	525787	5511885	4.3			2.7
Comment: 249 E. Thunder Lake Rd., next to Street Light on Rd. EDGE OF PAVEMENT + GRAVEL								
6		Receptor	525996	5511975	3.2			.21
Comment: Measured ~14m from Light on Road Near the Hydrostation (SW2), near location 1A								
7		Receptor	526119	5512213	0.03			0.0
Comment: 352 E. Thunder Lake Rd. → POINTED AT LIGHT HOUSE DOWN								
8		Receptor	526358	5512240				0.0
Comment: Noise Site 2 → LIGHT OFF AT FRONT OF RESIDENCE								
Comment:								
Comment:								

Light Measurement Observations

Project Name/Number: Treasury Metals / 1300747
Location: Wabigoon Area - Thunder Lake
Measurement Description: (receptor, line, flare) Receptor

Name: R. Jeer
Date: July 3/13
Time: 10:40 - 12:00

Area Description (field, forest, urban, rural, buildings): Rural / Forest
Ground Conditions (wet, snow, grass, pavement):
Cloud Cover and Precipitation (% cover, rain):
Moon: SEE SHEET 1
Temp:
Other:

Obs. #	Photo #	Description	UTM E	UTM N	Lum 1 (cd/m^2)	Lum 2 (cd/m^2)	Lum 3 (cd/m^2)	Illum (lux)
9		Receptor	521586	5514620	15.1			
Comment: 65 Thunder Lake Rd. ← EDGE OF ROAD PAVEMENT TO GRAVEL								
10		Receptor	522692	5515466				4.1
Comment: Taken at stop sign / corner of North Shore & Thunder Lake Rd.								
11		Receptor	523837	5515874	0.19			.02
Comment: N. side of Thunder Lake, pointed at residence / measured from Rd. ~12m from light source								
12		Receptor	525303	5514730	0.17			0.02
Comment: Johnsons Beach (by Noise site 3)								
Comment:								
Comment:								
Comment:								
Comment:								
Comment:								
Comment:								