Dub Architects Limited

10315 – 109 Street Edmonton, Alberta Canada T5J 1N3

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July 15, 2008

The City of Edmonton
Asset Management and Public Works
18th Floor, Century Place
9803 – 102A Avenue
Edmonton, Alberta
Canada T5J 3A3

Attn: Mr. Chris Ward, Branch Manager
Project Management & Construction

Dear Sir:

Re: Edmonton Gates

In response to issues and questions raised at our meeting on July 7th with yourself and Mr. Brandel Rock, please find the following information:

1. **Contract / Insurance / Bonding**

   I have reviewed the proposed contract documents and find them generally acceptable. Clause 3.3 would have to be removed and insurance would be limited to $1M. Specific project insurance would be provided during construction. Bonding by the individual contractors cannot be confirmed until the contractors are selected, but we would make bonding a condition in the bidding or negotiation process.

2. **Glass Type**

   The glass will be shatterproof, much like a car windshield. Glass panels will be manufactured from two individual glass layers laminated together to form a single unit. In the event of breakage no glass would fall to the ground. Heat strengthened (tempered) glass may or may not be required. The glass would be translucent to prevent reflective glare.

3. **Electrical Operating Costs**

   Initial estimates according to our electrical consultants suggest that power consumption will be unnecessary or minimal (see attached #1 by Hemisphere).

   "The Proposed method for illuminating the structure is through LED technology. LED has many benefits over conventional lighting applications such as minimal maintenance and low power consumption. With LED lighting, color shifting is also a major benefit, allowing lighting themes to be applied to the structure, such as simulating the Northern Lights.

   With reduced power consumption, the gateway can be designed as sustainable structure, alleviating the need for a utility connection and power metering. To achieve sustainability, solar panels will be introduced to the top of the structure which will charge battery cells during the day for the LED's to run off throughout the night. Early design suggests the gateways can be completely sustainable with the use of sun energy, however, if required, minimal power utility will be provided."

   If power utility is available, there is also the possibility that any surplus energy generated by the solar panels can be fed back into the electrical grid for power credit. However, fees involved may out weigh the benefits of contributing to the power grid. Preliminary estimates indicate that the annual energy production for an on-grid application would be 3,719 KW (see attachment #2 for the Photovoltaic Energy Model).

4. **Structure**

The steel structure on a concrete base will be approximately 21m tall and 35m wide, (see attachment #3 for a visual description) as described in the structural assessment.

"Briefly, the structure is a three dimensional truss system in the shaped of a skewed pyramid. One face is covered with glass panels, while the rest is open lattice truss work. A three dimensional computer model was created to assess the deformation, forces and vibrations of the structure" (see attached #4 for the structural engineer's recommendations for the structure).

The foundation would consist of a concrete base supported by concrete piles.

5. **Traffic safety**

A safety mound will be created at the base of the gateway to divert any out-of-control vehicles to the side (see attachment #3 for sectional description). This can be supplemented by a guard rail, in keeping with the design. The final design would be developed with advisement of the roadway safety authority. The concrete base would protect the steel structure from impact by vehicles at the ground level so that the steel structure stability is maintained.

6. **Cleaning and Maintenance**

We see no major requirement to clean the structure beyond the natural cleaning provided by rainwater. If annual cleaning is required, this will be achieved by means of power washing and a cherry-picker lift device at the side of the road. The cost would be approximately $3,000 per year. Repairs, such as the potential replacement of glass panels, will be done by means of a cherry – picker or scissor-lift device.

7. **Vandalism screen**

A security screen may have to be added to the bottom 3m of the open sides of the pyramid so as to prevent vandals or daredevils from climbing the backside of the structure. This would likely be made of tempered glass or plastic.

8. **Landscaping**

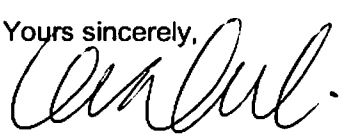
Forty 3m trees will be coniferous, and will require no cutting or maintenance. These trees are included in the budget figure. Surrounding grass would be cut with other median grass cutting.

9. **Delays**

We would appreciate if our offered cost of $750,000 for the east entry feature could be dealt with at the next City Council meeting, as costs may escalate with delays.

I trust the above is sufficient for your purposes at this time. If any additional information is required I am available at 780-428-7888 ext. 302.

Yours sincerely,



Gene Dub

Enclosures

October 18, 2007

Dub Architects Ltd.
10315 - 109 Street
Edmonton, AB T5J 1N3

Dear Sir:

Re: City of Edmonton
Gateway Proposal Assessment

The proposed method for illuminating the structure is through LED technology. LED has many benefits over conventional lighting applications such as minimal maintenance and low power consumption. With LED lighting, color shifting is also a major benefit, allowing lighting themes to be applied to the structure; such as simulating the Northern Lights.

With reduced power consumption, the gateway can be designed as a sustainable structure, alleviating the need for a utility connection and power metering. To achieve sustainability, Solar panels will be introduced to the top of the structure which will charge battery cells during the day for the LED's to run off throughout the night. Early design suggests the gateways can be completely sustainable with the use of sun energy, however, if required, minimal utility power will be provided.

Respectfully submitted,

Jason Geisler
Project Engineer

JMG/plb

HEMISPHERE 10950-119 Street • Edmonton, AB • Canada • T5H 3P5 • PH - 780-452-1800 • FAX-780-453 5205
www.hemisphere-eng.com

RETScreen® Solar Resource and System Load Calculation - Photovoltaic Project

Site Latitude and PV Array Orientation		Estimate	Notes/Range
Nearest location for weather data		Edmonton Int'l. A, AB	*See Weather Database*
Latitude of project location	°N	53.3	-90.0 to 90.0
PV array tracking mode	-	Fixed	
Slope of PV array	°	32.0	0.0 to 90.0
Azimuth of PV array	°	0.0	0.0 to 180.0

Monthly Inputs

Month	Fraction of month used (0 - 1)	Monthly average daily radiation on horizontal surface (kWh/m²/d)	Monthly average temperature (°C)	Monthly average daily radiation in plane of PV array (kWh/m²/d)	Monthly solar fraction (%)
January	1.00	1.15	-14.2	2.94	-
February	1.00	2.22	-10.8	4.36	-
March	1.00	3.61	-5.4	5.34	-
April	1.00	4.98	3.7	5.83	-
May	1.00	5.66	10.3	5.83	-
June	1.00	6.10	14.2	6.00	-
July	1.00	6.02	16.0	6.05	-
August	1.00	4.99	15.0	5.48	-
September	1.00	3.56	9.9	4.54	-
October	1.00	2.38	4.6	3.98	-
November	1.00	1.25	-5.7	2.77	-
December	1.00	0.84	-12.2	2.33	-

		Annual	Season of use
Solar radiation (horizontal)	MWh/m²	1.30	1.30
Solar radiation (tilted surface)	MWh/m²	1.69	1.69
Average temperature	°C	2.1	2.1

Load Characteristics		Estimate
Application type	-	On-grid

Return to Energy Model sheet

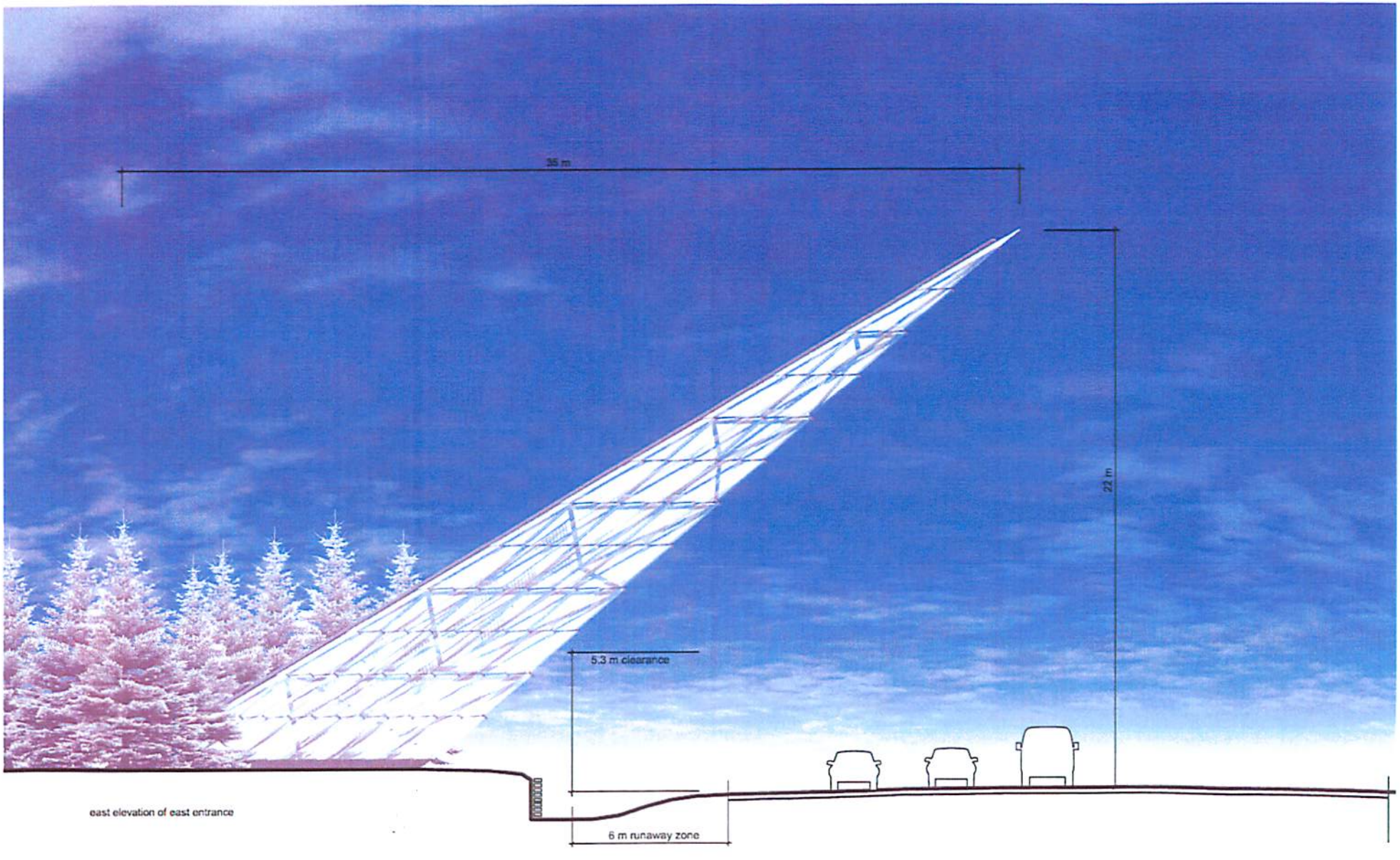
RETScreen® Energy Model - Photovoltaic Project

Training & Support

Site Conditions		Estimate	Notes/Range
Project name		Edmonton Entrance Feature	See Online Manual
Project location		Edmonton, AB	
Nearest location for weather data	-	Edmonton Int'l. A, AB	➡ Complete SR&SL sheet
Latitude of project location	°N	53.3	-90.0 to 90.0
Annual solar radiation (tilted surface)	MWh/m²	1.69	
Annual average temperature	°C	2.1	-20.0 to 30.0

System Characteristics		Estimate	Notes/Range
Application type	-	On-grid	
Grid type	-	Central-grid	
PV energy absorption rate	%	100.0%	
PV Array			
PV module type	-	poly-Si	
PV module manufacturer / model #		Day4 Energy 180W	See Product Database
Nominal PV module efficiency	%	13.9%	4.0% to 15.0%
NOCT	°C	45	40 to 55
PV temperature coefficient	% / °C	0.40%	0.10% to 0.50%
Miscellaneous PV array losses	%	5.0%	0.0% to 20.0%
Nominal PV array power	kWp	2.52	
PV array area	m²	18.1	
Power Conditioning			
Average inverter efficiency	%	92%	80% to 95%
Suggested inverter (DC to AC) capacity	kW (AC)	2.3	
Inverter capacity	kW (AC)	4.0	
Miscellaneous power conditioning losses	%	0%	0% to 10%

Annual Energy Production (12.00 months analysed)		Estimate	Notes/Range
Specific yield	kWh/m²	205.2	
Overall PV system efficiency	%	12.2%	
PV system capacity factor	%	16.8%	
Renewable energy collected	MWh	4.043	
Renewable energy delivered	MWh	3.719	
	kWh	3,719	
Excess RE available	MWh	0.000	
			Complete Cost Analysis sheet



east elevation of east entrance

PROTOSTATIX
ENGINEERING CONSULTANTS INC.

October 18, 2007

DUB ARCHITECTS LTD.
10315 – 109 Street
Edmonton, AB
T5J 1N3

Attention: Mr. Gene Dub

RE: GATEWAY PROPOSAL

As per your request, Protostatix Engineering Consultants has carried out an assessment of the structure under consideration. Briefly, the structure is a three dimensional truss system in the shape of a skewed pyramid. One face is covered with glass panels, while the rest is open lattice truss work. A three dimensional computer model was constructed to assess the deformations, forces and vibrations of the structure. The following are our recommendations for the steel skeleton.

A. THE STRUCTURE

1. The pyramid three edges (legs) will be formed of hollow square steel (HSS) shapes, approximately 305x305 mm in cross sections.

2. These three edges together with the foundations form three stable trusses.

3. The trusses will be filled in with horizontal elements and diagonals as shown in your model. The horizontal elements on the side that carries the glass panels will act as horizontal beams in addition to their function as truss elements. These beams will carry both the weight of the panels as well as the wind load on the glass panes. These horizontal elements will be formed also of HSS 305x305 sections.

4. For structural stability the horizontal elements on the other two faces of the pyramid will also be of the same size steel sections.

5. The diagonals and verticals in the trusses will be smaller sections HSS 152x152 sizes (152mm) square sections.

The computer model was analyzed on a preliminary basis under wind load and gravity load and the results show a total deflection at the tip of the pyramid of about 25 mm up or down under wind load. Similarly the deflection of the horizontal elements relative to the pyramid edges has been limited to 28 mm, which is well within the Canadian standards for a 14 m long element (L/500).

B. FOUNDATIONS

Because of the significant tilt of the structure over the road way, there will be significant overturning forces on the foundation. To hold the structure in place a 1.5 m thick concrete base (pile cap) is proposed under each of the pyramid legs. The relatively thick concrete is necessary to contain the anchor bolts required to hold the bases of the pyramid legs in place. Each pile cap will be supported on a group of piles. These piles are designed to resist the weight of the structure as well as the tensile forces transmitted from the tilt of the structure. A geotechnical assessment of the site is needed to determine the pile type and design parameters.

C. COST

The steel weight of proposed pyramid structure is estimated at 15,000 kg of welded HSS shapes. Our estimate for materials and erection of this structure is $130,000 plus or minus 10%. The foundation cost is estimated at $30,000.plus or minus 10%.

If you require further information do not hesitate to contact me.

Yours truly,

PROTOSTATIX ENGINEERING CONSULTANTS INC.

A.E. Elwi, Ph.D., P.Eng.
Principal