



Winnipeg Humane Society

BRENT BELLAMY

Design strives for LEED Gold in harsh climate

ARCHITECT Number Ten Architectural Group, Winnipeg **ASSOCIATE ARCHITECT** George Miers & Associates, Moraga, CA **LEED CONSULTANT** Thornley BKG Consultants, Victoria **STRUCTURAL ENGINEER** Crosier Kilgour & Partners, Winnipeg **CIVIL ENGINEER** Cochrane Engineering Ltd., Winnipeg **ELECTRICAL/ MECHANICAL ENGINEER** SMS Engineering Ltd., Winnipeg **COMMISSIONING AGENT** SMS Engineering Ltd., Winnipeg **CONSTRUCTION** Bird Construction, Winnipeg **LANDSCAPE ARCHITECT** Hilderman Thomas Frank Cram, Winnipeg **PHOTOS** Brent Bellamy, Winnipeg



Site plan

Built to handle more than 10,000 animals annually, this 4,000 sq.m shelter facility is located on a wooded lot that extends deep into the neighbouring community. The goal was to develop a building form and architectural character that would allow it to sit unobtrusively in its forest setting.

The design challenges were heightened by Winnipeg's extreme climate, which includes hot summers and the third coldest winters of any major city in the world.

The LEED framework also took on an extra level of complexity as it considered both the human interaction with the building, and more importantly, that of its animal residents. Throughout the integrated design process, the primary consideration for every discipline was the comfort and well being of the animals. Together with disease control and behaviour management, this concern drove many of the design decisions. Green

strategies were prioritized and evaluated for their cost effectiveness. The strategies implemented include:

SUSTAINABLE SITES

The site was chosen for its accessibility to transit and pedestrian traffic. To minimize disturbance of the natural habitat and the perimeter tree buffers, site development was limited to the south end of the property. Trees that had to be removed were felled and chipped on site into mulch for new shrub beds. The remaining treed areas were protected during construction.



AN ON-SITE RETENTION POND, CONSTRUCTED TO EASE THE BURDEN ON THE CITY STORM SEWER SYSTEM, WILL DEVELOP INTO AN ESTABLISHED WETLAND ENVIRONMENT [1]. THE MAIN ENTRY [2]. CONSIDERING THE NEED FOR BOTH HUMAN AND ANIMAL INTERACTION WITH THE BUILDING INTRODUCED AN EXTRA LEVEL OF DESIGN COMPLEXITY [3].

To reduce the burden on the city storm sewer system an on-site retention pond was constructed, including an overflow system composed of a site weir, overflow pipe, swales, and slow release catch basins that discharge into the municipal system only during major storm events.

Approximately 75% of pond edge is vegetated and over time will develop into an established wetland environment. In addition, a portion of the parking lot is permeable [gravel surfaced] to further reduce peak flows. Excavated clay, topsoil and existing gravel sub-base from access roads





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were salvaged, stockpiled and reused wherever possible in other areas of the site.

WATER CONSERVATION

Waterless urinals and low flow water closets are used in washroom areas. Roof drainage water will be collected in a 10,000 gallon underground storage tank to be recycled in the building as grey water for flushing

toilets. Overflow from the storage tank goes into the retention pond.

Animal shelters typically use large amounts of water including high pressure and high volume cleaning practices. The new facility will use low flow water pressure and environmentally responsible chemicals in the cleaning process. This fundamental shift will reduce water usage dramatically over time. The

design team did research and testing, to ensure that the most appropriate cleaning process would be implemented in the building.

ENERGY AND ATMOSPHERE

Based on energy modelling using the EE4 program for CBIP, the building's overall energy performance exceeds the Model National Energy Code by 49.9%.

A GEOTHERMAL SYSTEM OF HEAT PUMPS AND GROUNDWATER WELLS WITH SUPPLY AND RETURN FROM DEEP AQUIFERS SUPPLIES CENTRAL HEATING AND COOLING, SUPPLEMENTED BY HIGH EFFICIENCY BOILERS [4]. STRATEGIC PLACEMENT OF WINDOWS, CLERESTOREYS, SKYLIGHTS AND LIGHT TUBES DELIVERS NATURAL DAYLIGHT TO INTERIOR SPACES. THE HIGH PERFORMANCE WINDOWS ARE LOW 'E', ARGON FILLED, AND USE WARM EDGE SPACERS AND THERMAL BREAKS [5]. DURABLE PRODEMA PANELS AND LOCAL TYNDALL STONE MAKE UP THE EXTERIOR FINISH [6]. SOLAR SHADING DEVICES SUCH AS BUILDING MOUNTED LOUVERS AND ROOF OVERHANGS REDUCE OVERHEATING AND GLARE. MULTIPLE STAGGERED ROWS OF PLANTING PROVIDE ADDITIONAL SHADING AND WIND PROTECTION [7]. WOOD MATERIALS FOR THE DRAMATIC FRAME OF GLULAM AND DOUGLAS FIR ROOF DECKING CAME FROM CERTIFIED SUSTAINABLY-MANAGED FORESTS [8].



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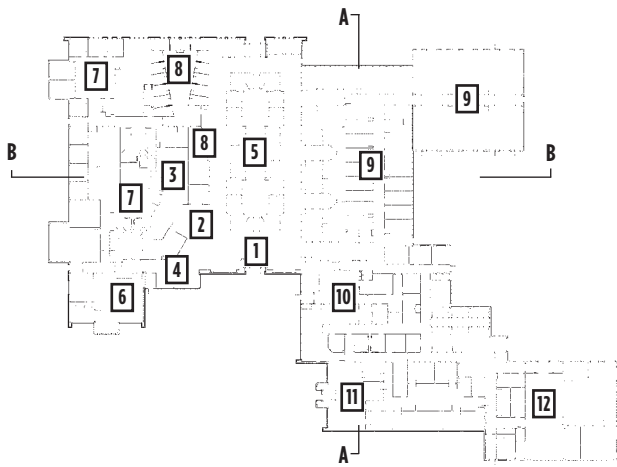
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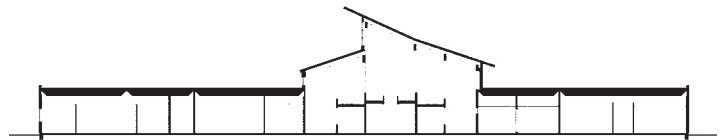


Floor plan

- | | | |
|-------------|--------------------|----------------------|
| 1 Vestibule | 5 Adoption Gallery | 9 Animal Holding |
| 2 Reception | 6 Classroom | 10 Animal Receiving |
| 3 Boutique | 7 Administration | 11 Veterinary Clinic |
| 4 Cafe | 8 Cat Habitat | 12 Shipping |



Section A-A



Section B-B

An earth energy [geothermal] system utilizing heat pumps and groundwater wells with supply and return from deep aquifers is being used for central heating and cooling. The geothermal system is supplemented by high efficiency boilers as the earth energy system cannot handle all of the building's heating loads.

The groundwater is used for direct cooling in two make-up air units serving the animal

holding areas. The heated groundwater is then circulated through the heat pumps and cooled before returning to the ground. This optimizes heat pump efficiency, and balances the heating and cooling energy, and protects the aquifer temperature from being negatively effected over time.

Due to the nature of the facility, 100% outside air is required for animal holding areas to control

odours and the risk of air borne disease. Heat recovery systems are being provided to recover heat from the exhaust air stream to temper the incoming air and reduce energy consumption. The heat pipe heat recovery systems feature separated air streams to prevent cross contamination of the outdoor air with exhaust.

To reduce lighting energy consumption, occupancy and daylight sensors are used.



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CLERESTORY DETAIL. SEE DRAWING AT RIGHT [9].

MATERIALS

Structure

Wood frame structure of Douglas fir roof deck, joists, glue laminated beams by Western Archib and exterior canopy from certified sustainably-managed forests

Exterior

Prodema panels and locally sourced Tyndall Stone; high performance aluminum-framed windows are low 'e', argon filled, and use warm edge spacers and thermal breaks

HVAC

Geothermal system by Ice Kube Systems is supplemented by high efficiency boilers; heat recovery systems recover heat from the exhaust air to temper incoming air; heat pipe heat recovery separates air streams to prevent cross contamination of the outdoor air with exhaust

Interior

Countertops from reclaimed solid surface materials and recyclable; carpet of 35% recycled content, resilient flooring, millwork made from 100% pre-consumer recycled wood fibre and no urea formaldehyde; strawboard, made from locally sourced heat straw, used for decorative wall panelling throughout the public areas; occupancy and daylight sensors; Armstrong acoustic ceiling tiles

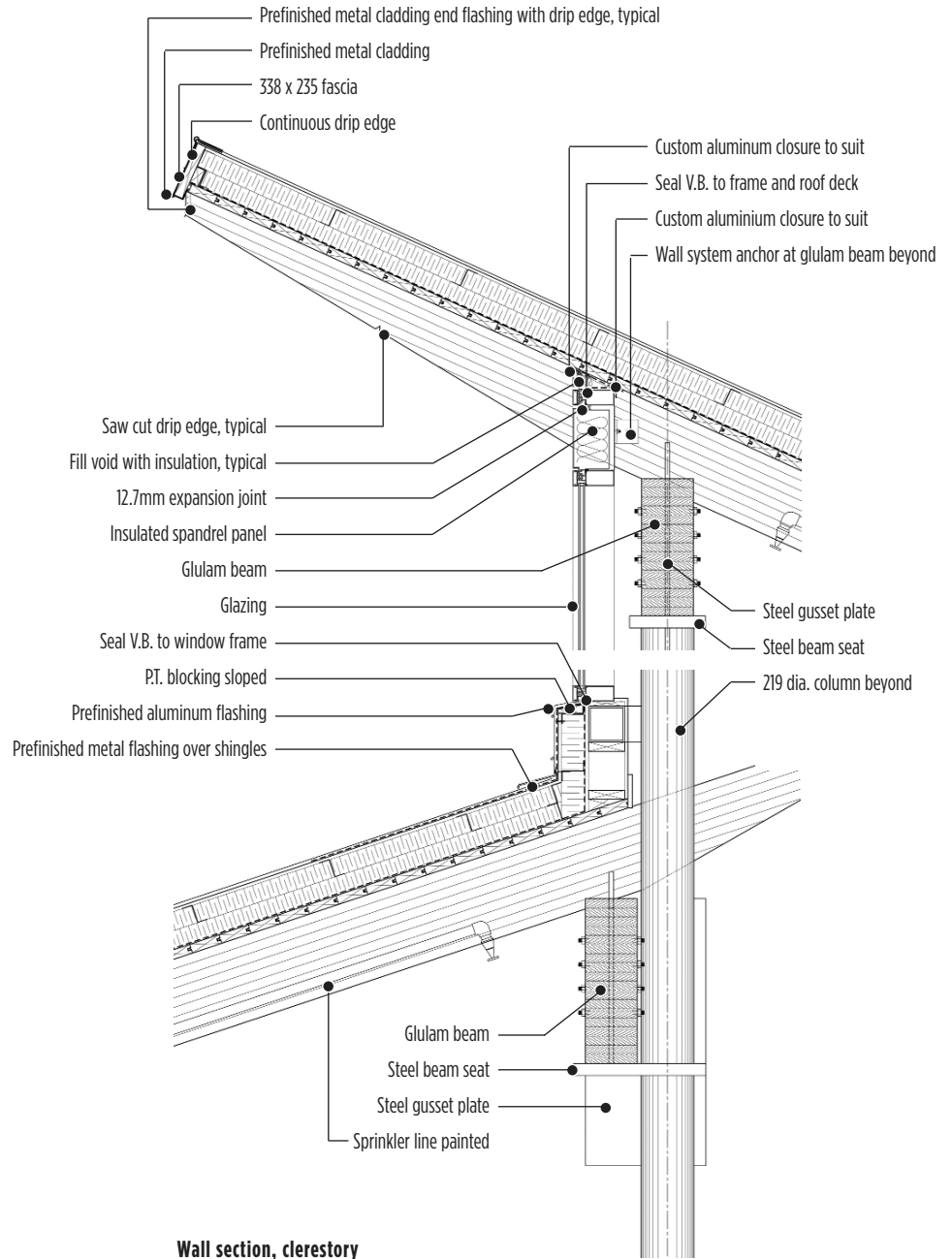
MATERIALS AND RESOURCES

Local and regional materials such as Tyndall stone, locally produced concrete pavers and strawboard are integral to a comprehensive green materials strategy.

INDOOR ENVIRONMENTAL QUALITY

Operable windows are used in all office areas for natural ventilation.

Natural daylight to interior spaces occupied by humans and animals is maximized by strategic placement of windows, clerestories,



Wall section, clerestory

skylights and light tubes. High performance windows including low 'e', argon filled, warm edge spacers and thermal breaks were used.

To reduce overheating and glare, there is extensive use of solar shading devices such as building mounted louvers and roof overhangs. Planting occurs in multiple staggered rows to provide additional shading, maximum wind protection, visual screening, and microclimate creation.

Overall, the project illustrates how integrated design works both spatially and envi-

ronmentally. Interior and exterior spaces flow into one another, with varying levels of protection and privacy while the environmental systems articulate the symbiosis between building and landscape. ◀

BRENT BELLAMY M.ARCH, MRAIC, LEED AP WAS THE LEAD DESIGNER FOR NUMBER TEN ARCHITECTURAL GROUP AND DOUG HANNA MAA, MRAIC, LEED AP WAS THE PARTNER IN CHARGE ON THE WINNIPEG HUMANE SOCIETY.