



## Green School Construction and Renovation

**Board Received:** October 24, 2016

**Review Date:** November 2020

### Policy Statement:

The Grand Erie District School Board is committed to the development of green and healthy education facilities that contribute to a sustainable future. All school construction, renovation projects and related contract documents will consider the Board's Green School Construction and Renovation Guidelines which are intended to achieve green and healthy facilities.

### Accountability:

1. Frequency of Reports – As needed
2. Criteria for Success – All construction projects meet or exceed Green Construction objectives

### Procedures:

The following Grand Erie District School Board Green Building and Renovation Guidelines provide an overview of the targets established for developing greener building projects. The Green Building and Renovation Guidelines illustrate the Board's intent, and commitment to green and healthy education facilities.

All school construction and renovation projects will consider Green School Construction and Renovation Guidelines as set out in this policy. The guidelines are formatted for use as a checklist for quick reference. Final Major Construction Project Reports (FT1) will include a section outlining Green School Construction features included in the completed project. The Grand Erie District School Board will recognize school green achievements with special commemoration at the official opening or celebration.

Six categories have been developed to provide flexibility in achieving green and healthy facilities:

- 1.0 Land Use Development
- 2.0 Water Efficiency
- 3.0 Energy Performance
- 4.0 Resource Management
- 5.0 Air Quality
- 6.0 Innovation in School Design

A list of Action Items for Contract Documents for achieving Green Building standards is attached as Appendix 'A'. It provides a list of criteria for the consulting team.

## 1.0 Land Use Development

### 1.1 Site Selection

#### Site Acquisition Criteria:

- Avoid ecologically sensitive land:
  - Carolinian forests and wetlands
  - Natural habitats of endangered species
- Avoid prime farmland
- Avoid sites with a minimum development density
- Target Brownfield Development and/or Damaged Site (Habitat) Restoration when it is a viable option.
- Locate site near public transit when possible to encourage alternative transportation.

### 1.2 Site Design

- Stormwater management (controlling rate and quantity of flow)
  - Cisterns and drywells are encouraged
- Limit site disturbance during construction
- Eliminate light trespass from the site
  - Photocell and timer control of lighting
- Encourage stacking of floors

### 1.3 Erosion & Sedimentation Control

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse
- Prevent sedimentation of storm sewer or receiving streams
- Prevent polluting the air with dust and particulate

### 1.4 Stormwater Management (SWM)

- Include SWM plan in Contract Documents (Specifications).
- Implement a stormwater management plan demonstrating that the peak discharge rate and quantity do not exceed predevelopment rates.
- Provide pervious surface instead of impervious:  
*Water that can dissipate into the earth creates less demand on infrastructure systems.*
- Examples of pervious surfacing:
  - Porous paving
  - Grid paving filled with aggregate or vegetation
  - Unit pavers spaced apart
  - Granular surfacing

### 1.5 Minimize Parking Capacity

- Number of parking spaces shall not exceed local zoning minimum requirements +10%
- Preferred parking for carpools for 5% of parking spaces.  
*Show calculations on drawings.*

### 1.6 Bicycle Storage

- Bicycle storage facilities/ parking should be located in a protected area.  
*To reduce the load of automobile use and promote healthy communities GEDSB encourages the use of alternative transportation.*

### 1.7 Open Green Space

- Exceed the local zoning requirement for open green space where possible.  
*Show calculation on site plan.*
- Stack floors to reduce the building footprint  
*Introduce basement or second floor to reduce building footprint area.*

### 1.8 Heat Island Effect

- Provide heat reduction through highly reflective roof for minimum of 90% of roof area.
- Consider other factors for heat reduction such as:
  - Provide trees to shade parking lot
  - Shade east, south and west building facades with deciduous trees
- Consider utilization of "Living Roof" to reduce heat island effect and energy consumption/demand for HVAC systems
- Ensure design incorporates continuous vapour barrier membrane system to reduce infiltration of air/water.

### 1.9 Building Envelope

- Minimize environmental impact on building.
  - Consider at least one of the following:
    - Provide shading devices on south/west exposures to minimize heat gain such as shade devices, louvers, roof overhangs
    - Exceed O.B.C. (Ontario Building Code ) thermal-resistance requirements
    - Specify soy-based spray-on insulation
    - Provide insulated roof panels of light-weight concrete
    - Provide Energy Star rated (reflective) roofing
    - Caulk all interior and exterior joints to "pick proof", to prevent air infiltration & leakage
  - Encourage effective use of window design:
    - Use Low E, argon-filled windows
    - Use daylighting techniques or products to achieve even, diffused, natural light to the building's interior using windows that disperse light, light shelves and skylights.
    - Provide operable windows for individual environmental control

### 1.10 Light Pollution

- Eliminate light trespass to neighbouring sites and night time glare

### 1.11 Landscaping

- Provide perennial planting species that are native to the region and microclimate.
- Provide environmentally-friendly land use:
  - Maintain wetlands
  - Retain existing special features
  - Use drought-tolerant plant material
- Provide sustainable vegetation and planting beds, where and when appropriate
- Provide adequate shade for playground occupants.

### 1.12 Joint Use of Facilities

- Make the school a more integrated part of the community  
*Community Use of Schools Program*

## 2.0 Water

### 2.1 Irrigation

- No potable water use for irrigation
- Consider use of grey water cisterns to irrigate planting beds where feasible

### 2.2 Water Use Reduction

- Use low-flow, high-efficiency plumbing fixtures
- Consider use of rain or grey water for:
  - Toilet flushing
  - Cooling tower make up water
- Plumbing fixtures
  - Water closets: 4.8 GPF Pressure-assist
  - Urinals: 1.0 GPF
  - Lavatories & Wash Fountains: 0.5 GPM aerators with infrared sensors
  - Clothes Washers: 7.5 gallons/ft<sup>3</sup>/cycle
  - Dishwashers: 1.0 gallons/rack
- Consider the installation of "water-less" urinals to reduce water consumption.

### 2.3 Water Filling Stations

- Consider the installation of water filling stations to discourage use of bottled water

## 3.0 Energy

### 3.1 Energy Performance

- Comply with ASHRAE 90.1-2004 or MNECB
- Consider the most energy efficient lighting (i.e LED) where possible
- Use enhanced energy-saving technologies, such as but not limited to:
  - Heat recovery from exhaust air
  - Occupancy sensors in all rooms to control lighting and radiation valves
  - Condensing boilers
  - Pre-heat system
  - Variable speed pumping for heating boilers
  - Photocell control of lighting in areas that are daylight intensive
  - Multiple switching for classrooms
    - Four switches per classroom:
      - Outside row x 2
      - Inside two rows x 2
- Consider Green Roofs to support reduced energy consumption and extend the life cycle of roof membrane.

### 3.2 Daylighting

- Design the building to maximize interior day-lighting:
  - Strategize Building Orientation
  - High Performance Glazing
  - Automatic Photocell-based Controls

### 3.3 On-site Renewable Energy

- Consideration for Renewable Energy Sources :
  - Solar Photovoltaics
  - Wind Turbine(s)
  - Geothermal
- 3.4 Ozone-Friendly Equipment
  - Zero-use of Hydro chlorofluorocarbon (HCFC) based refrigerants for equipment
- 3.5 Smart-Building Automation
  - Utilize sensors for better control of lights, windows, security
- 3.6 Commissioning
  - Use third party commissioning for optimizing building systems operations
- 4.0 Resource Management
  - 4.1 Storage & Collection of Recyclables
    - Locate area for storage and collection of recyclable materials compliant with local recycling program.
  - 4.2 Building Reuse
    - Encourage building re-use:
      - Maintain 50% of existing building's structure and shell
      - Reuse of Existing Materials when possible
  - 4.3 Construction Waste Management
    - Implement a waste management plan that includes recycling/salvaging of at least 50% of construction waste  
*Include Waste Management Schedules in specifications.*
  - 4.4 Recycled Content
    - Use materials with recycled content of a minimum 10% of the total value of materials.  
*Include in Sustainable Product Requirements selection in specifications.*
  - 4.5 Regional Materials
    - Use a minimum of 20% of building materials or products that are extracted, processed and manufactured within 80s km of the project site  
*Include in Sustainable Product Requirements selection in specifications.*
  - 4.6 Durable Materials
    - Walls to be constructed of durable materials with fewer joints  
Specific materials include:
      - Loadbearing concrete
      - Polished Concrete
      - Vinyl Quartz Tile
  - 4.7 Wood Materials
    - Consider use of certified wood (i.e Forestry Stewardship Council Certified)
- 5.0 Air Quality
  - 5.1 Carbon Dioxide Monitoring

- Control fresh air into building via carbon dioxide sensors, in areas of varying occupancy.
- Increase Natural Ventilation

#### 5.2 Indoor Air Quality (IAQ) during Construction

- Implement an Indoor Air Quality Management Plan  
*Include IAQ Management Schedules in specifications.*

Strategy examples:

- Schedule construction activities to minimize absorption of VOCs by porous materials
- Protect all building materials from moisture damage
- Isolate clean or occupied areas from areas under construction
- Implement cleaning procedures to ensure that the facility is kept tidy during construction
- Cover return air ducts during construction
- Include testing allowance for air infiltration, vapour barrier & insulation value
- Replace HVAC filters upon completion of projects

#### 5.3 Low-Emitting Volatile Organic Compounds (VOC) Materials

- Low VOC materials
  - Paints and Coating
  - Adhesives and Sealants
  - Carpets
- Consider use of green wall.
- Conduct a pre-occupancy building flush out.  
*It is recommended that a flush-out period be part of the Air Quality Management Plan.*

#### 5.4 Mould-resistant materials

- Specify products and furnishings that are mould resistant

### 6.0 Innovation in School Design

#### 6.1 Building Envelope

- Performance Review including testing for air infiltration, vapour barrier and insulation value.  
*[Include in testing and inspection allowance]*

#### 6.2 Building Systems & Components - Best Practices

- Exposed ceiling - reduces amount of materials used by 50%
- Provide ceiling radiation panels
- Acoustic deck - used on all exposed ceilings
- Consider Green Roof systems to improve energy efficiency.

#### 6.3 Building Efficiency

- Provide calculations for green design targets
  - Corridor/ classroom floor area ratio

#### 6.4 Health Awareness

- Planning and educating on common health issues in buildings such as mould, air particulate, allergens

6.5 Procedures and Practice

- Preventative practise measures:
  - inspections during fabrication process such as:
    - Precast Panels

6.6 Maintenance

- Low-impact cleaning practices
  - Use of chemical-free, water-reduction floor scrubbers

## Appendix A

## LIST OF ACTION ITEMS FOR CONTRACT DOCUMENTS

## Architectural

- Outdoor bicycle storage to be provided
- Provide recycling area
- Erosion & Sedimentation Control Plan must be specified
- Specify Construction Waste Management Plan:
  - divert a minimum of waste from landfill sites
  - recycle/salvage at least 50% of construction waste
- 10% of materials by value shall be recycled
- 20% of materials extracted, processed and manufactured within 800 km of project site
- Specify an IAQ management plan
- Specify a building flush-out prior to occupancy
- Specify low VOC paints, coatings, adhesives, sealants and carpets

## Structural

- Specify as much recycled content as possible in concrete, steel etc.

## HVAC

- Specify 400-series refrigerants for all equipment
- Specify an IAQ management plan

## Plumbing

- Storm Water Management Plan to be implemented
- Provide low-flow plumbing fixtures, for example:
  - Water closets: 4.8 GPF Pressure-assist
  - Urinals: 1.0 GPF
  - Lavatories & Wash Fountains: 0.5 GPM aerators with infrared sensors
- Consider the installation of "water-less" urinals to reduce water consumption

## Electrical

- All exterior luminaires shall be full cut-off

## Landscaping

- Provide perennial planting species that are native to the region and microclimate