

September 6, 2019
Project: 6461

Township of Cavan Monaghan

988 County Rd. 10,
Millbrook, ON
L0A 1G0

Attention: **Yvette Hurley**
Chief Administrative Officer

Electrical Site Condition Assessment Report

Project: **Millbrook Arena**
4 Needler's Lane
Millbrook, ON
L0A 1G0

Review Date: Tuesday August 27th, 2019 at 2:00 pm
Reviewed by: David Millen, P.Eng. Electrical

1. General Comments

- 1.1 A visual review of the electrical systems at the Millbrook Arena was conducted for inspection of equipment conditional and standards of good practice.
- 1.2 Photographs were taken as part of the site review.

2. Utility Service

- 2.1 The facility is powered by two separate utility services. The 120/240V 200A service that supplies the front of the building (Front Service) and the 600V/347V 400A service that supplies the rear of the building and ice plant (Rear Service).
- 2.2 A set of three pole mounted 75kVA pole mounted transformers supply the Rear Service used primarily for the ice plant. The transformers are configured as a solidly grounded 4 wire 347/600V supply at 225kVA.
 - 2.2.1 The transformers and pole assembly appear in decent condition.
 - 2.2.2 The secondary conductors run overhead individually from the service pole to the arena wall where they transition to core flex and run down the exterior wall and into the rear electrical area and the 600V main disconnect.



2.3 A single pole mounted 50kVA pole mounted transformers supply the Front Service used to supply front of the building, including hall, canteen changerooms and washrooms.

2.3.1 The transformer appears in good condition. The transformer also supplies the street lighting to the west.

2.3.2 The secondary conductors run overhead individually from the service pole to a wall mounted cable termination rack. The cables enter a raceway via a weather-head and drop to the utility meter on the exterior of the building.



2.4 Gauge and material of the entry cables was not determined.



3. Rear Service

- 3.1 The Rear Service main disconnect is a federal pioneer 347/600V rated at 400A.
- 3.2 Note that although the 400A service is rated for 333kVA at 80% de-rating the available power is limited to the 225kVA by the transformer bank
- 3.3 The Main disconnect supplies the utility meter cabinet.
- 3.4 The Meter cabinet supplies a 600V 400A 4 pole BEL splitter.
- 3.5 This splitter supplies the Refrigeration Plant (200A square D fused disconnect), a heater (30A Commander fused disconnect) and a panel board (100A federal pioneer fused disconnect).
- 3.6 The Refrigeration plant was not reviewed as part of this report.
- 3.7 The heater is located in the refrigeration plant room and appears to be in good shape.
- 3.8 The Panel board, a federal pioneer NHDP 225A 3 phase 4 pole model, supplies the ice surface lighting, de-humidifiers and exhaust fans.
- 3.9 The 600V equipment appears to be all original and is all very dated with signs of many years of wear. The splitter is completely covered in rust caused by the high humidity in the area where the equipment is installed.



- 3.10 A 100A 120/240V panel is installed at the rear of the facility that is supplied from the Front Service for exit lights, lighting, receptacles, small fans and the timeclock.
- 3.11 It is recommended to conduct an inspection and preventative maintenance of the interior.

4. Front Service

- 4.1 The Front Service main disconnect is rated 120/240V at 200A complete with 200A fuses and is located in the front electrical/mechanical room which is also the location of 4 furnaces and the incoming water service.
- 4.2 The Main disconnect supplies a BEL 600V 3 pole 225A splitter.
- 4.3 This splitter supplies the first-floor panel board, and disconnects for the second-floor panel (125A breaker), office panel (50A breaker) and second floor A/C (30A fused disconnect) that is off and locked shut.
- 4.4 The first-floor panel, Federal Pioneer NBLP-32-3L, supplies power and lighting to the changerooms, offices, washrooms and lobby on the first floor as well as the furnaces and the canteen sub panel (50A 2P). There is a 2P 50A breaker for the Dental Bus outlet.
- 4.5 The Second Floor Panel supplies the power and lighting to the hall, warm up kitchen, laundry room, and washrooms on the second floor.
- 4.6 The office panel was not accessible for review.

- 4.7 The canteen panel, (Square D 16 CCT) supplies the receptacles and equipment in the canteen (refrigerator, coffee makers, popcorn machine, cash register)
- 4.8 The 240V equipment appears to be all original but is in good condition.



5. Lighting, Emergency Lighting and Egress Signage

5.1 The ice surface lighting is 400W 347V Metal halide.



5.2 It is recommended to replace the existing metal halide fixtures with LED for improved control, instant on capability and longevity.

5.3 Most of the existing 120V lighting fixtures are tubular fluorescent fixtures. Some incandescent fixtures have been upgraded to CFL lamps.



5.4 It is recommended to replace the existing fluorescent fixtures with LED, not just replace the lamps with LED equivalents.

5.5 Existing emergency lights and battery packs appear at end of life. They should be replaced with new battery packs and LED lamps.

- 5.6 Existing exit signs should be replaced with self-powered green running man signs consistent with current OBC requirements.

6. Fire Alarm system

- 6.1 The existing fire alarm system is a single zone Notifier CSGL-2000. While it appears to be in good working order it is outdated and should be considered for upgrade.



- 6.2 The fire alarm devices appear to be original and should be considered for replacement.
- 6.3 The notification devices are bells. Consider adding strobe coverage for improved notification.

7. Summary

- 7.1 The electrical systems (Power, lighting, emergency lighting) installed at the Millbrook Arena are mostly original, >30 years old. The electrical systems are presently in good working condition.
- 7.2 If the facility will continue to operate as an arena, in the short term (5 years) the electrical systems are acceptable and should only require ongoing maintenance to maintain.

- 7.3 In the long term (> 5 years) some changes should be done to improve maintenance costs and efficiency. The following values are rough estimates and do not account for any other changes required by structural and mechanical divisions or any change of use for the facility.
- 7.3.1 Replace 600V splitter: \$1200.00
- 7.3.2 Replace linear fluorescent fixtures with LED fixtures
 - Replace Metal Halide with High Bay LED
 - Replace lighting controls (add occupancy control, dimmers etc.):
 - Replace emergency lights with LED and Exits with Running Man LED: \$90,000
- 7.4 The existing fire alarm system is adequate but doesn't provide visual notification (strobes).
- 7.4.1 Replace fire alarm system: \$60,000

Prepared by:



David Millen, P.Eng.