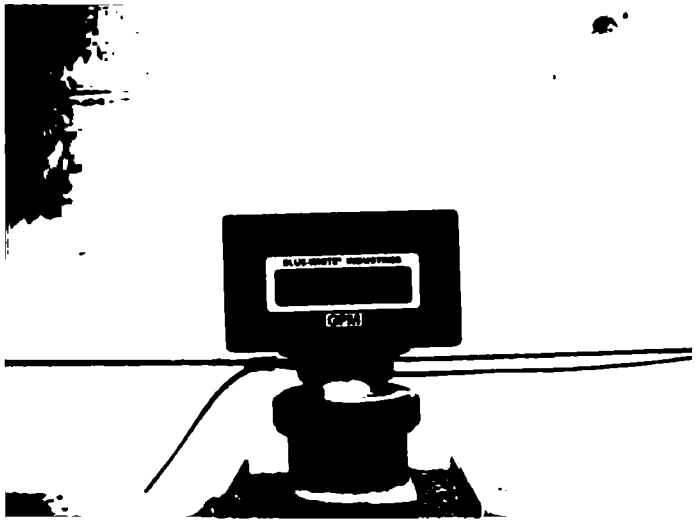
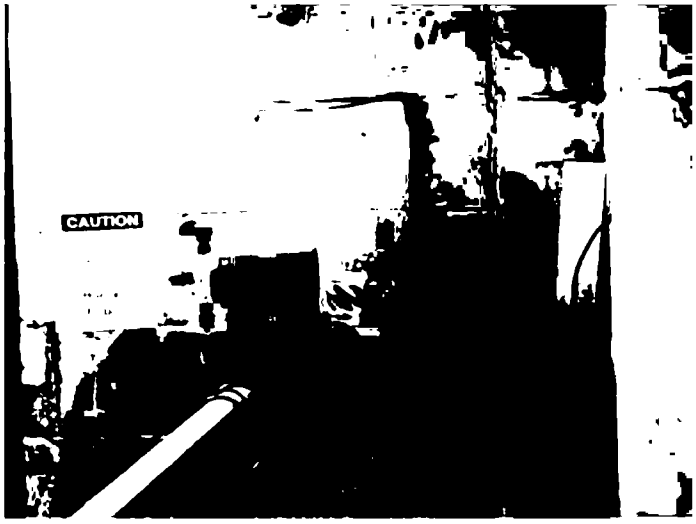
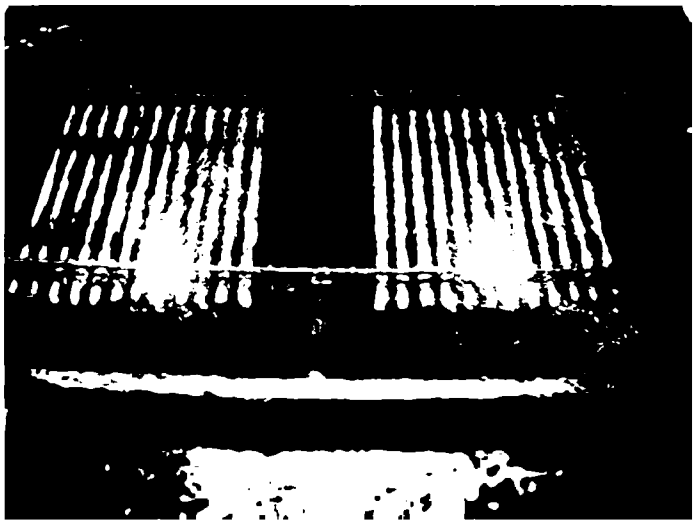


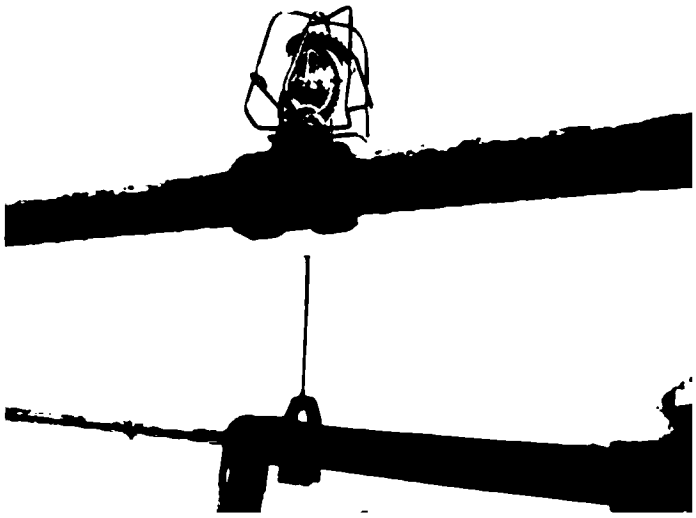
Pool Pump Room - Pool filtration system flow meter.



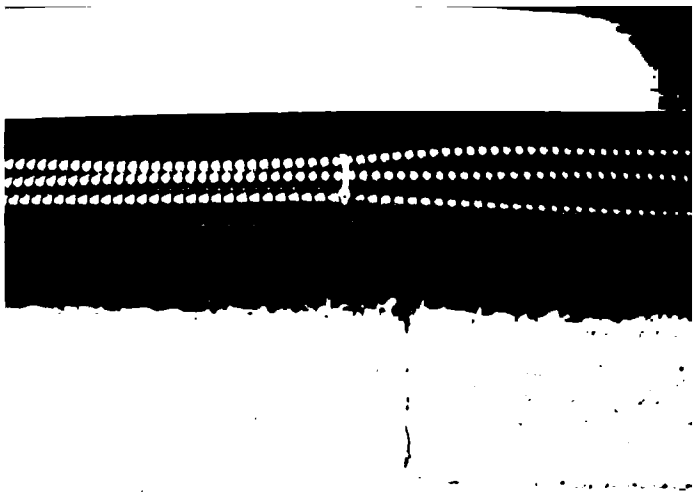
Pool Pump Room - Pool chemical dosing pumps.



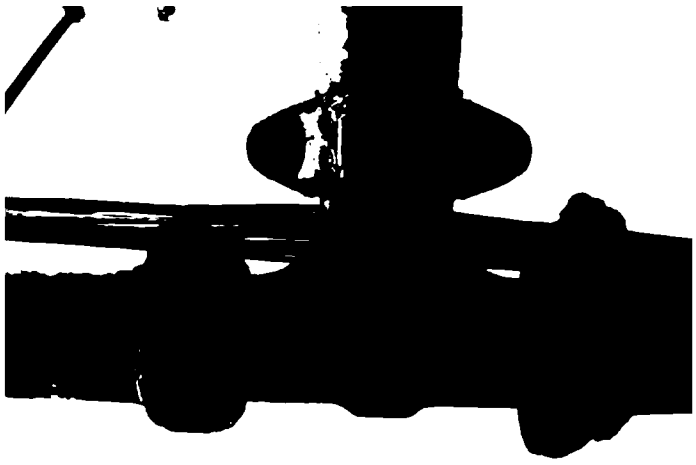
Pool Pump Room – Perlite filtration tank with racks.



Pool Pump Room – Typical black iron sprinkler pipe and head.



Pool Pump Room - Surface-mounted galvanized flex conduit secured with cable ties.

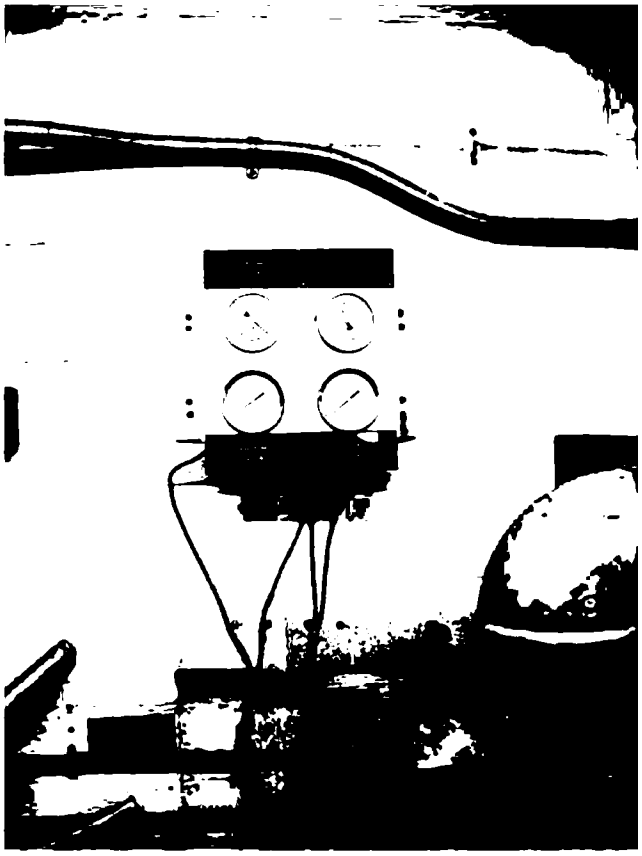


Pool Pump Room - Typical sprinkler system Victaulic fitting.

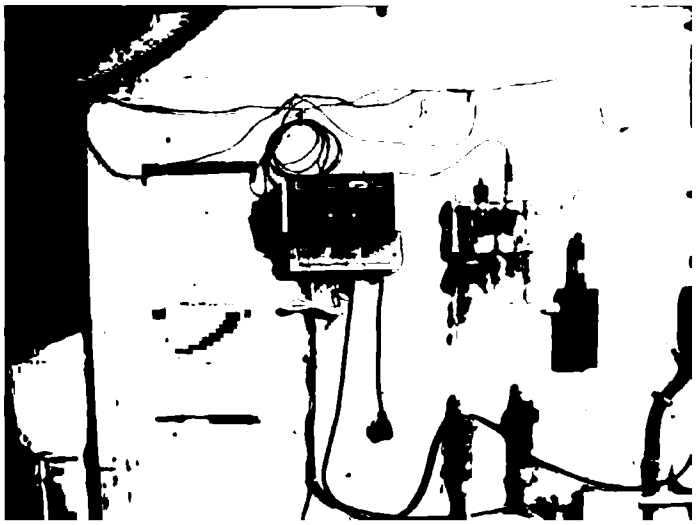
Pool City-water Make-up

Pool Pump Room – Access to perlite filtration tank.

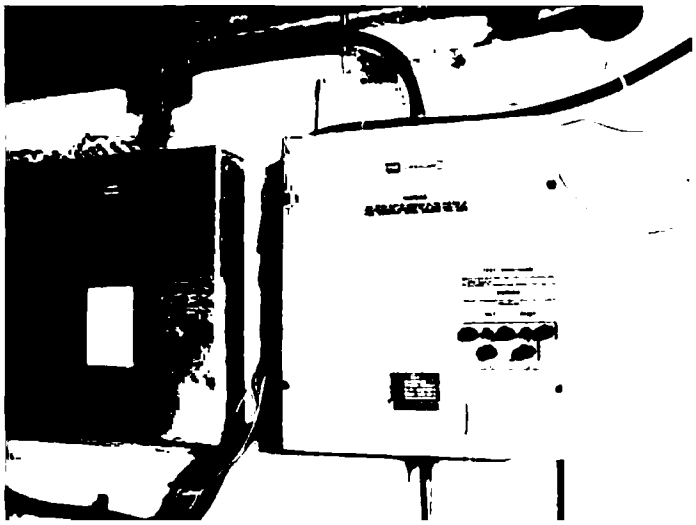
Pool Pump Room - Miscellaneous electrical panels and controllers. Several no longer in use.



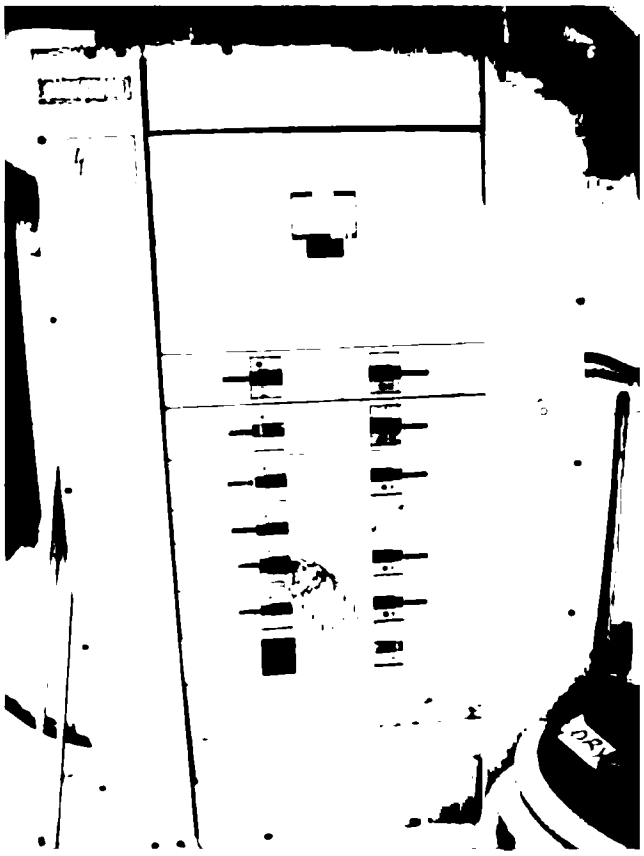
Pool Pump Room - Main Pool Pump Pressure Gages top.
Vac. Pump bottom.



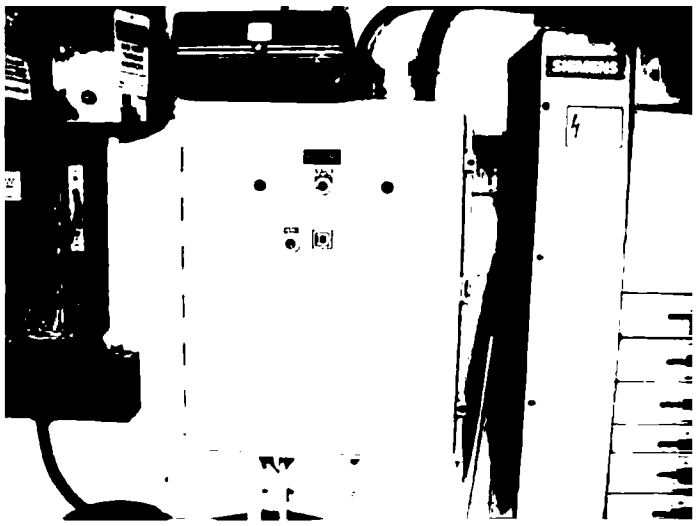
Pool Pump Room - Pool chemical dosing system.



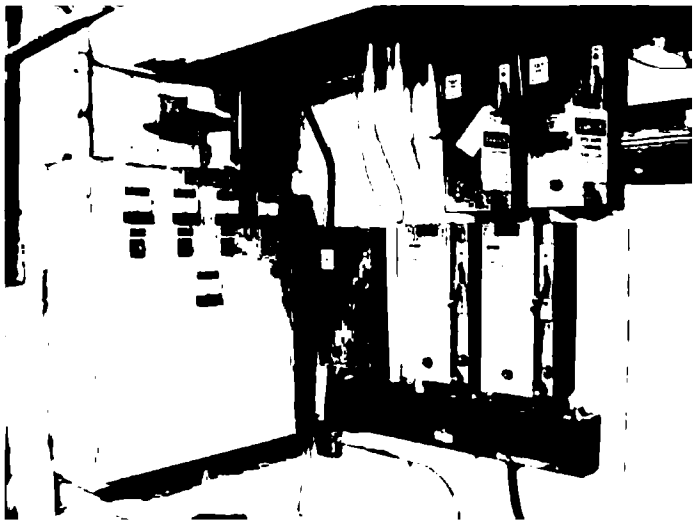
Pool Pump Room - GFI for pool equipment



Pool Pump Room – Distribution panel for pool heaters, pumps and controllers.



Pool Pump Room – Contactors for main filtration pump and teach pool



Pool Pump Room - Abandoned South Wall Equipment

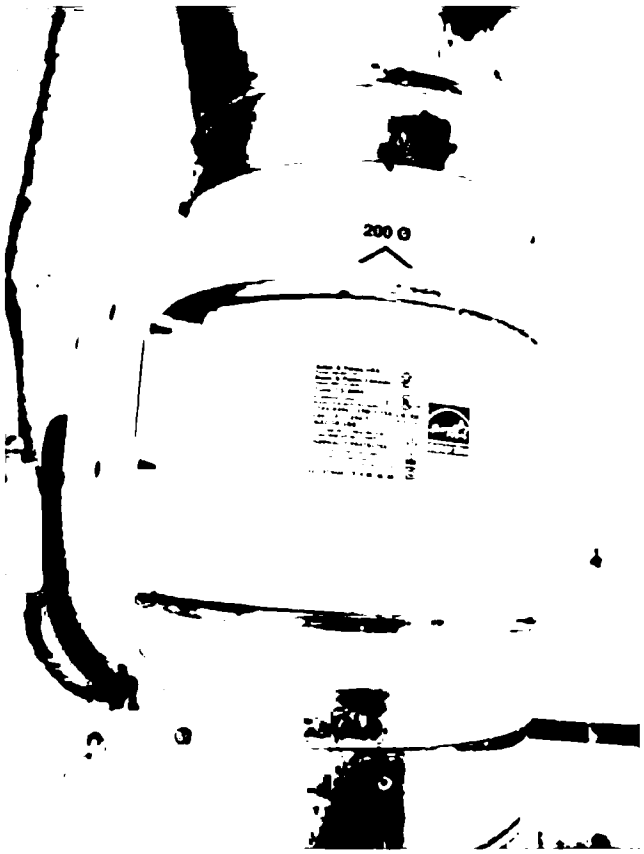
Pool Pump Room - Abandoned Equipment

Pool Chemical Room - Emergency eyewash.

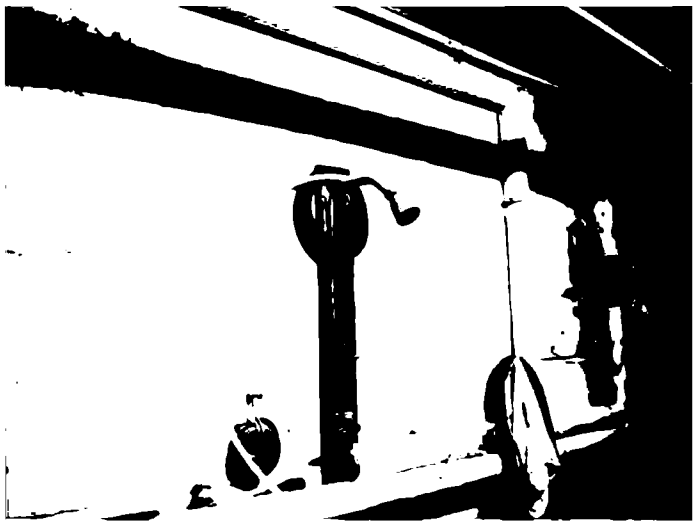
Pool Chemical Room - Sodium Hypochlorite barrels and Perlite hopper.

Pool Chemical Room - Floor wet by A/C condensate discharged to floor.

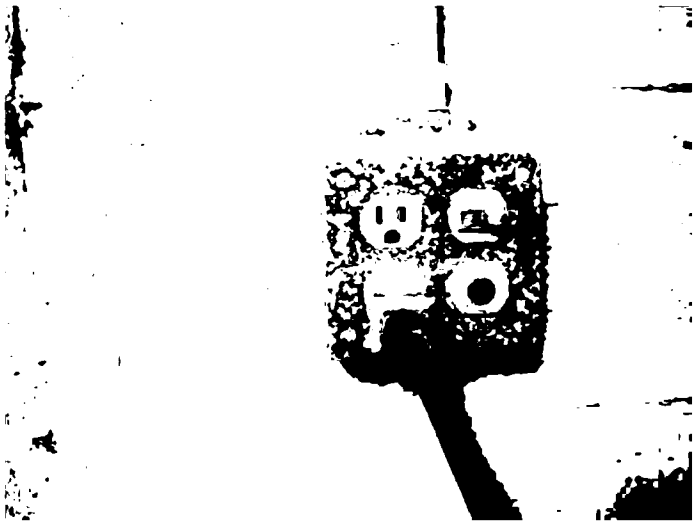
Pool Chemical Room – Perlite and Calcium Chloride storage.



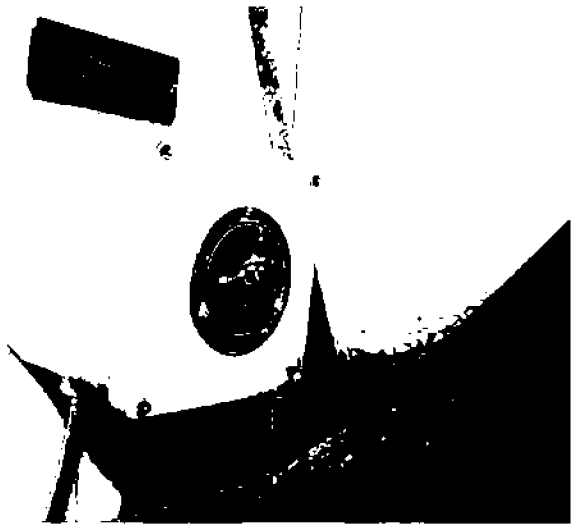
Pool Chemical Room - Exhaust fan.



Pool Chemical Room - Emergency shower.



Pool Chemical Room - Surface-mounted outlet with heavy corrosion.



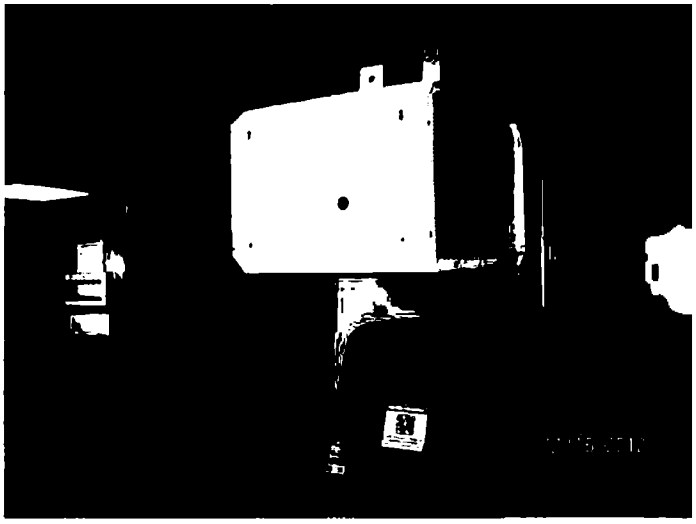
Pool Chemical Room - Perlite feeder timer.

Work Shed Access Hallway - Typical services congestion.

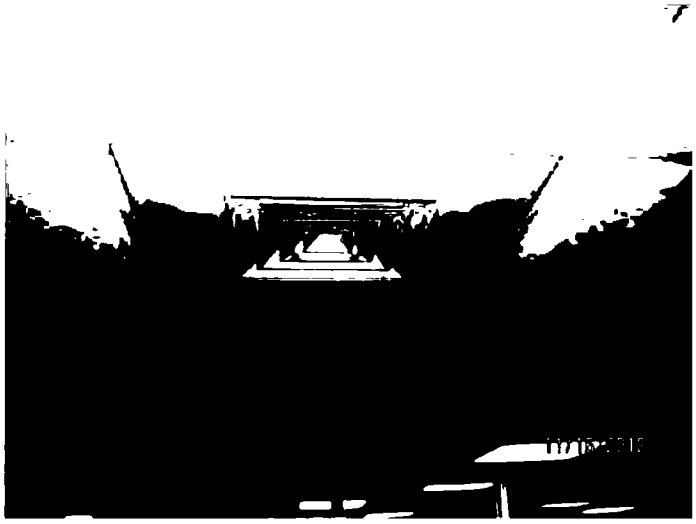
Finance Manager's Office - Exposed A/C supply duct with high-sidewall grilles.

Pool Mezzanine File Storage Room.

Tim's/Reception - Typical sprinkler head.

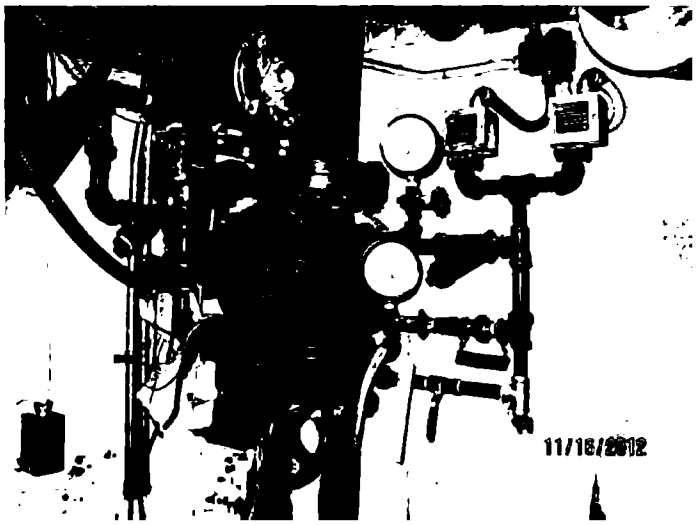


Tim's/Reception - Typical blower heater.



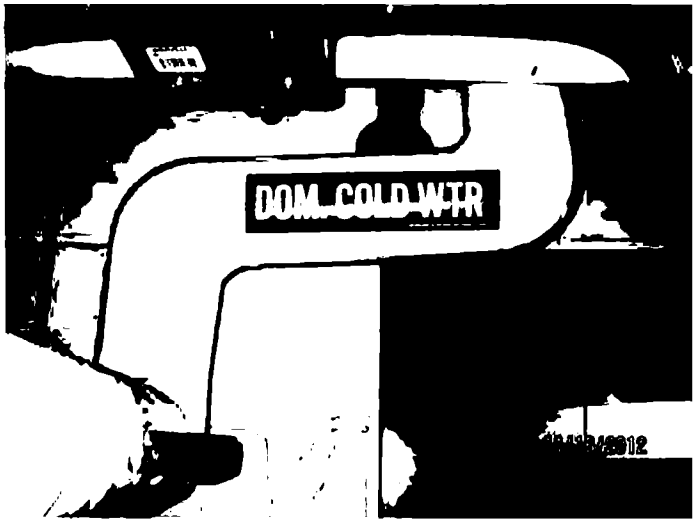
Tim's/Reception - Typical supply diffuser.

Boiler Room - City water meter and isolation valve.



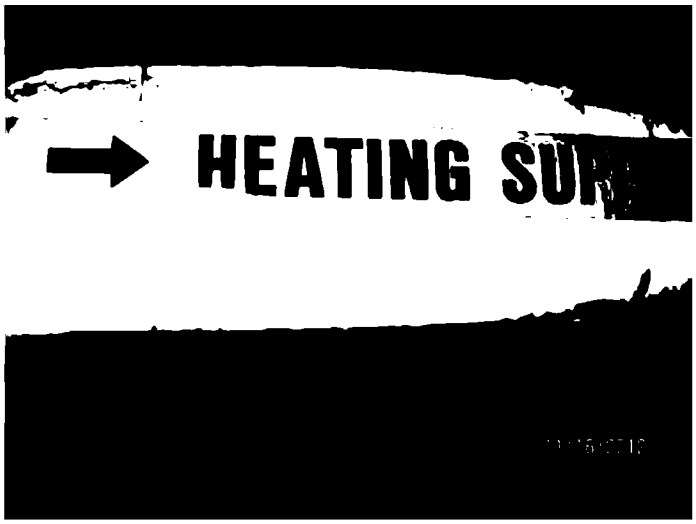
Boiler Room - Sprinkler system components.?

Boiler Room - Domestic Hot Water Heaters.

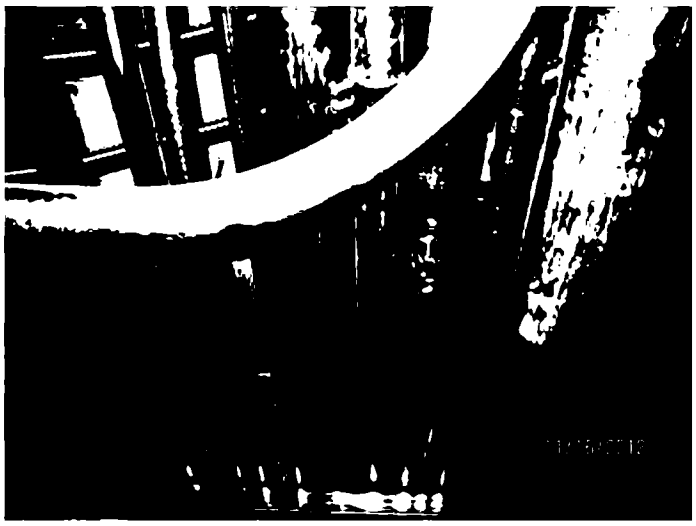


Boiler Room - Typical domestic cold water piping.

Boiler Room - Typical heating water return piping.



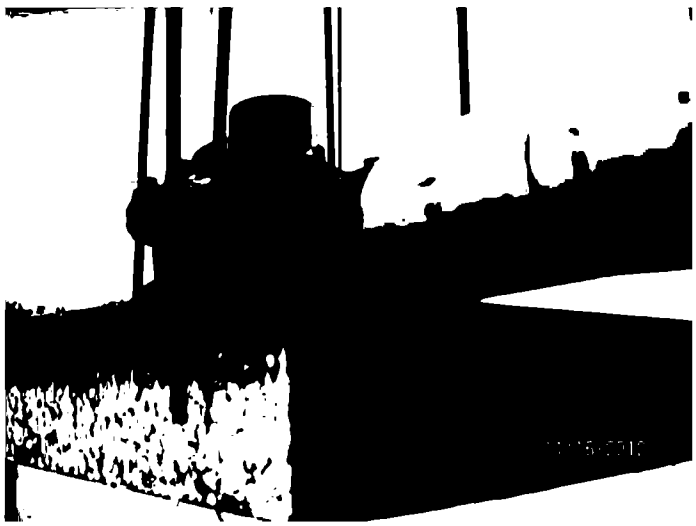
Boiler Room - Typical heating water supply piping.



Boiler Room - Typical galvanized electrical conduit.

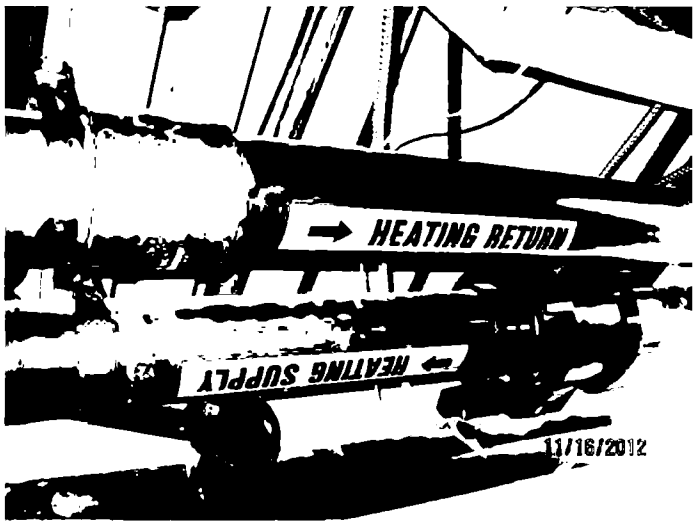
Boiler Room – Boiler Room Exhaust

Boiler Room – Canvas connection to boiler room exhaust.



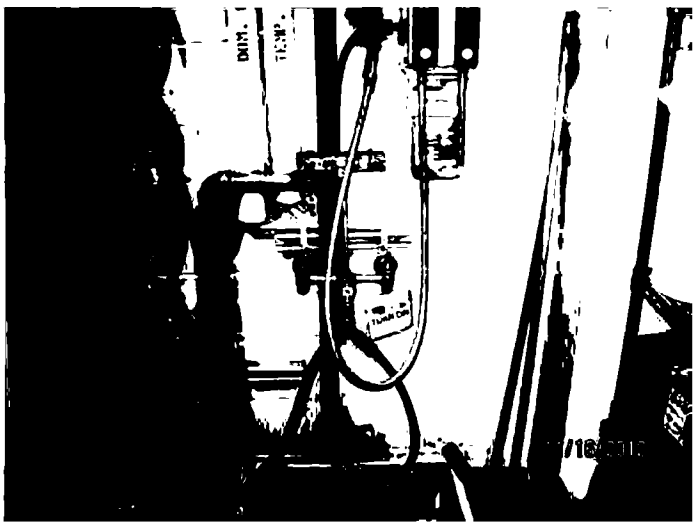
Boiler Room – Abandoned water meter and drip pan.

Boiler Room – Domestic hot water heat exchanger gages.

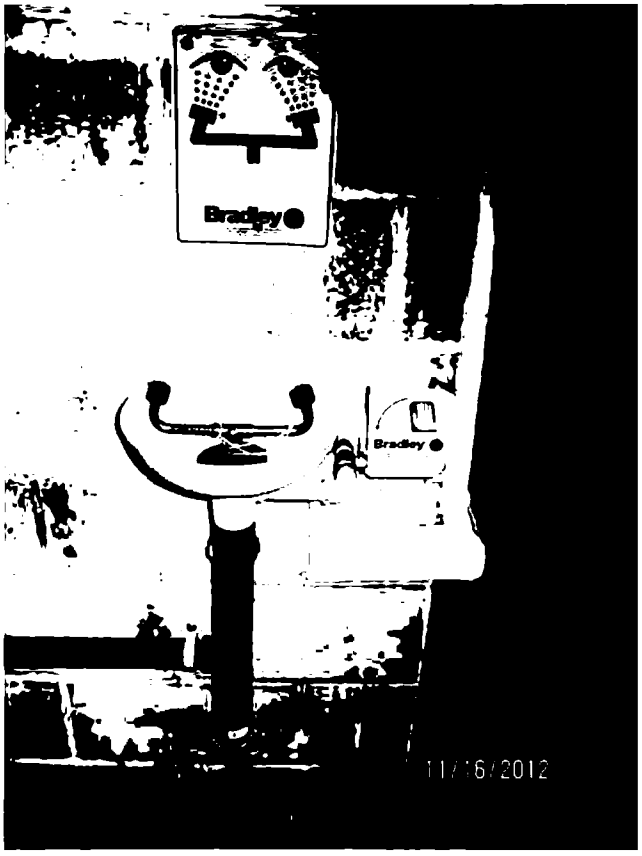


Boiler Room - Pool water to domestic water preheat piping. Labeling conflict.

Laundry Room – Drier exhaust system with clean-out hatch taped shut.



Laundry Room – Janitor's sink.



Air Handler Room - Emergency Eyewash.

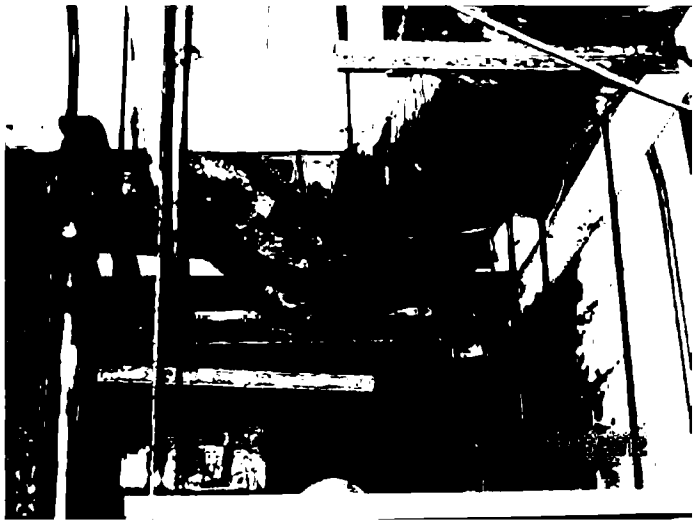
Air Handler Room - Outside air Louver.

Air Handler Room – Aluminum Pool Deck OAU return duct with corrosion and holes.

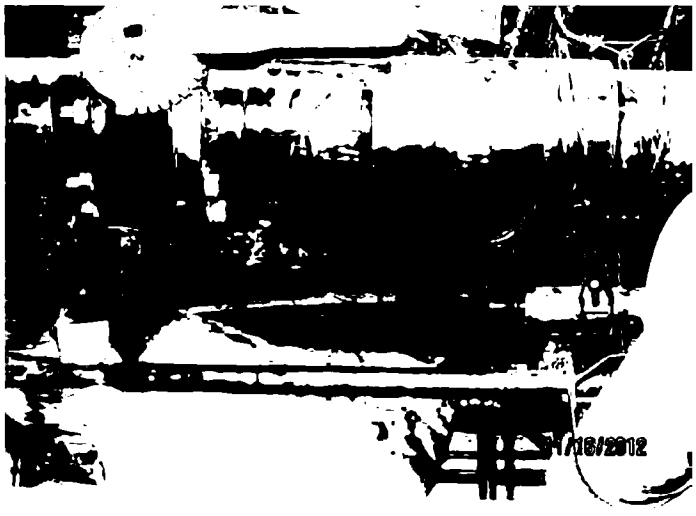
Air Handler Room - Typical heating water piping.

Air Handler Room – Pool Deck OAU return duct condensate drain . Piping to drain missing.

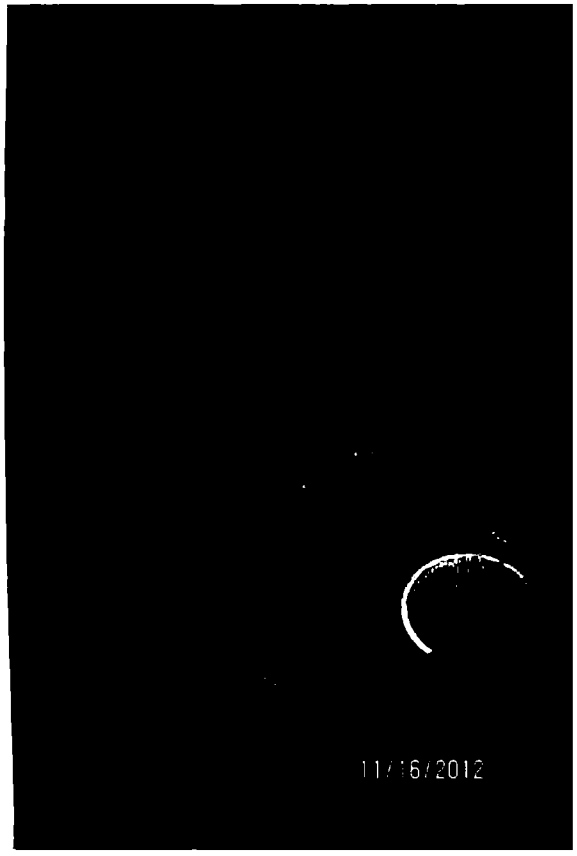
Air Handler Room – Fitness Center Outside Air with Main Changing Rooms Outside Air Supply Above.



Air Handler Room - Members Changing Rooms Return



Air Handler Room – Outside Air Supply Duct to main changing rooms.

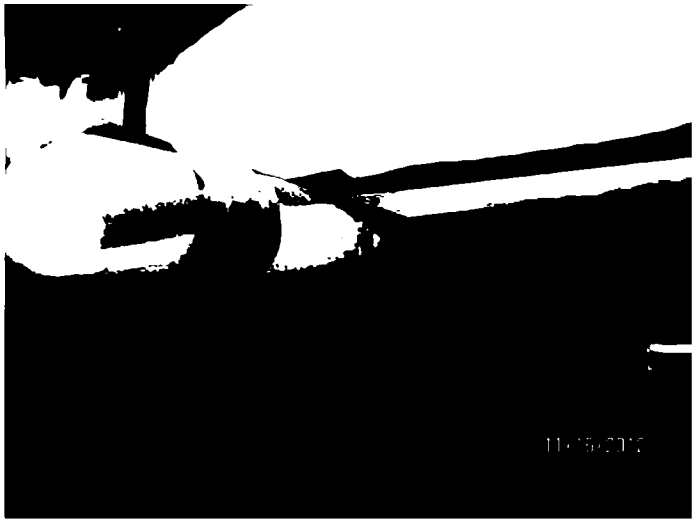


Air Handler Room

Air Handler Room - Duct behind Pool Deck OAU Abandoned.

Air Handler Room - Hot tube dosing pump

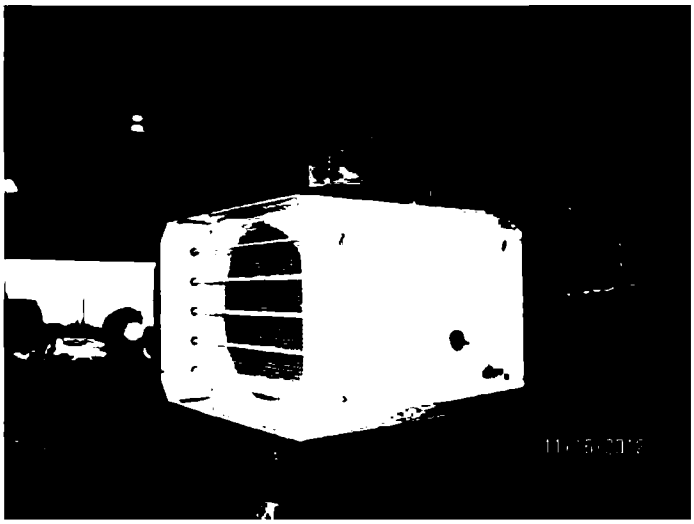
Air Handler Room - Pool Deck OAU Access Hatch taped shut.



Air Handler Room - Temporary vibration isolation.

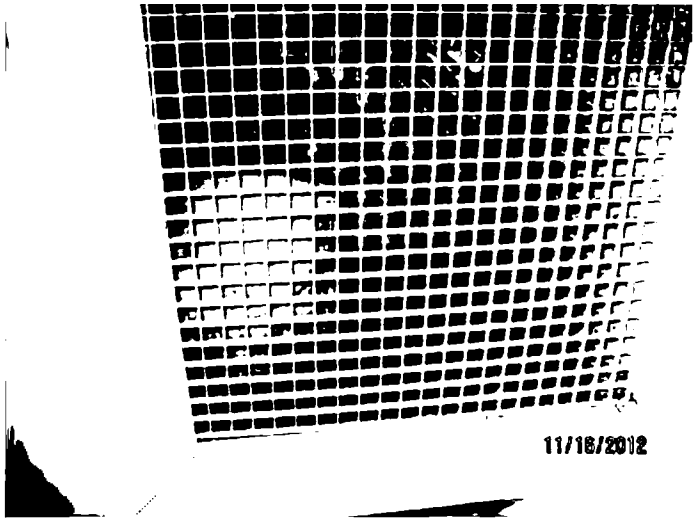
Hot Tub - Typical supply and exhaust terminals.

Lower Fitness - Early vintage drinking fountain - member requested.

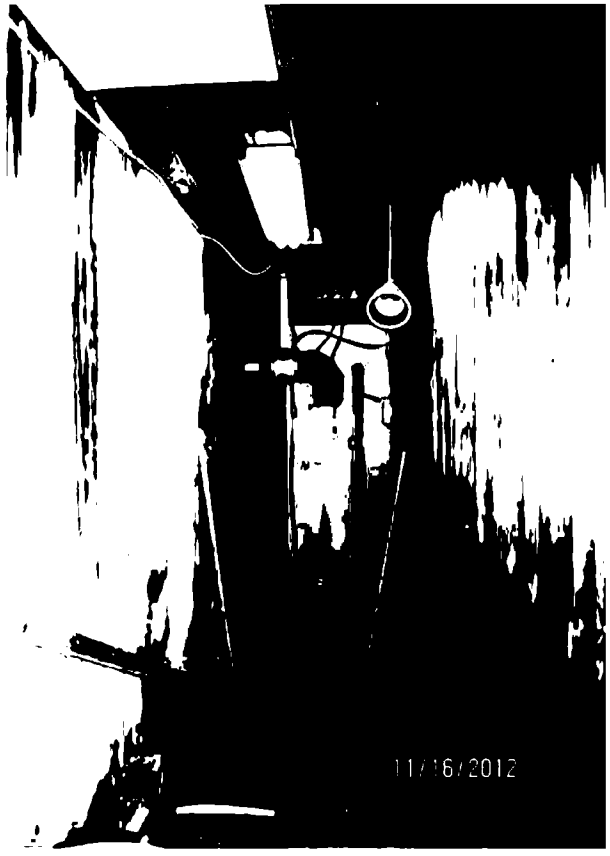


Lower Fitness - Vestibule heater.

Lower Fitness - Typical Supply diffuser (square) and Outside Air diffuser(linear).



Lower Fitness - Ceiling access to condensate prone P-trap from Tim's above.



Male Main Changing Room Storage - Tim's Freezer condenser unit and exhaust fan.

Male Main Changing Room Closet - Water damage to exterior wall. Cause unknown.

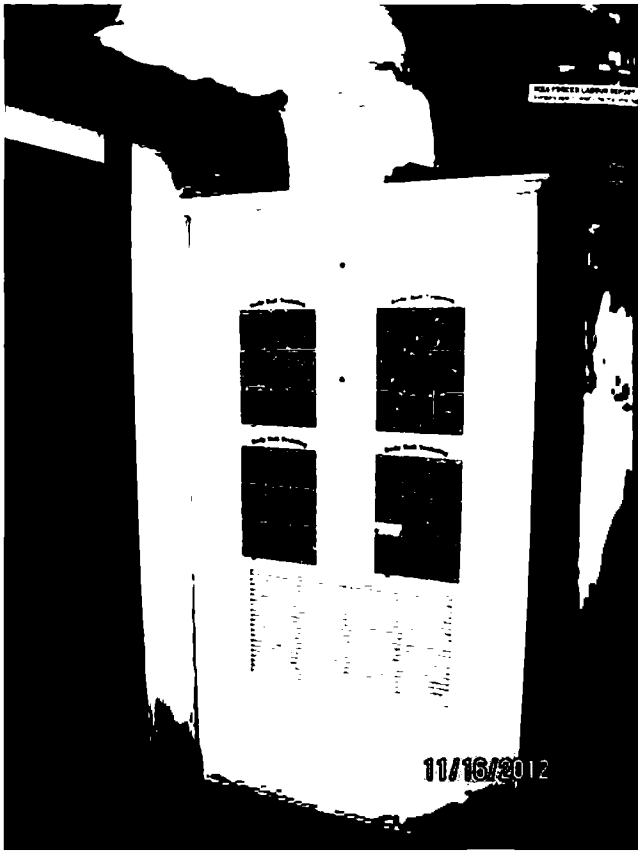
Male Main Changing Room Storage - Condensate discharged to floor.

Male Main Changing Room - Typical exhaust grille and pendant sprinkler head.

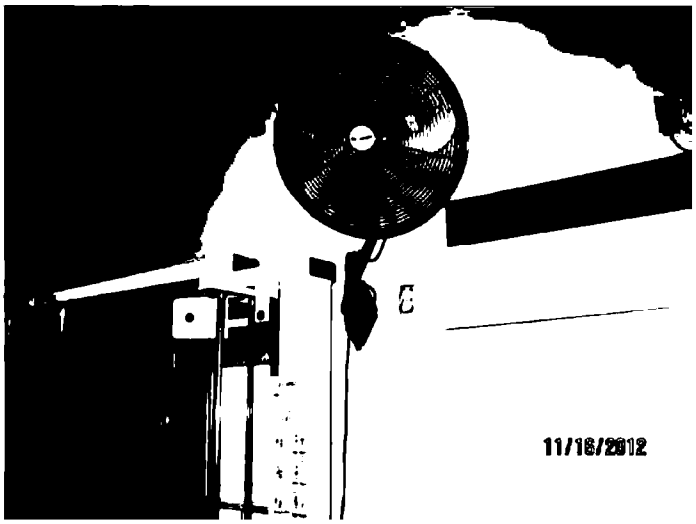
Male main Changing Room - Piping to Siamese connection.

Upper Fitness - A/C(galvanized) and outside air (white) ducts

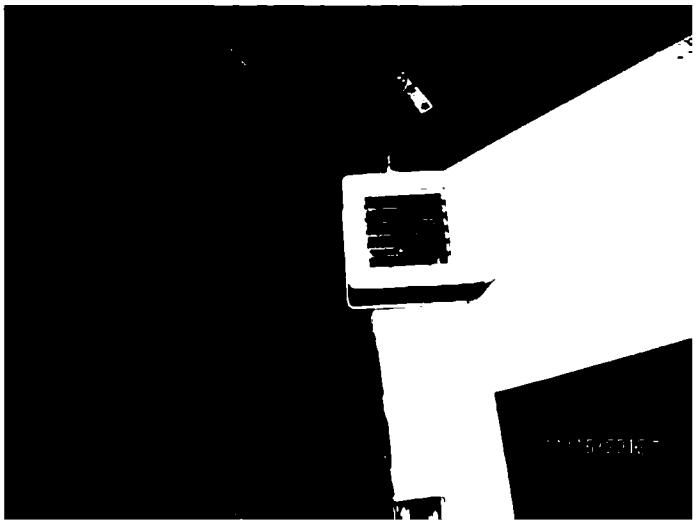
Upper Fitness - Water damage caused by condensate drip from sidewall diffuser above.



Upper Fitness - City water fed cabinet AHU.

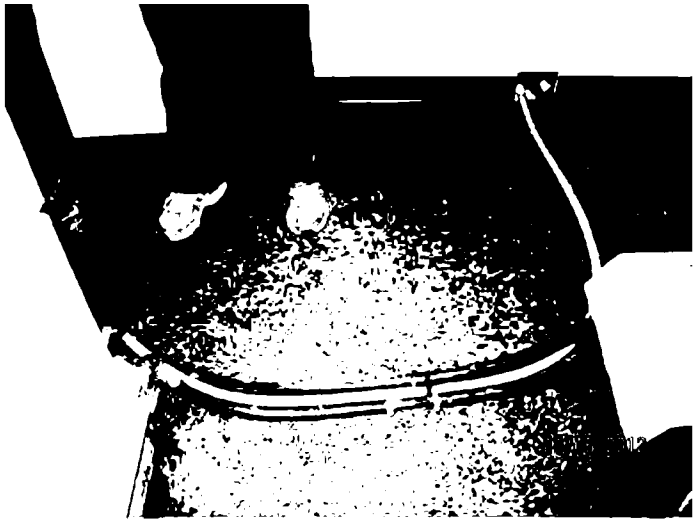


Upper Fitness - Typical wall fan.

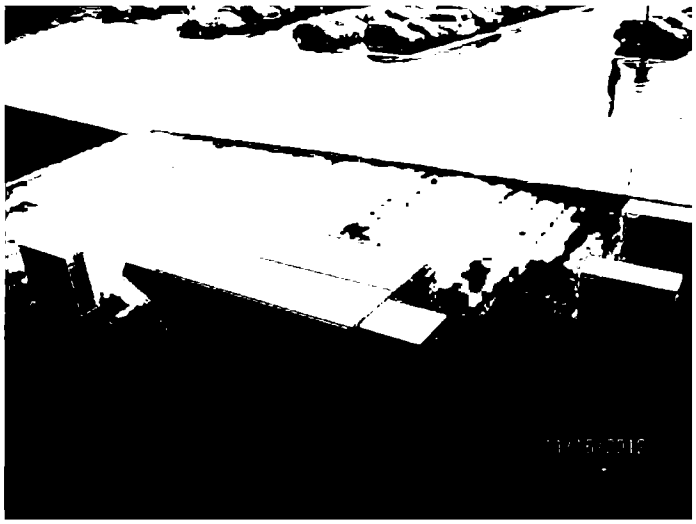


Upper Fitness - Typical blower heater.

Squash Court - Outside air duct and diffusers.



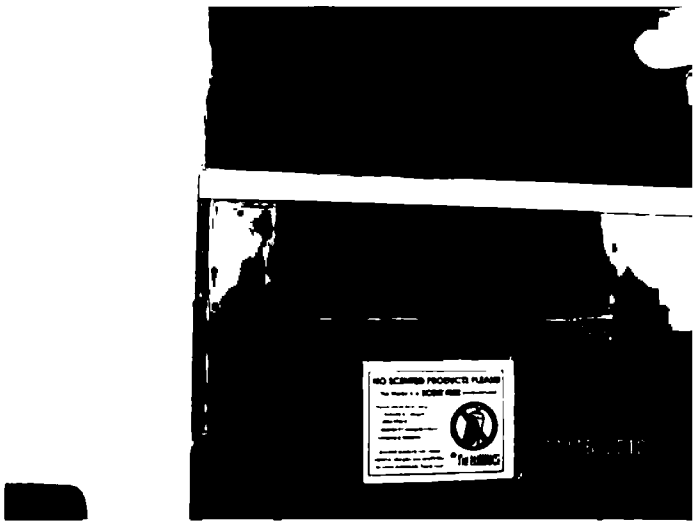
Upper Fitness Office - Piping serving chilled water AHU run across walkway.



Members' Changing Rooms condenser units and Energy Recovery Ventilator.

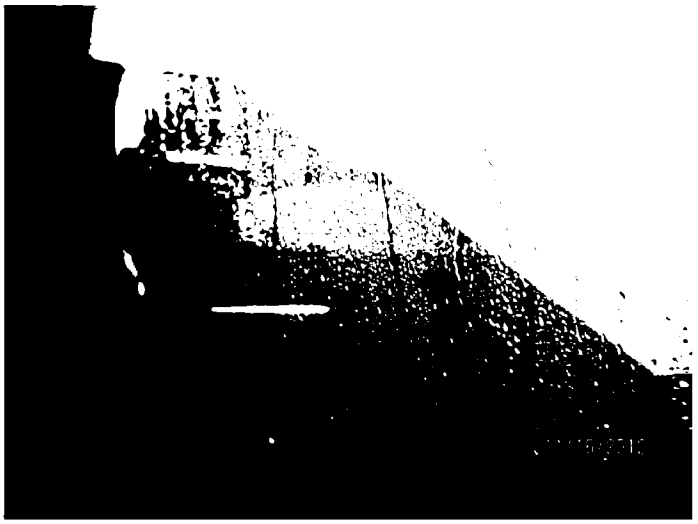
Upper Fitness - Main Changing Room exhaust fan.

Upper Fitness - Main Changing Room exhaust duct with loose insulation.



Upper Fitness - Washroom exhaust grilles.

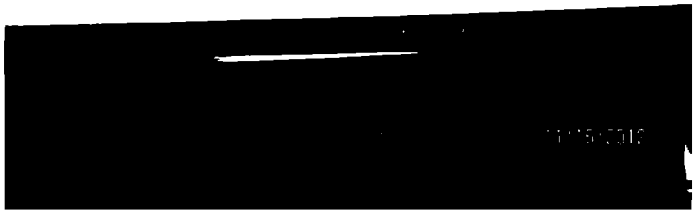
Upper Fitness - Typical urinals.



Roof terminals serving lower - Tim Horton's heat exhaust. Upper Fitness Exhaust.

Pedway - Typical heater

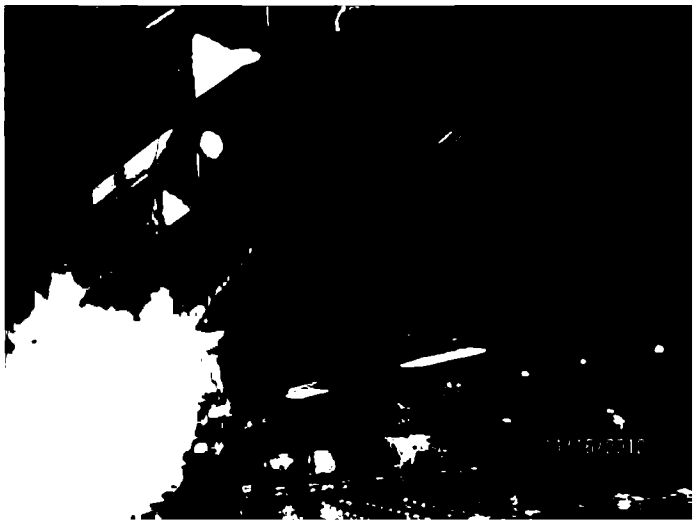
Heating Water Pump Room - Typical supply and return piping.



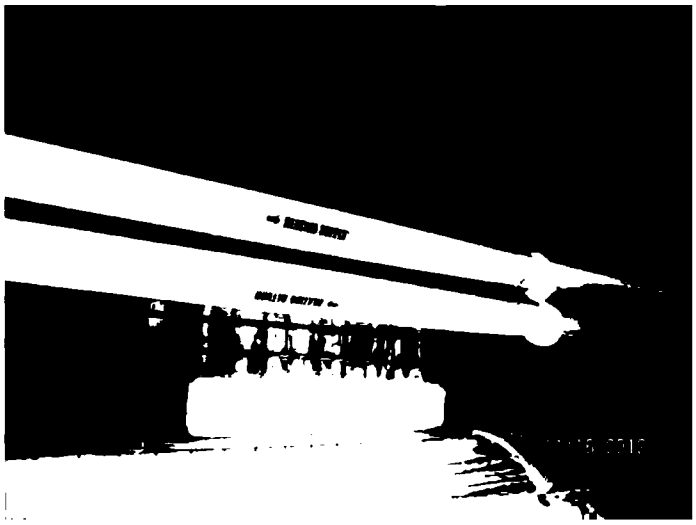
Pedway - Possible location for transfer terminal from Heating Water Pump Room.

Administrative Offices – Typical ductless split system blower with condensate pump.

Administrative Offices - Typical outside air diffuser.



Pool Deck – Return Duct.

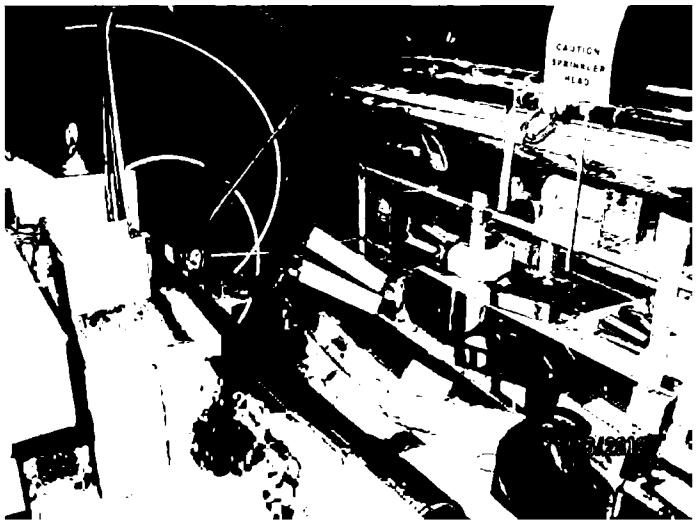


Pool Deck – Typical heating water supply and return piping.

Fish Bowl - Typical supply diffuser.

First Aid Room - Sink with floor mounted water heater.

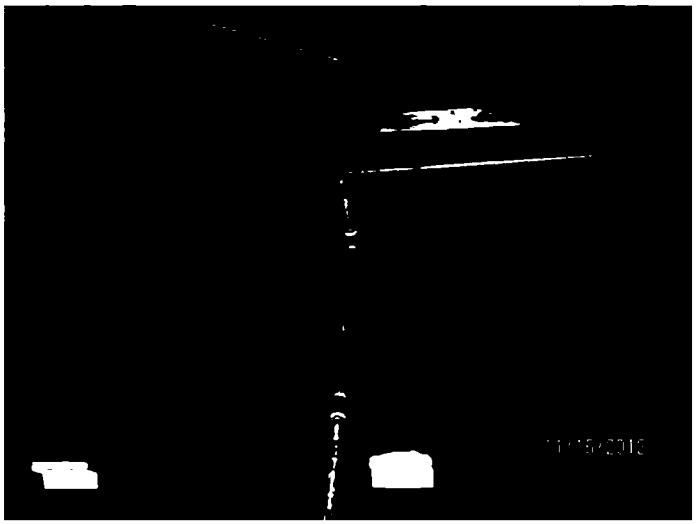
Lunch Room - Kitchenette.



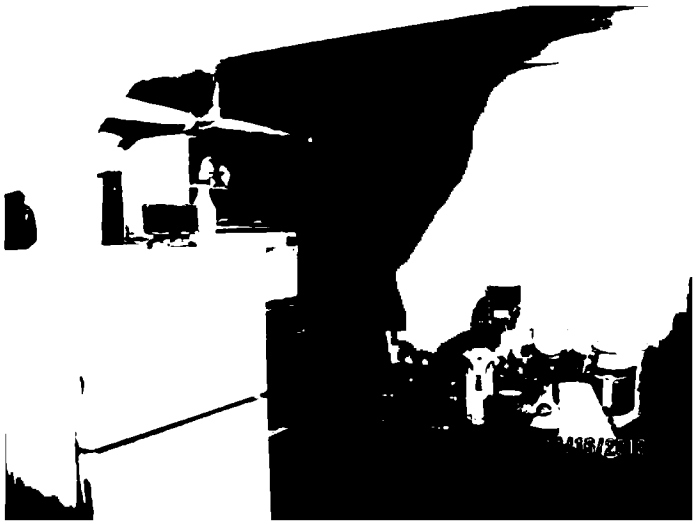
Pool Deck Mezzanine Storage Room

Party Room - City water fed AHU.

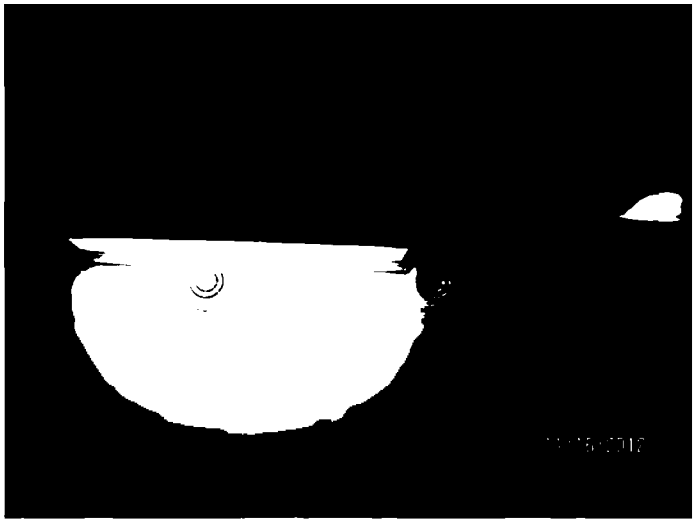
Pool Deck Mezzanine - Abandoned outside air duct.



Pool Deck Mezzanine - New galvanized sprinkler pipe with black iron fittings.

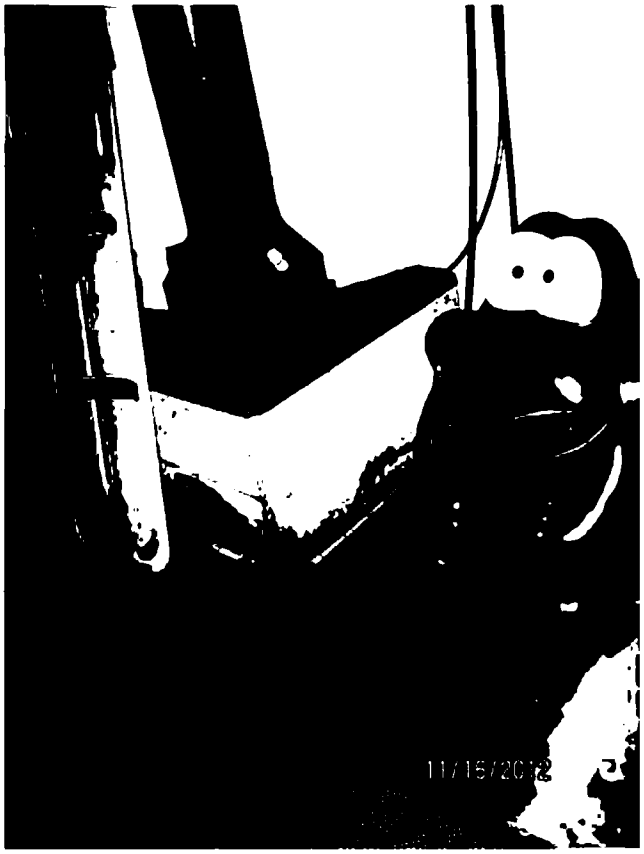


Instructor's Room - Kitchenette.



Instructor's Room - Typical Supply Diffusers.

New Party Room with new galvanized pipe and black iron fittings.

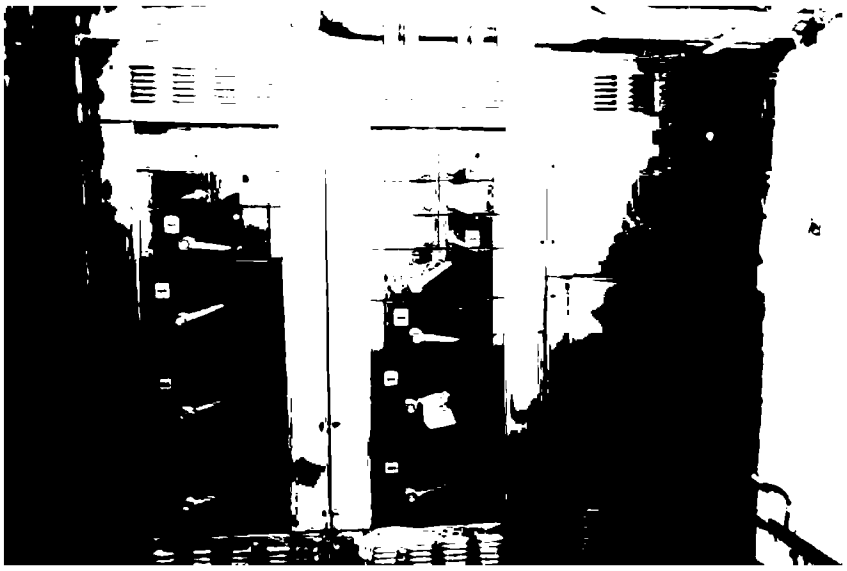


Pool Deck - Condensate piped to floor.

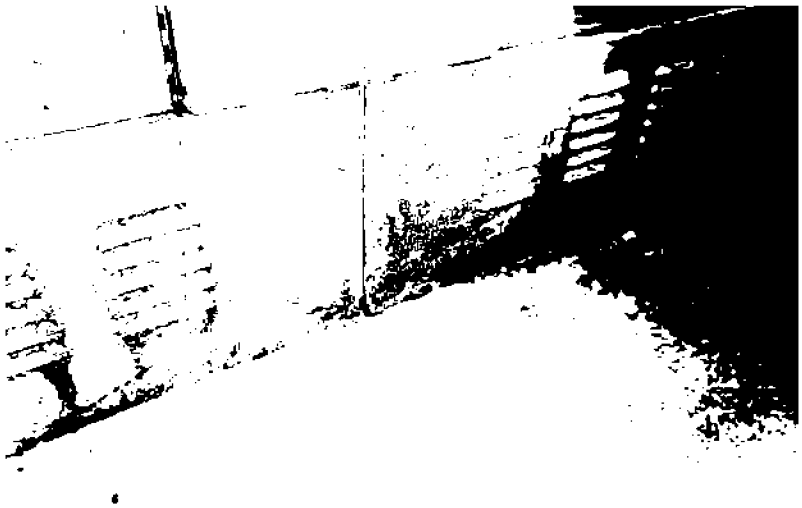
Pool Deck - Painted sprinkler piping.

Pool Deck - Typical hose bib and drinking fountain.

Pool Deck - Accessible shower.



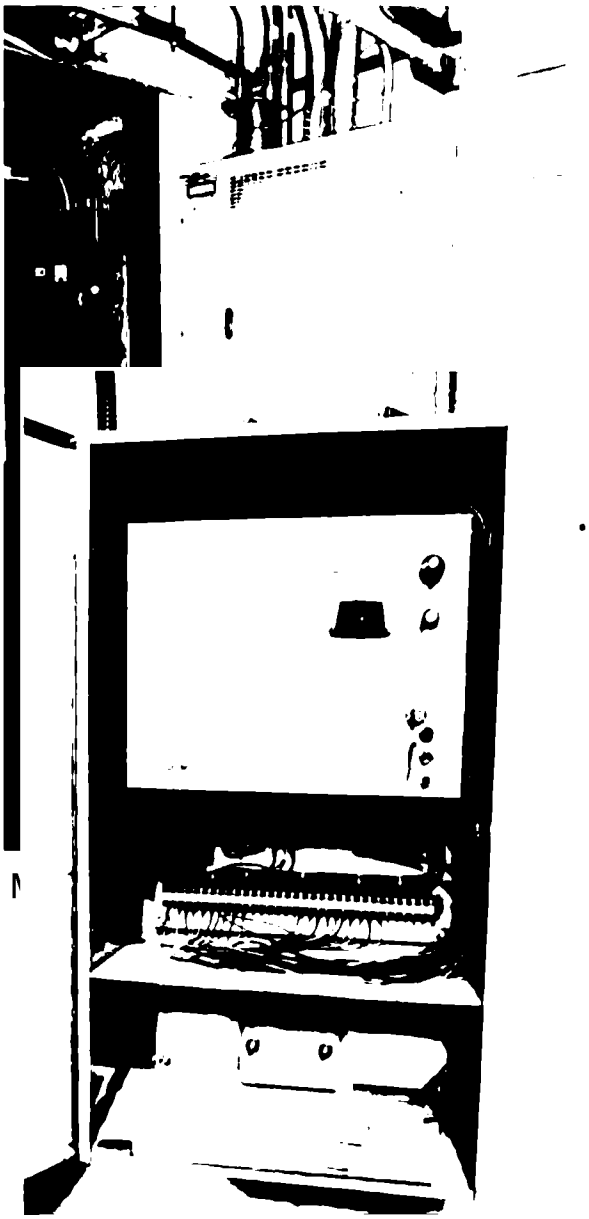
Main Electrical Service Board



Corrosion on Main Service Board

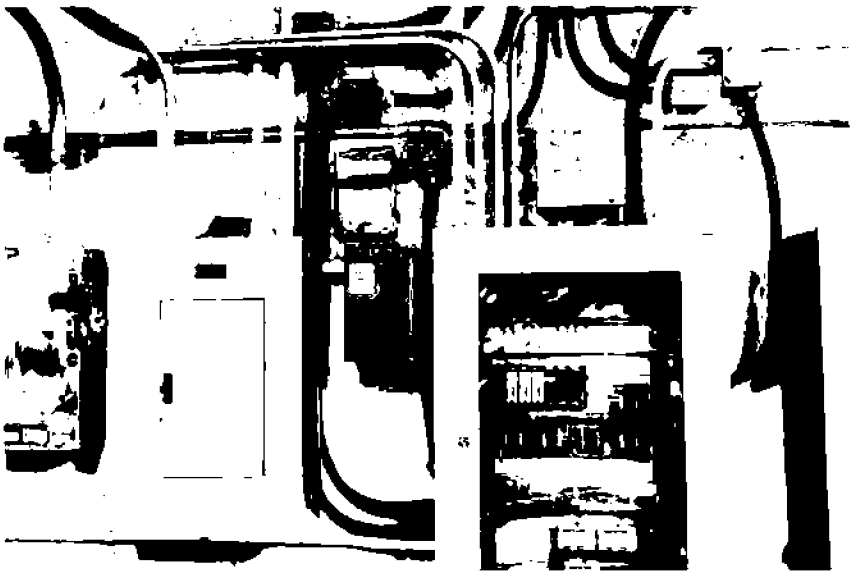
Main Building Ground Bus

Emergency Transfer Switch

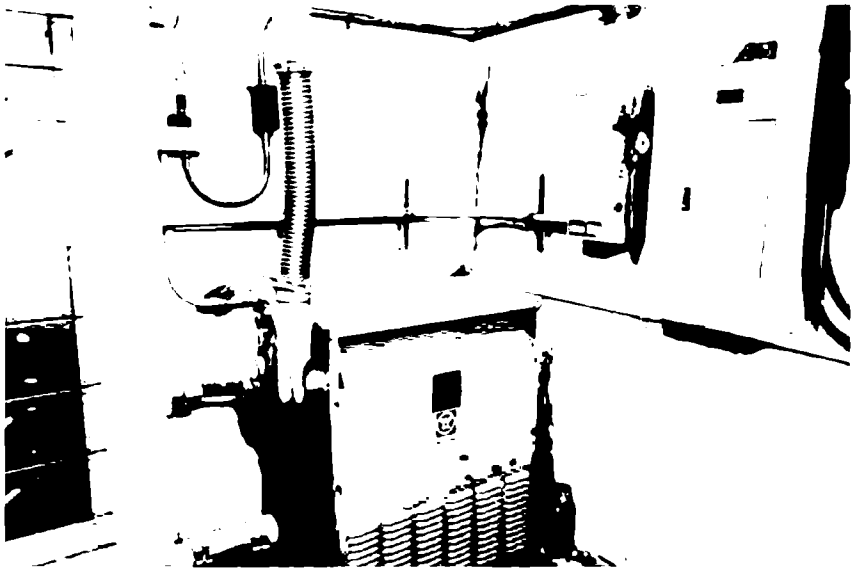


Load Shedding Demand Control Panel

Main 120/208V Distribution Panel



Electrical Room Elevation - Exterior Lighting Controls, Panelboard and Abandoned Fire Alarm Panel



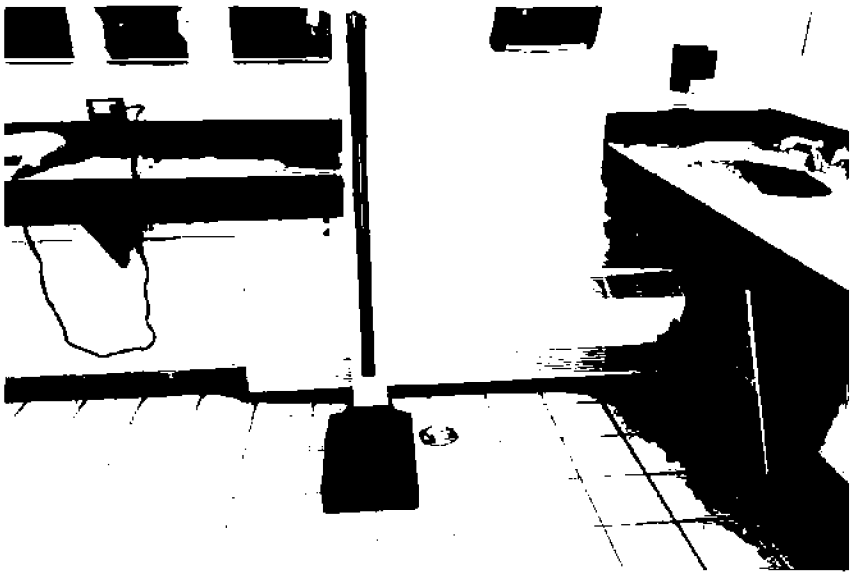
120/208V Distribution Transformer

Abandoned DC Battery Unit

Newer Panel in Mechanical Room

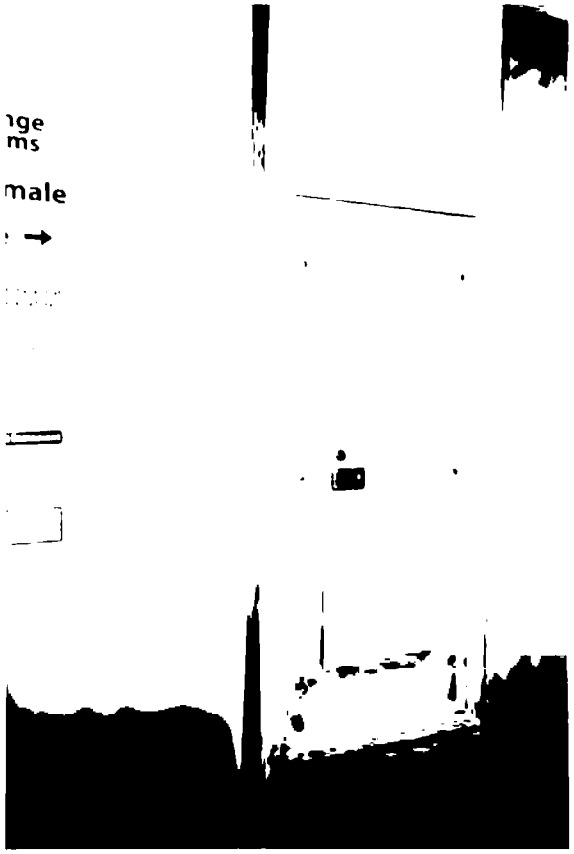
Newer Transformer in Mechanical Room

Typical Lighting - Renovated Change Rooms



Typical Electric Heater - Renovated Change Rooms

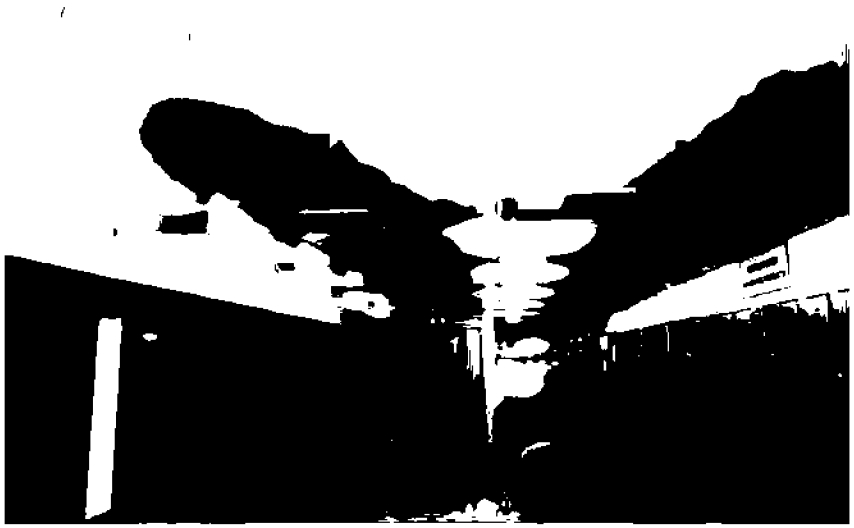
Motor Control Centre - Mechanical Room



Typical Original Construction Electrical Panel

Typical Existing Intrusion Alarm Panel

Existing PA System Head End



Typical Change Room Lighting

Tim Horton's Data Rack

Main Building Data Rack

Appendix B: Thermal Imaging Report

Advanced Thermal Imaging

Infrared Thermal Imaging Report

Aquarena
C/O Stantec
St. John's, NL

ATI

Date: Dec 4, 2012

Job: 1053-01

Advanced Thermal Imaging, Inc
P.O. Box 14182, C.B.S, NL
A1W 3J1
Phone: 728-2999
advancedti@bellaliant.net

Stantec

Job #: 133410801

Thermography Report

Client: Stantec **Date: Dec 04, 2012**

Location: Aquarena, St. John's, NL

ATI was commissioned by Michael Taylor of Stantec to perform thermal imaging services on the exterior structure of Aquarena facility in St. John's.

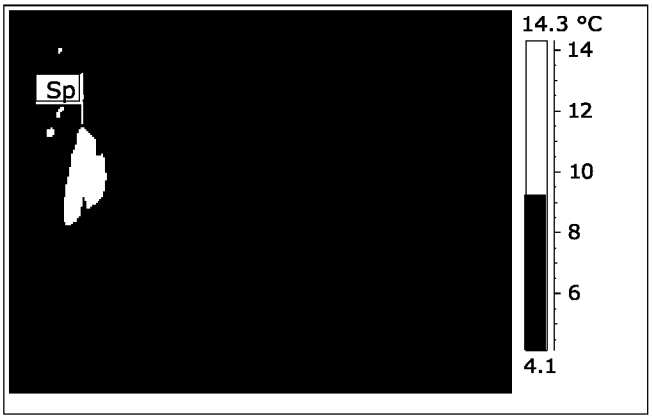
Conditions

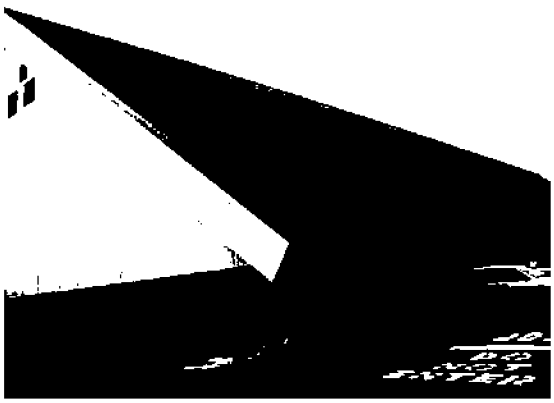
Sky was cloudy, wind was observed to be from the NE 4-7 km/h at beginning of survey, and light fog. Digital images were taken during the day and IR images taken that same evening.

Findings

- There were no abnormal heat signatures uncovered in the roof or walls of the structure during the thermal imaging process at the time of this service.
- The door of the structure do have heat signatures
- The main areas where heat signatures are exhibited is on the north face (facing Prince Philip Drive) (see page 15 - 22).
- On pages 21 & 22 a window is showing a heat signature that is not evident on the other windows on its right and left. This could be a window fault or it may be as a resulting of interior or exterior heating.
- On pages 27 & 29 the heat signature at the top eves appears to be heating from the vents at the upper right of the images.

Advanced Thermal Imaging





Date	12/4/2012
Image Time	8:06:42 PM
Filename	IR_0001.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	8.4 °C

Location:	Aquarena

Other remarks:

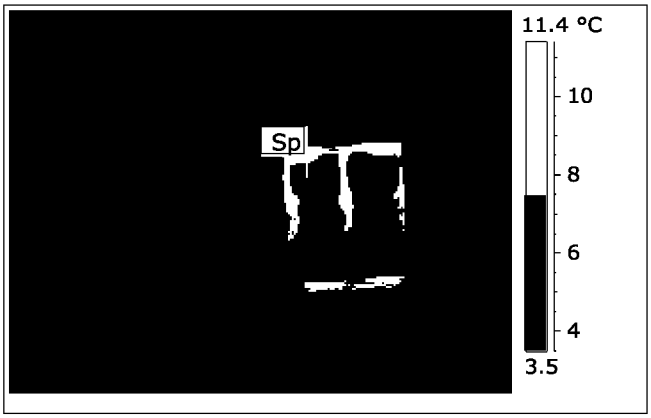
South east corner of structure

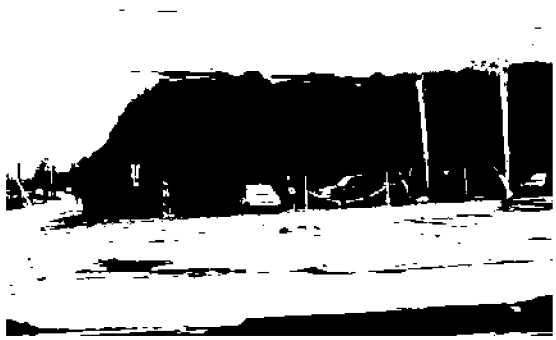
Comment:
Thermal imaging process started at south east corner of building and proceeded north (right), around building and back to south facing wall on left side of above image

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging





Date	12/4/2012
Image Time	8:07:59 PM
Filename	IR_0004.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	9.3 °C

Location:

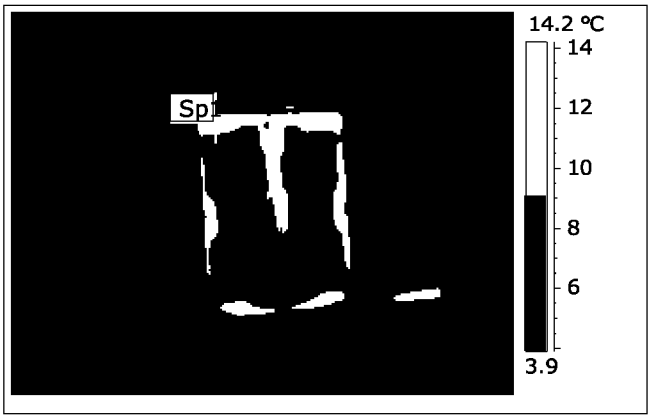
Other remarks:

Comment:
Heat loss through first door near south east corner

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:08:57 PM
Filename	IR_0005.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	12.5 °C

Location:

Other remarks:

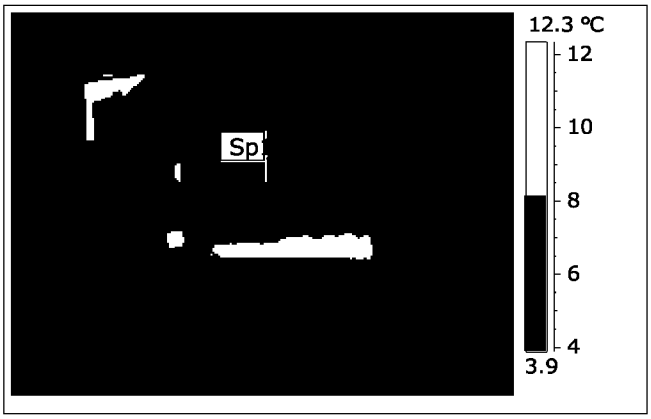
Comment:
Heat loss through second door

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:09:43 PM
Filename	IR_0006.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	6.2 °C

Location:

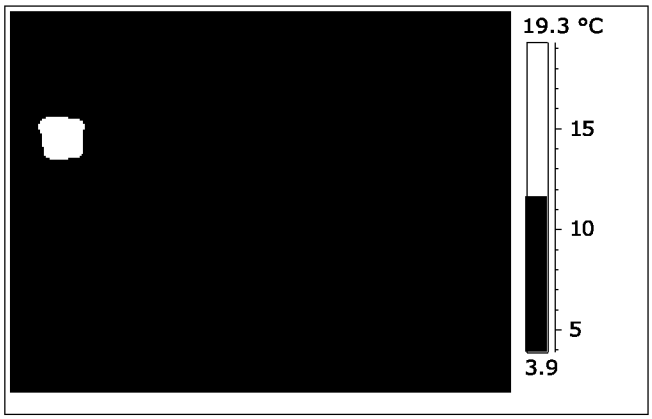
Other remarks:

Comment:
Walls on structure showed consistent temperature reading around structure. No anomalies were picked up in the walls or the roof of the structure.

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:10:45 PM
Filename	IR_0007.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %

Location:

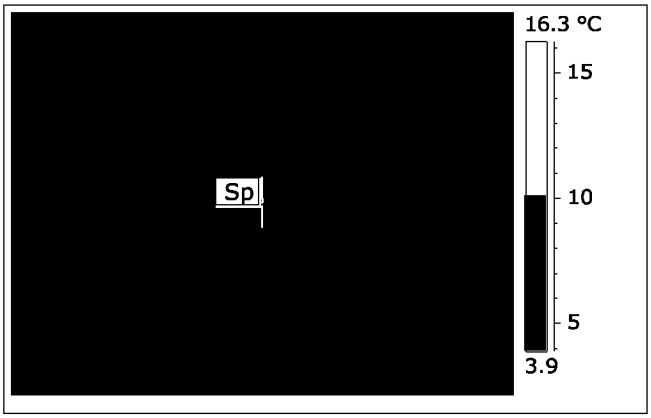
Other remarks:

Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:11:07 PM
Filename	IR_0008.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	6.5 °C

Location:

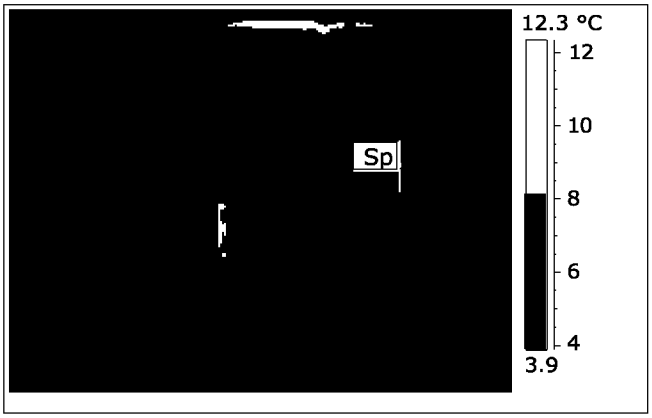
Other remarks:

Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:11:26 PM
Filename	IR_0009.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	7.4 °C

Location:

Other remarks:

Comment:
This is a close-up image of the door on the right hand side of the image on page 6

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

Date	12/4/2012
Image Time	8:12:14 PM
Filename	IR_0010.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	8.4 °C

Location:

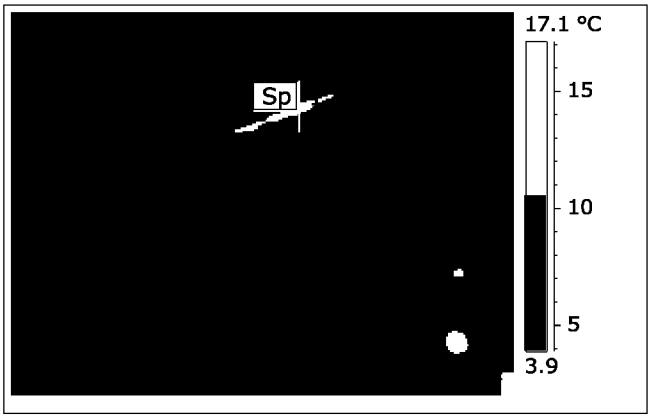
Other remarks:

Comment:
This is the last door proceeding north before the main entrance

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:13:12 PM
Filename	IR_0011.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	12.0 °C

Location:

Other remarks:

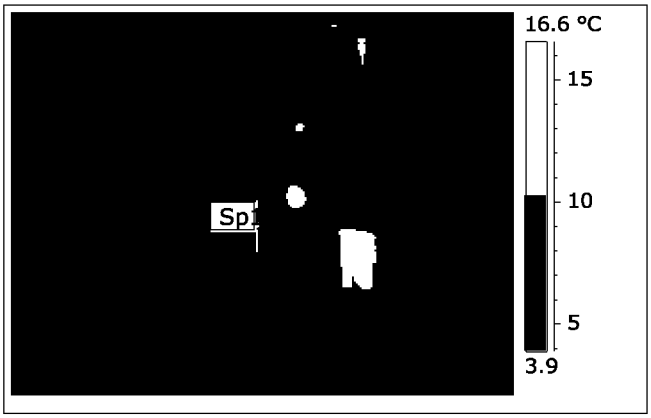
Roof area left of Main Entrance

Comment:
Heat loss at eve of structure

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:13:32 PM
Filename	IR_0012.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	6.4 °C

Location:

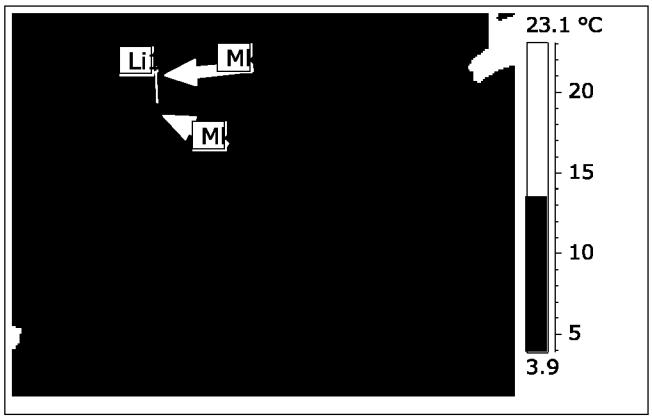
Other remarks:

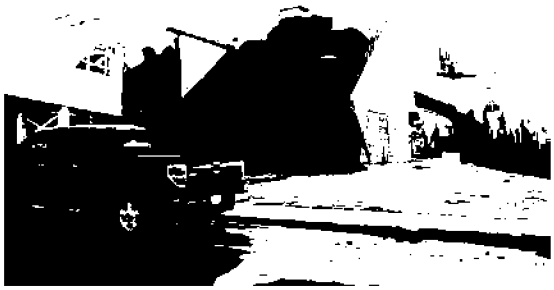
Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging





Date	12/4/2012
Image Time	8:17:29 PM
Filename	IR_0013.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Li1 Max. Temperature	8.5 °C

Location:

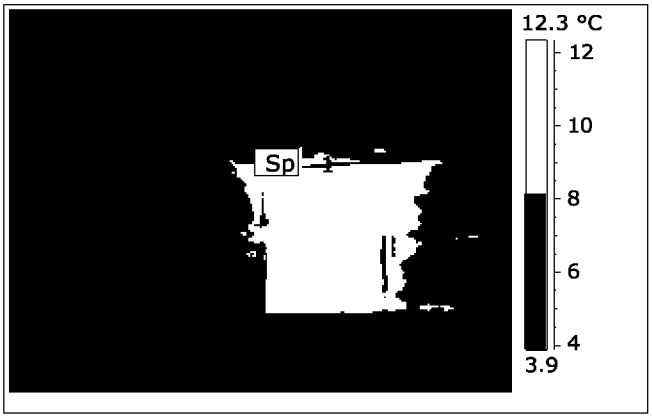
Other remarks:

Comment:
Slight heat loss at join in structure

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:17:48 PM
Filename	IR_0014.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	11.8 °C

Location:

Other remarks:
Main doors

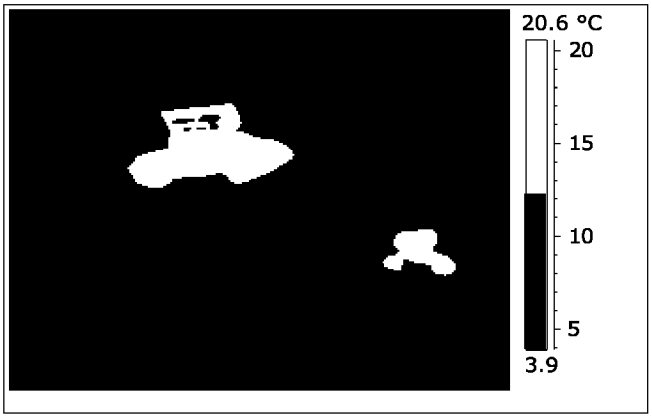
Comment:

Note:

Inspected by : Signature:.. - - - - - - - - - date: - - - - -

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:18:26 PM
Filename	IR_0015.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %

Location:

Other remarks:
Roof area right of main doors

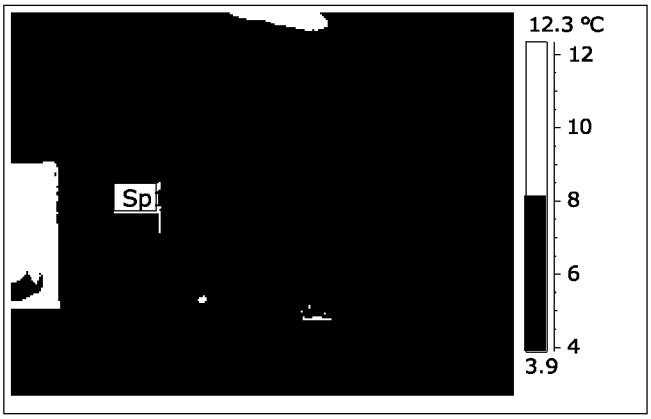
Comment:

Note:

Inspected by : Signature:.. - - - - - - - - - date: - - - - -

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:18:45 PM
Filename	IR_0016.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	6.3 °C

Location:

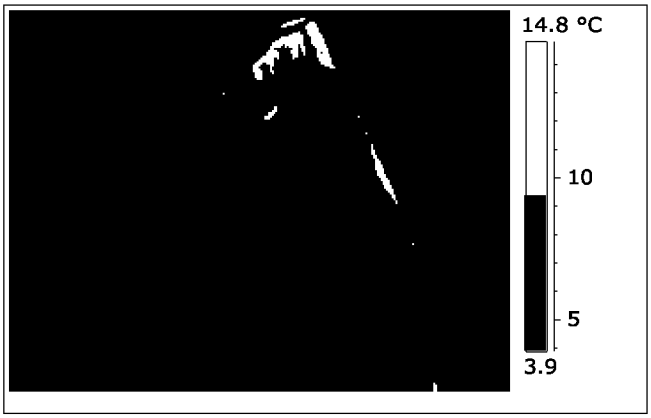
Other remarks:
Right of main doors

Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:20:17 PM
Filename	IR_0017.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %

Location:

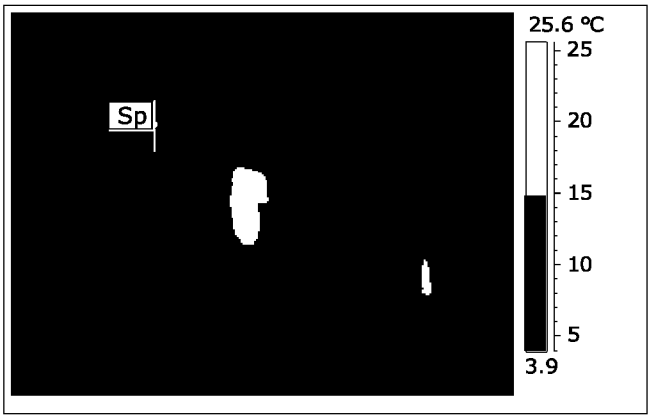
Other remarks:
North side of structure

Comment:
Heat loss evident at upper structure

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:20:32 PM
Filename	IR_0018.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	6.7 °C

Location:

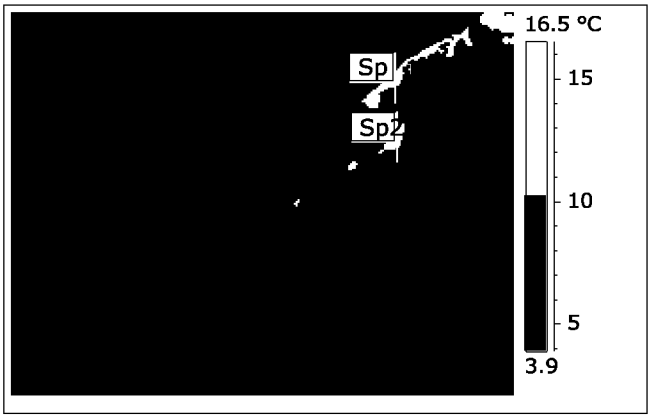
Other remarks:
Lower left side

Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:21:22 PM
Filename	IR_0019.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	16.7 °C
Sp2 Temperature	13.6 °C

Location:

Other remarks:
Upper left side close-up

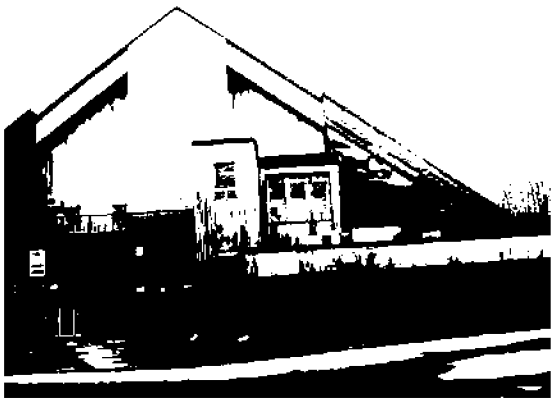
Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:21:33 PM
Filename	IR_0020.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	6.0 °C

Location:

Other remarks:

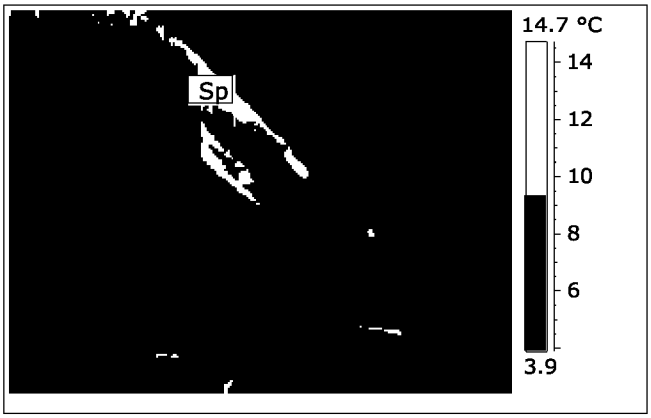
Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:21:58 PM
Filename	IR_0021.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	15.8 °C

Location:

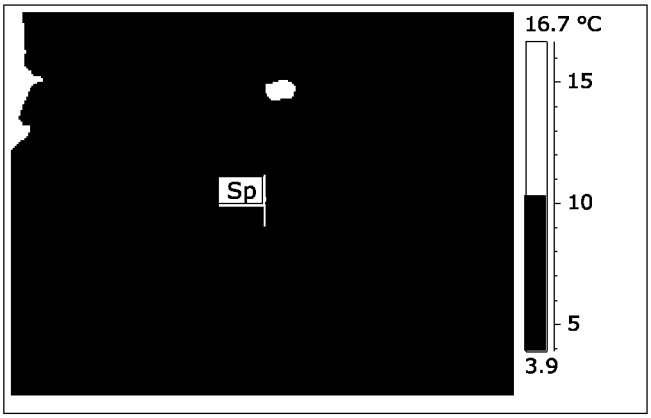
Other remarks:

Comment:
Heat loss evident at upper right side of north face

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:22:41 PM
Filename	IR_0022.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	9.6 °C

Location:

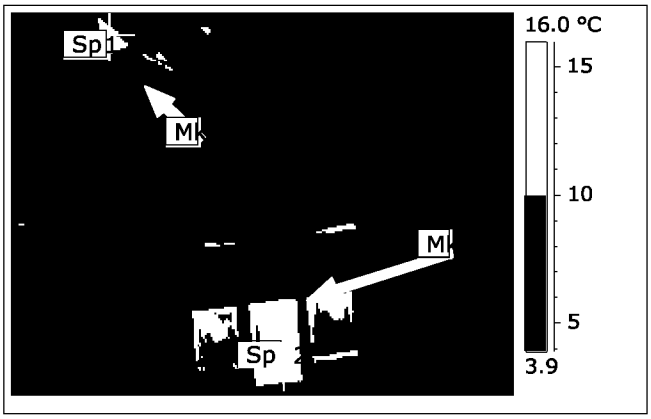
Other remarks:
Door at right of main doors north face.

Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:23:14 PM
Filename	IR_0023.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	15.3 °C
Sp2 Temperature	17.3 °C

Location:

Other remarks:
North face upper right

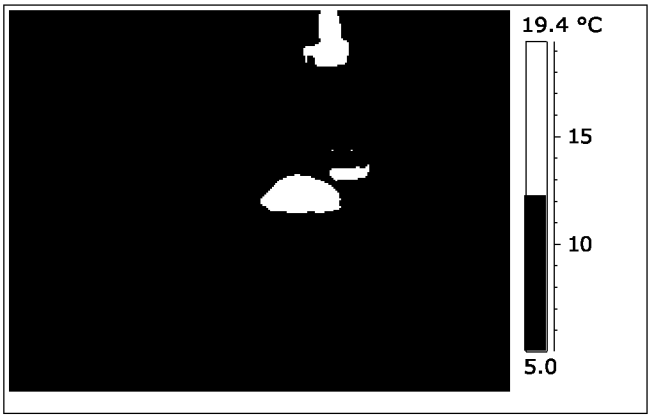
Comment:
Heat loss at upper right section and heat signature on middle window

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:23:35 PM
Filename	IR_0024.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %

Location:

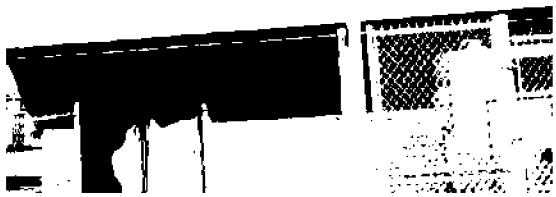
Other remarks:
Lower right of north face

Comment:
Heat signature on window same as in page 21 and
Heat signature below is from a vent

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:27:04 PM
Filename	IR_0025.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	13.2 °C

Location:

Other remarks:
Door on north west corner

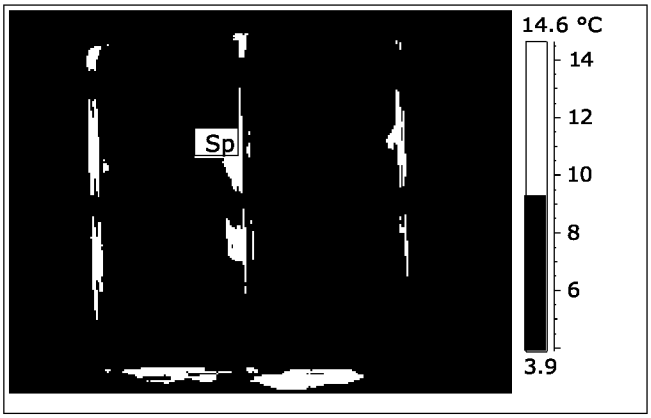
Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:27:45 PM
Filename	IR_0026.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	11.0 °C

Location:

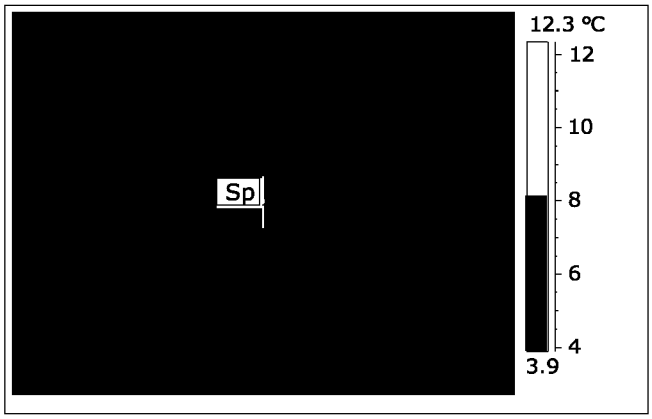
Other remarks:

Comment:
Second door proceeding north to south along west wall.

Note:

Inspected by : Signature:.. - - - - - - - - - date: - - - - -

Advanced Thermal Imaging



Date	12/4/2012
Image Time	8:28:19 PM
Filename	IR_0027.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	7.0 °C

Location:

Other remarks:

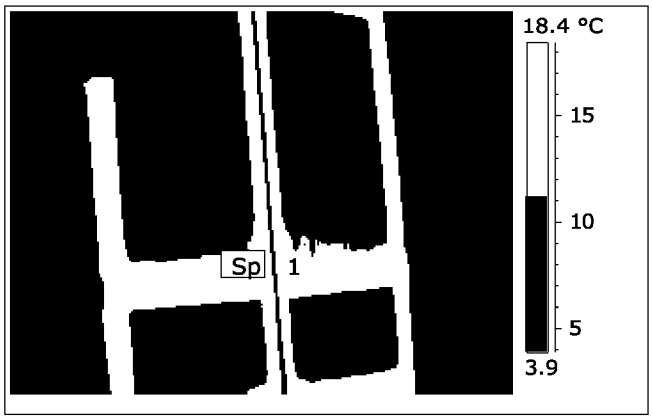
Comment:
Wall in center of west wall

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:30:01 PM
Filename	IR_0028.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	15.4 °C

Location:

Other remarks:

Comment:
Door on south west corner of building

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

Date	12/4/2012
Image Time	8:31:30 PM
Filename	IR_0029.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	5.8 °C

Location:

Other remarks:
South wall

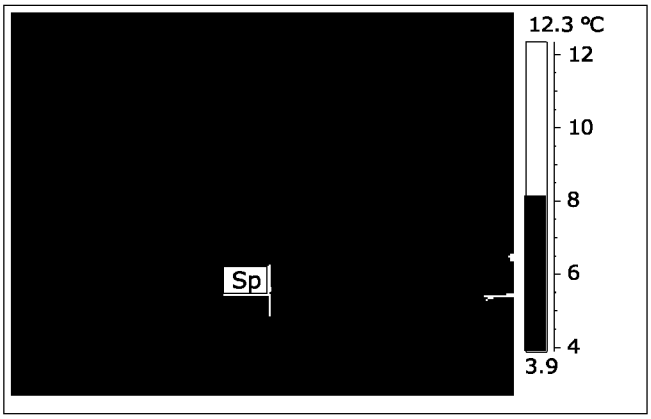
Comment:
Heat signature at eve appears to be from the grated in above right of image.

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



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Filename	IR_0030.jpg
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Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	7.2 °C

Location:

Other remarks:
Lower south wall

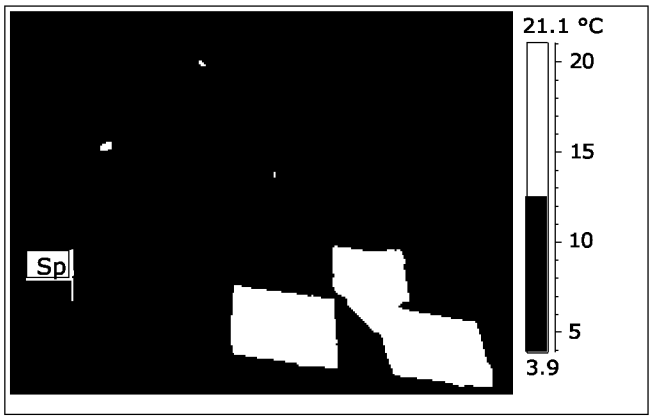
Comment:

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

Advanced Thermal Imaging

[redacted]



Date	12/4/2012
Image Time	8:32:31 PM
Filename	IR_0031.jpg
Emissivity	0.95
Object Distance	15.0 m
Reflected Apparent Temperature	6.0 °C
Atmospheric Temperature	6.0 °C
Relative Humidity	85.0 %
Sp1 Temperature	5.5 °C

Location:

Other remarks:

Comment:
Close-up of upper south wall

Note:

Inspected by : Signature:.. _ _ _ _ _ _ _ _ _ date: _ _ _ _ _

FLIR

CANADA
SS-EN ISO 9001:2008 CE RT IFIED
Certi ficateNo. I 0244

Calibration Certificate
FLIR

Model: **FLIR T440bx**

Serial No: 62100634

Lens: 15deg. 24deg. 90 deg.

The calibration of the camera is traceable to NIST, The National Institute of Standards and Technology, USA and to SP, Swedish National Testing and Research Institute. The calibration is based on the International Temperature Scale (ITS-90).

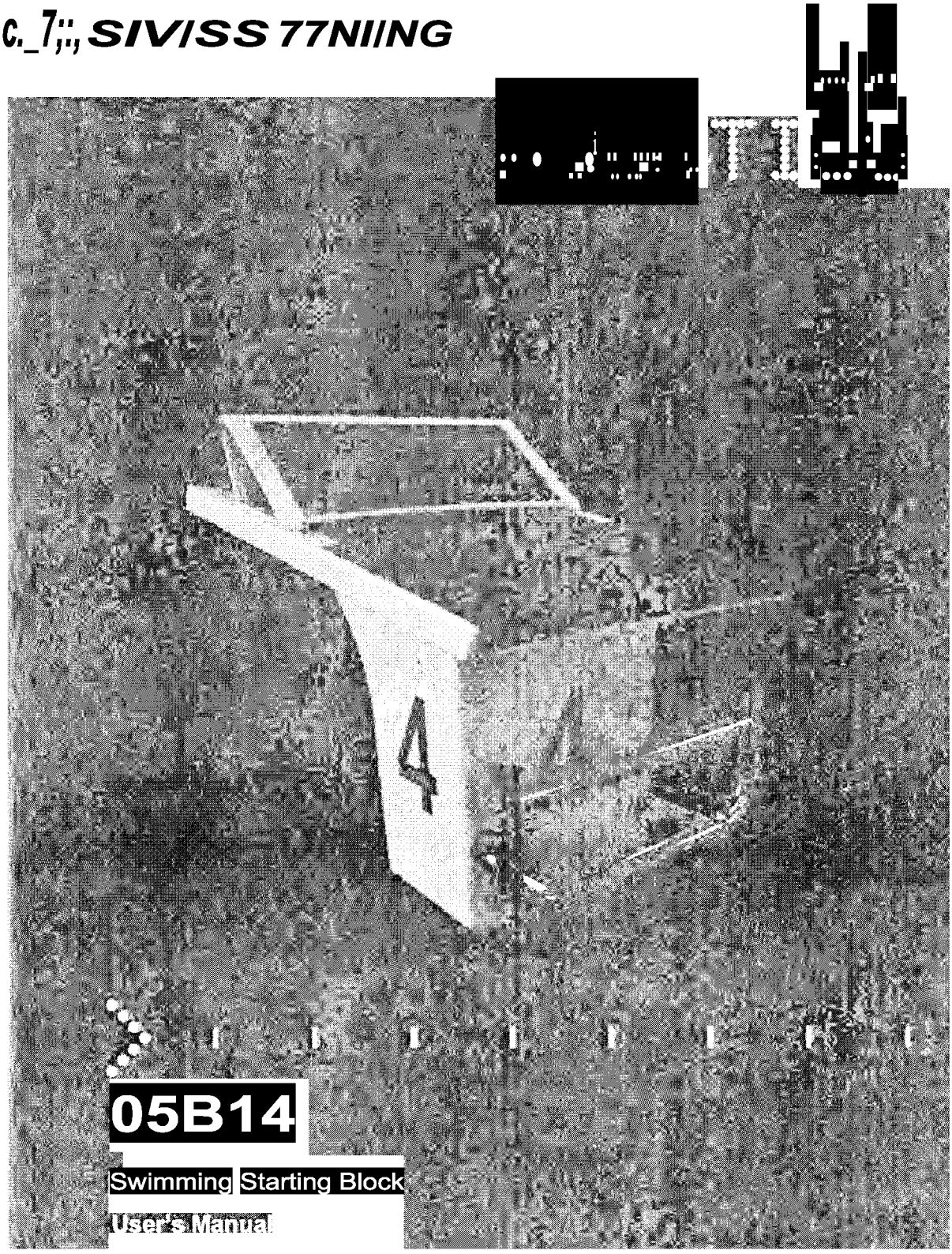
Calibration Site: FUR Systems Ltd.,
Burlington, ON
Canada

Calibration Date: September 7 2012

Calibrated by
Don Hamilton

FLIR recommend.s that arecalibrationbe made every 12 months

c._7;:, SIVISS 77NI/NG



3454.519.02

Version 1.3

Edition September 2016

Caution and safety precautions

- Never use any other charger than the supplied or a type approved by Swiss Timing. This could destroy the battery, cause damage to unit, and possible cause personal injury due to fire or/and electrical shock.
- Never bypass a power cord ground lead by breaking off the ground pin, or by using inappropriate extension cords or adapters.
- Never plug a power cord into the AC power source until you have made sure that all installation, cabling and power levels, are proper, and that the applicable procedures in this manual have been followed.
- Protect the equipment against splashing, rain and excessive sun rays
- Never use the device if it is damaged or insecure.
- Verify the selection of the power distribution.
- Verify that the voltage quoted on the rating plate is the same as your voltage. Connect the appliance only to power sockets with protective earth The use of incorrect connection voids warranty
- This programmay be modified at any time without prior notification.
- Do not open the case; there is nothing that needs servicing inside it. Nevertheless, if the case must be opened, you must call for some qualified personnel. The power supply cable must be disconnected before opening the case
- During the transport of all Swiss Timing equipment delivered with a reusablecarry case, the said case should be used at all times. This is imperative to limit the damage, such as shocks or vibration that can be caused to the units during transport.
- The same cases should also be used when returning equipment to Swiss Timing for repair. Swiss Timing reserves the right to refuse all guarantees if this condition is not fulfilled.
- If the installationincludes a horn, be sure to maintain a sufficient security distance from the public.

Documentation Updates

Swiss Timing ltd. reserves the right to make improvements in the products described in this documentation at any time without prior notice Furthermore, Swiss Timing Ltd. reserves the right to revise this documentation in its content at any time and without any obligation to notify any person or organization of such revision.

Disclaimer

The information provided in this documentation has been obtained from sources believed to be reliable, accurate and current. However, Swiss Timing Ltd. makes no representation or warranty, express or implied with respect, but not limited to, the completeness, accuracy, correctness and actuality of the content of this documentation. Swiss Timing ltd. specifically disclaims any implied warranty of merchantability, quality and/or fitness for any particular purpose. Swiss Timing Ltd. shall not be liable for errors contained in this documentation or for incidental or consequential damages in connection with the supply, performance or use of this documentation.

Environment

This symbol indicates that this product should not be disposed with household waste It has to be returned to a local authorized collection system. By following this procedure you will contribute to the protection of the environmentand human health. The recycling of the materials will help to conserve natural resources.

Copyright

TABLE OF CONTENTS

1 INTRODUCTION

OSB14 presents a powerful patented feature, revolutionising the way the swimmers start from their blocks. Diving from the starting block with the body propelled by the knee at a 90° angle drastically increases the explosiveness of the start. Physical tests undertaken by top level swimmers showed faster races versus a standard block.

OSB14 starting blocks are designed with the optimum angles of both the platform and the footrest for racing starts.
Design research also applied to the top surfaces, very comfortable yet roughs enough to guarantee the swimmer a feeling of total security.
The length of the platform 74cm adapts to the new styles of start.

The diameter and position of the handgrips have also been carefully considered to respond to all the requirements of different hand positions. A door at the back of the block allows easy access to the interior to connect the cabling.

OSB14 allows an easy mounting of OBL1 (Omega Backstroke Ledge) on the platform.

1.1 Construction of 05814-RBD starting block (Relay Break Detection)

1. 3454.070 OSB14 base with rear door and handle
2. 3454.041 Platform OSB12 with footrest
3. 3454.600 Complete RBD
   - 3454.010 Upper frame
   - 3454.011 Lower frame
   - 2659.056 Rubber shock absorber (silentbloc)
   - 3393.018 Spring loaded contact
   - 3393.019 Contact screw
   - 3393.020 Adjustment screw
   - 3393.021 Isolation plate
   - 3454.035 Isolation washer
   - 3393.601 Connection cable
4. A4 conical screw M8 for platform fixing (6x)
5. Fixation material
   - 3454.726 Material 6 lines
   - 3454.728 Material 8 lines
   - 3454.730 Material 10 lines

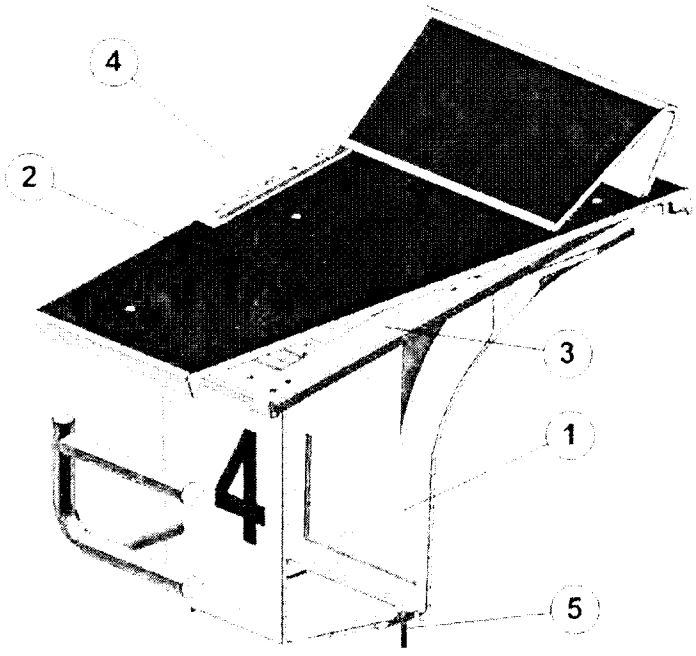


Figure 1 - 0S814-RBD

1.2 Construction of 05B14-starting block without RBD

1. 3454.070 OSB14 base with rear door and handle
2. 3454.041 Platform OSB12 with footrest
3. 3454.019 Intermediate plate
4. A4 conical screw M8 for platform fixing (6x)
5. Fixation material
   - 3454.726 Material 6 lines
   - 3454.728 Material 8 lines
   - 3454.730 Material 10 lines

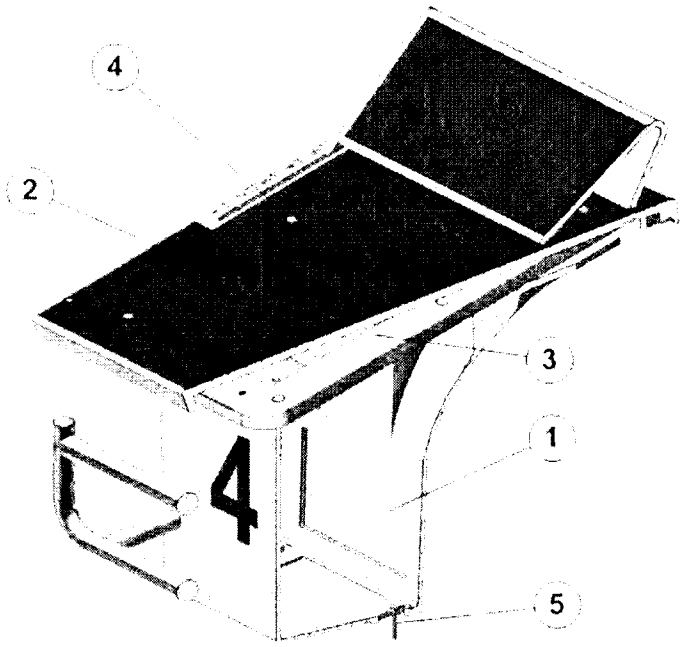


Figure 2- 0S814 without RBD

2 INSTALLATION

2.1 Positioning of the 05B14 starting blocks

The **05B14** starting blocks are positioned according to the measures indicated: 238mm from the swimming pool border (248mm with the OCPS touchpad) to the front of the base.

A The handle of the 05B14 must be aligned with the border of the touchpad (Ex. OCPS).

Are the touchpads missing or is the swimming pool too small with touchpads, align the **05B14** starting block with the border of the swimming pool.

The drilling oblong fixations permits a play of the block; this permits a possible correction of the alignment.

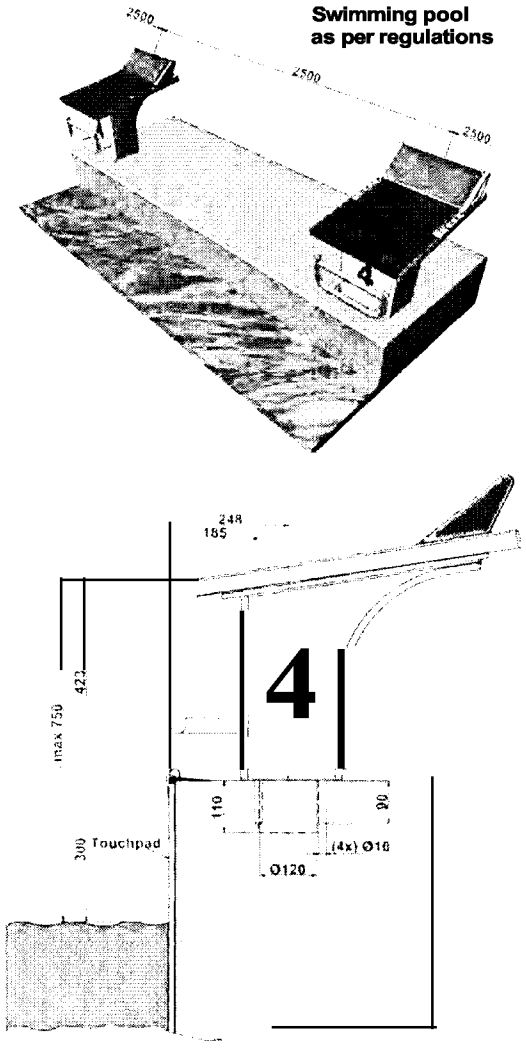


Figure 3 - Positioningof the0 S814

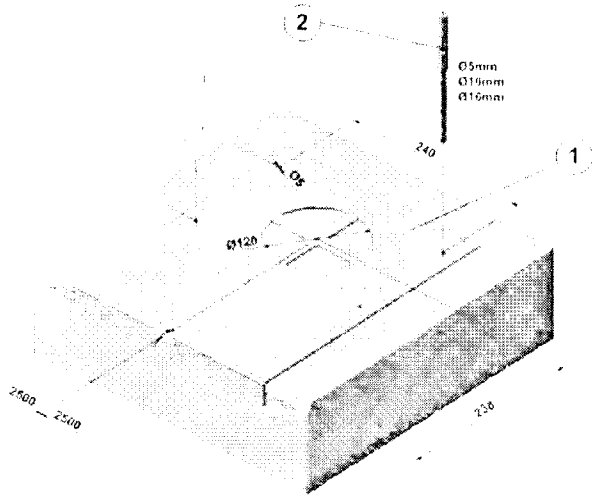
2.2 Fixation of the starting block

if\. **To ensure proper functioning of the 0S814 starting block system, the fixation must be absolutely rigid.**

2.3 Drilling and mounting of the 05B14

Put the drilling gauge (1) on the border of the swimming pool and mark the 4 05 holes of the gauge with a 05 drill (2).
Drill the 4 holes respectively with drills0 5,0 10 and0 16mm (2).

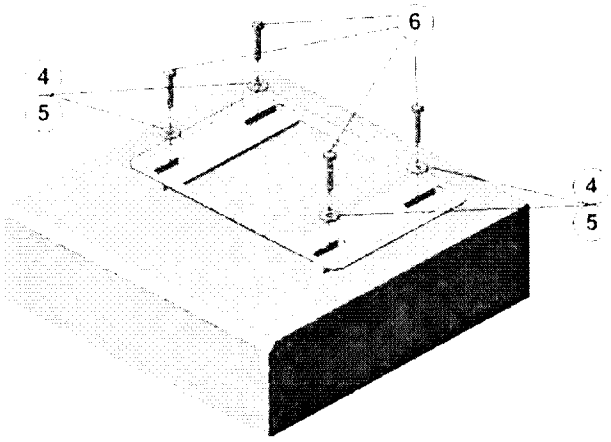
A **Minimal depth: 90mm, maximal depth: 95mm**



1. 3454.074 Drilling gauge
2. 9051.9803 Drill0 5
   9051.9008 Drill0 10
   9051.9814 Drill0 16
3. 9039.8582 Pegs M8 x 90 (4x)

:0:. As *per instruction manual* ***3393.505 Preparing the drillings,*** *push the pegs MB (3) in the0 16* ·y ho/es *and put the 0S814 starting block on the 4 fixation points.*

Fix the base with the 4 screws M8 x 45 (6) and the 4 washers M8 x 30 (4). If the space it's too small, use the 4 washers M8 x 24 (5).



4. 3454.032 Inox washer A4 M8 0 30 (4x)
5 3454.034 Inox washer A4 M80 24 (4x)
6. 3454.037 Screws A4 M8 x 45 **(4x)**

2.4 Drilling and mounting of the Deckplate

A For fix cabling, a hole with 0120 - 122mm at 238mm away from the pool's border must be foreseen in order to provide space for the cables (the gauge has a hole 0120mm).

3 TECHNICAL SPECIFICATIONS

	OS614-RBD	OS614-Simple
Dimensions	737 x 314 x 655 mm *Platform 740 x 520 mm*	
Weight [kal	29	27
Colours	White RAL9010 with non-skiddini	surface dark blue RAL5002
Contact	Closing the moment of start (NO)	
Action force	13.0 Kg a18.0 Kg	
Connection	Cable with 2 pole plug (L1400 mm)	

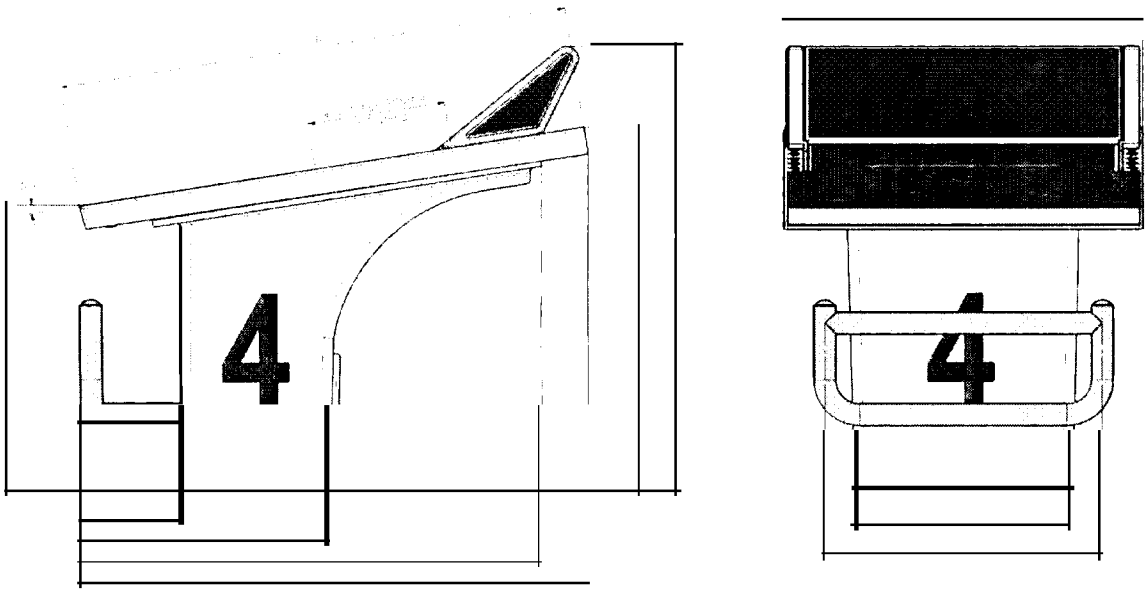


Figure 4 - Technical specifications

4 CONTROL OF THE STARTING BLOCK

4.1 Control without application of pressure

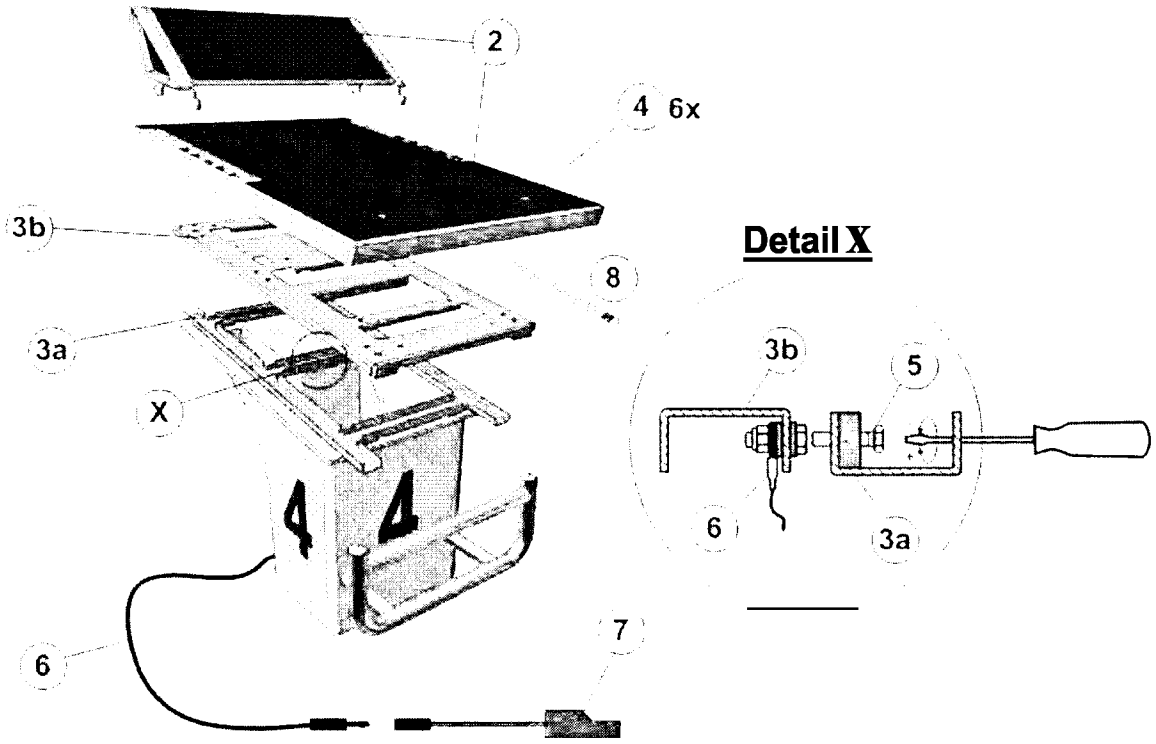
Connect the buzzer (7) to the connection cable (6).
If there is no pressure on the platform, the buzzer (7) remains silent.
However if the buzzer (7) emits a sound, proceed as described in paragraph *4.5*.

4.2 Pressure sensitivity control

Press with the dynamometer (8) against the middle of the platform (2).
Read on the dynamometer (8) the necessary pressure to activate the buzzer (7).
If the sensitivity is out of the range between 13kg and 18kg, see paragraph *4.5.3*.

4.3 Connection to the timing system

If the results are ok in points *4.1* and *4.2,* connect the connection cable (6) to the timing system.



F igure 5 - Maintenance

4.4 Inspection

Every 6 months: check cable connections.

Once a year: check rigidity of block fixation.

4.5 Troubleshooting

4.5.1 Detection of a short-circuit

If the buzzer (7) emits a sound while there is no pressure on the platform, proceed as follows:

Unscrew the 6 A4 conical screws MS (4) on the platform (2).

Remove platform (2) and connect the buzzer (7) to the connection cable (6).

Insert a screwdriver into the 2 holes of the lower frame (3a) and unscrew each of the adjustment screws (5) until they do not touch the contact head any more (see Detail X).

If the sound continues, verify if the wiring or the frames (fix or mobile) are not in short-circuit (mechanical or electrical connection).

4.5.2 No contact

If the buzzer (7) does not emit a sound during the sensitivity adjustment , proceed as follows:

Make sure that the platform (2) and the RBD (3) are correctly assembled; there must be a visible movement (Paragraph *4.*6).

Make sure that the 2 adjustment screws (5) are not too far apart.

4.5.3 Sensitivity adjustment

If the sensitivity is out of the range between 13kg and 18kg (as indicated in paragraph 4. 2), make an adjustment by proceeding as follows:

Connect the buzzer (7).

Insert a screwdriver in one of the holes of the lower frame (3a) then screw the adjustment screw (5), facet after facet of the hexagonal head until the buzzer emits a sound.

Unscrew the adjustment screw (5) by turning it 4 facets backwards (0,16mm/facet)

Adjust the second screw (5) in the same way.

Make a test with the dynamometer (8) by pushing or pulling the upper frame (3b).

If the measured pressure is higher than 18kg, continue screwing the screw in and test at every facet.

If pressure is lower than 13kg, unscrew and test at every facet.

It is recommended to proceed systematically with the adjustment (a regular play between the 2 contacts.

4.6 Assembly of the RBD / intermediate plate and platform

When assembling the RBD / intermediate plate (3), insert the 5 screws/washers(A) and tighten them with the 5 nuts/washers (8).

When assembling the platform (2), insert the 6 A4 conical screw M8 (4) and tighten them.

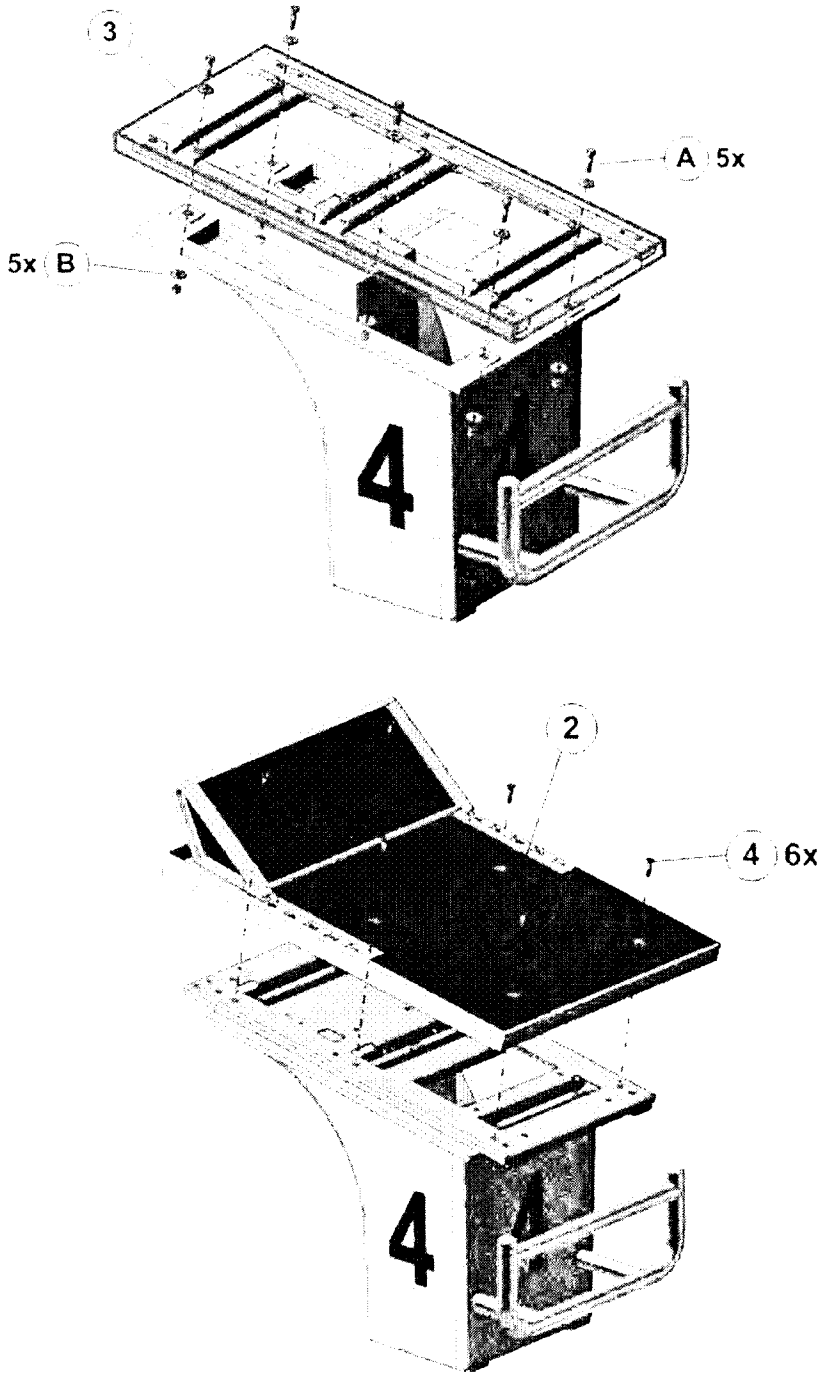


Figure 6 - Assembly RBD I intermediate plate and platform

4.7 Dismantling of the platform

Unscrew the platform (2) by removing the 6 A4 conical screws M8 (4) on the top.

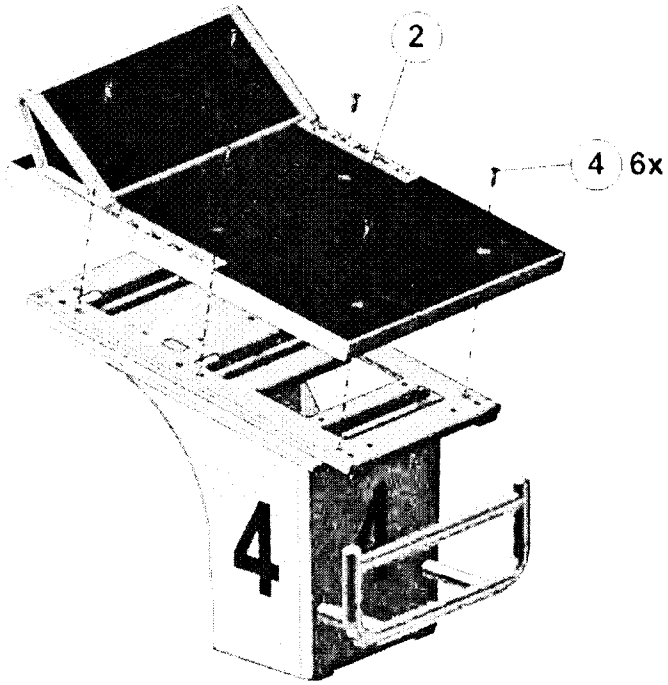


Figure 7 - Dismantling of the platform

4.8 Dismantling of the footrest

Put the footrest in position 3 to access the screws between the footrest and the guides.

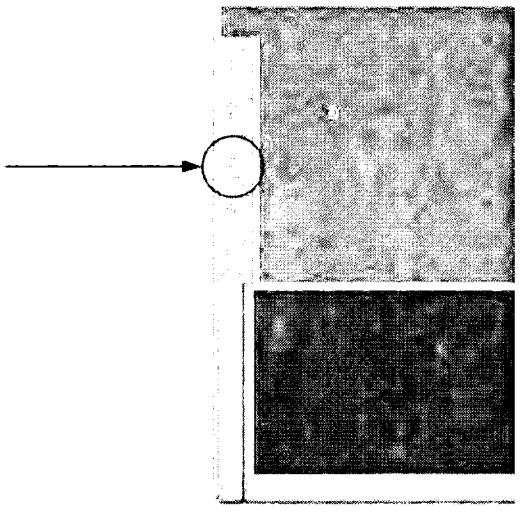


Figure 8 - Dismantling of the footrest

Rotate the platform to access the lateral screws and unscrew the 4 screws (2 on each side).

Pull to remove the footrest.

To reassemble the footrest, start from this point and follow the instructions backwards.

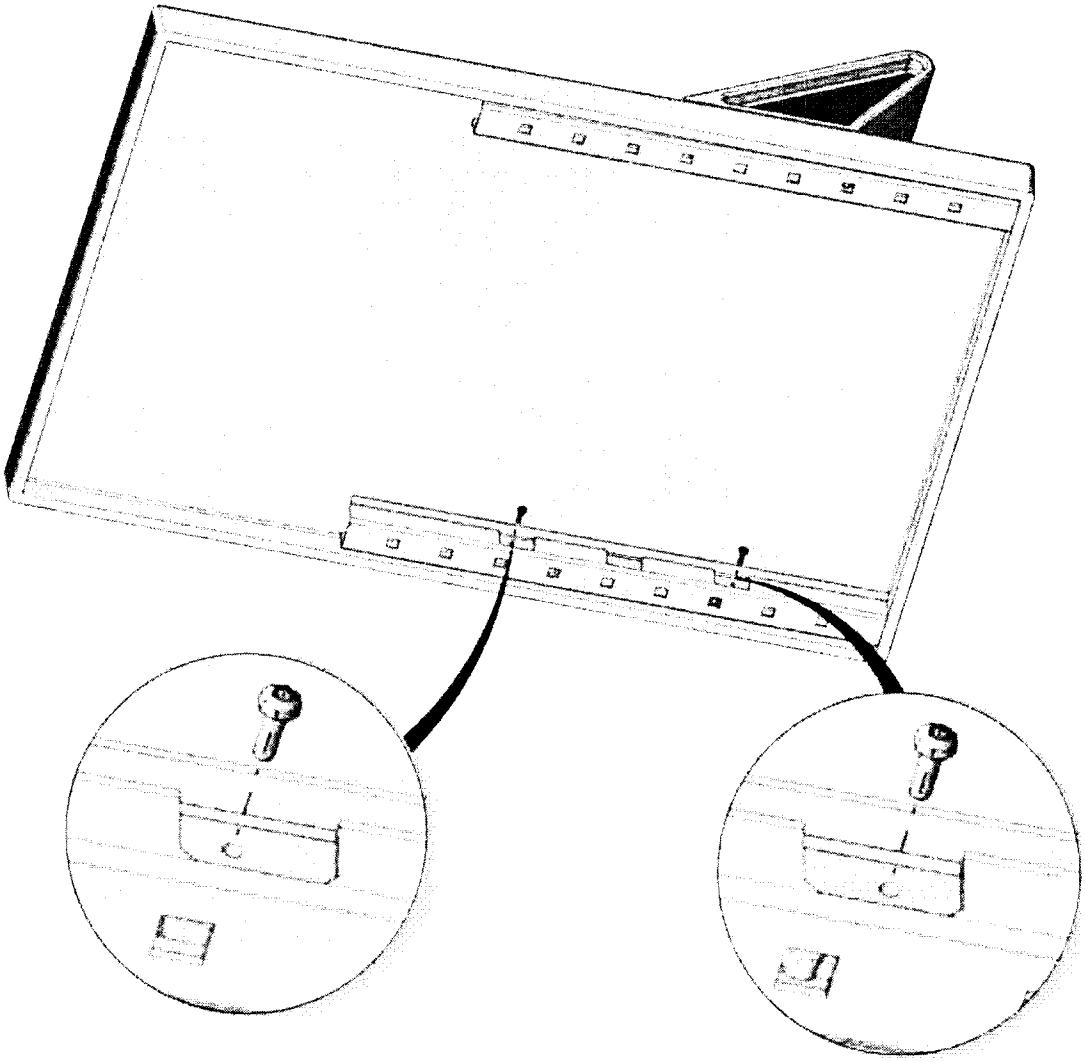


Figure 9 - Dismantling of the footrest

5 PREVENTION AND MAINTENANCE A

Equipment installed in aquatic complex, often sealed with a high moisture level, require special attention in regards to their maintenance. In fact, the stainless steel parts found on ladders, fences or swimming starting blocks can have corrosion if they are not frequently cleaned.

Stainless steel is an excellent product that needs to be very clean to keep its stainless quality.

When you receive your new equipment, it is important to establish a maintenance program to avoid the stainless steel parts to deteriorate. Indeed, lack of maintenance can make the chromium oxide film inefficient, which could cause corrosion on your equipment. A dirty surface is the biggest ally of corrosion and your biggest enemy.

Dirt, grease and deposit left by users or by contaminated water deposit must be removed by cleaning the surface with **fresh water** (do not use the pool's water) and wiped, if possible, with a clean dry cloth.

A basic cleaning of the starting blocks' inner and outer surfaces (without disassembling) must be done **regularly,** preferably every week.

A thorough cleaning with removal of the top (see manual) must be done **regularly,** several times a year, depending on the degree of contamination of the stainless steel. You must pay extra attention to the RBD (Relay Break Detection) and the handles (backstroke ledge).

Concerning dismantling, it is imperative to use tools that are specially designed for stainless steel.

Applying a hydrophobic (insoluble in water) silicone type B 431 also increases the protection of the sensitive areas of the 0S814 against corrosion.

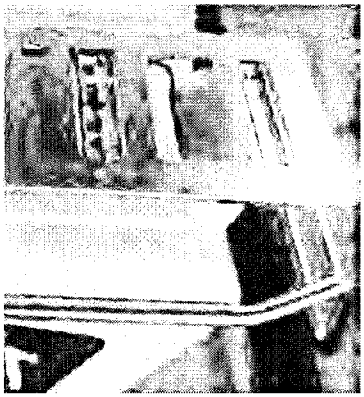
A tube of this silicone is provided with each mounting set and must be used in case it is dispersed and after each thorough cleaning or rehabilitation.

If your equipment is already showing significant dirt deposits, you need to get rid of them in order that the oxygen from the air gets in contact with the chromium in the stainless steel to form the protective chromium oxide film.

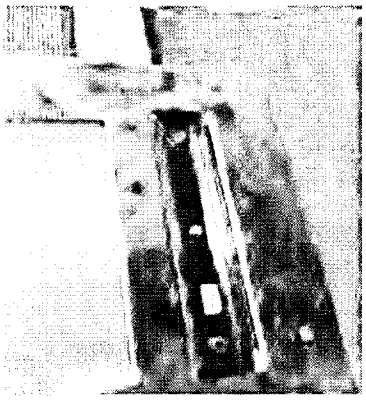
A thorough cleaning with fresh water should be sufficient. If some dirt remains, rub with a nylon pad or a cotton cloth. Make sure the pad you use is not rough to prevent it damaging the protective film or the aesthetic finish of the product.

After a **thorough cleaning,** clean the stainless steel with fresh water **twice a week** during a few months and then decrease the frequency.

Never use a metal brush, steel wool, emery paper or any abrasive material to clean. Indeed, stainless steel would be contaminated by a large quantity of undesirable particles which inevitably would cause rust stains.



OSB *properly maintained*



OSB *poorly maintained*

REMINDER

- **A** weekly **basic cleaning** is required.
- **A thorough cleaning** must be done regularly, several times a year.
- You must use **fresh water** for cleaning.
- Never use abrasive material to clean the stainless steel parts.
- Drying the stainless steel parts must be done using a clean dry cloth.
- Use specially dedicated stainless steel tools for dismantling the starting blocks.
- Applying a hydrophobic silicone type B431 increases the protection of the sensitive areas against corrosion.

6 APPENDICE

6.1 Index figures

6.2 Version history

Version	Date	Modifications since last version
1.0	15/05/14	Initial version
1.1	26/06/14	Improvement of prevention and maintenance chapter (addition of silicon type 8 431)
1.2	11/01/16	Updated screws M8x40 by screws M8x45 and new drilling depth max 95mm instead of 100mm
1.3	14/09/16	Update drawing dimensions page 6

Appendix C – Aquarena & Field House VFA Reports

System Renewa ll Report
by Renewal Action FY

Region: ALL REGIONS
Campus: Memorial University of Newfoundland - St John's

Currency: CAD **Period:** 10 years **Inflation:** 0%

Year: 2020

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	B1010 - Floor Construction	Suspended Slab	75	2020 (Observed)	5.89	635	3,740	3,740
Aquarena-AQ	B2010 - Exterior Walls	Caulking	15	2020 (Observed)	12,361.90	1	12,362	12,362
Aquarena-AQ	B2010 - Exterior Walls	Brick Veneers	15	2020 (Observed)	12.00	9,200	110,400	27,600
Aquarena-AQ	C3020 - Floor Finishes	Chemical Storage Room Floor	30	2020 (Observed)	3,183.88	1	3,184	3,980
Aquarena-AQ	D2094 - Pool Piping and Equipment	Teaching Pool Piping and Circulating Pumps	20	2020 (Observed)	17,306.66	1	17,307	19,383
Aquarena-AQ	D2094 - Pool Piping and Equipment	Pool Diving Air Cushion Compressor and Controls	30	2020 (Observed)	150,000.00	1	150,000	168,000
Aquarena-AQ	D3050 - Terminal and Package Units	AHU #1 for Pool Area	25	2020 (Observed)	191,032.34	1	191,032	238,790
Aquarena-AQ	D3050 - Terminal and Package Units	AHU #2 for Changing Rooms	25	2020 (Observed)	128,563.76	1	128,564	160,705
Aquarena-AQ	D3050 - Terminal and Package Units	Supply/Return Fans Upper Level Fitness	25	2020 (Observed)	23,734.87	1	23,735	29,669
Aquarena-AQ	D4010 - Sprinklers	Sprinklers - Wet	35	2020 (Observed)	4.12	63,105	259,993	324,991
Aquarena-AQ	D5020 - Lighting and Branch Wiring	Lighting T12 Service Rooms	20	2020 (Observed)	6.39	3,080	19,681	24,602
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814
Aquarena-AQ	E1090 - Other Equipment	Spring Boards - boards only	5	2020 (Observed)	5,562.85	4	22,251	11,126

Total Renewal Cost for 2020: 1,052,761

Year: 2021

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	D5010 - Electrical Service and Distribution	Transformer - 225 KVA (Main)	45	2021 (Observed)	31,838.74	1	31,839	39,798

System Renewal Report
by Renewal Action FY

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2021: 67,613

Year: 2022

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	D3050 - Terminal and Package Units	Fitness Room HVAC	20	2022 (Observed)	1,500.00	9	13,500	13,500
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2022: 41,314

Year: 2023

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	C3020 - Floor Finishes	Pool Waterproofing	12	2023 (Observed)	150,000.00	1	150,000	187,500
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2023: 215,314

Year: 2024

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	D2010 - Plumbing Fixtures	Plumbing Fixtures - Fitness Club L2	30	2024 (Observed)	1,782.97	12	21,396	26,745
Aquarena-AQ	D2020 - Domestic Water Distribution	Water Heater/ Freezer - Tim Hortons	20	2024 (Observed)	14,092.57	1	14,093	15,784
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2024: 70,343

Year: 2025

System Renewal Report
by Renewal Action FY

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	C3020 - Floor Finishes	Rubber Sports Floor	20	2025 (Observed)	17.83	5,660	100,918	126,147
Aquarena-AQ	C3030 - Ceiling Finishes	Ceiling Finishes - Acoustical Tile - Poor	20	2025 (Observed)	7.96	1,700	13,532	16,915
Aquarena-AQ	D2020 - Domestic Water Distribution	Shower Water Heaters - Fitness Club	15	2025 (Observed)	9,169.58	1	9,170	10,270
Aquarena-AQ	D2030 - Sanitary Waste	Sanitary Drainage	45	2025 (Observed)	2.54	63,105	160,287	160,287
Aquarena-AQ	D2094 - Pool Piping and Equipment	Pool Piping Filtering	20	2025 (Observed)	176,775.15	1	176,775	197,988
Aquarena-AQ	D5010 - Electrical Service and Distribution	Electrical Service and Distribution	40	2025 (Observed)	350,000.00	1	350,000	437,500
Aquarena-AQ	D5020 - Lighting and Branch Wiring	Branch Wiring	40	2025 (Observed)	3.71	61,515	228,221	285,276
Aquarena-AQ	D5037 - Fire Alarm Systems	Fire Alarm Panel and Devices	25	2025 (Observed)	65,831.21	1	65,831	65,831
Aquarena-AQ	E1090 - Other Equipment	Pool Equipment and Accessories	30	2025 (Observed)	400,000.00	2	800,000	1,000,000
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814
Aquarena-AQ	E1090 - Other Equipment	Spring Boards	15	2025 (Observed)	85,105.02	1	85,105	85,105
Aquarena-AQ	E1090 - Other Equipment	Spring Boards - boards only	5	2020 (Observed)	5,562.85	4	22,251	11,126

Total Renewal Cost for 2025: 2,424,259

Year: 2026

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	D2010 - Plumbing Fixtures	Plumbing Fixtures - Fitness Club	30	2026 (Observed)	1,782.97	17	30,310	37,888
Aquarena-AQ	D2010 - Plumbing Fixtures	Showers - Public	10	2026 (Observed)	1,782.97	7	12,481	15,601
Aquarena-AQ	D5030 - Communications and Security	Communications and Security	25	2026 (Observed)	114,619.54	1	114,620	143,274
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2026: 224,578

Year: 2027

System Renewal Report
by Renewal Action FY

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	B3010 - Roof Coverings	Modified Bitumen Roof Membrane (2004)	20	2027 (Observed)	26.75	54,000	1,444,500	1,805,625
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2027: 1,833,439

Year: 2028

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	C3010 - Wall Finishes	Wall Finishes	10	2028 (Observed)	2.53	63,105	159,656	199,570
Aquarena-AQ	D3050 - Terminal and Package Units	Party Room \ Lower Fitness HVAC	20	2028 (Observed)	1,500.00	24	36,000	36,000
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2028: 263,384

Year: 2029

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	D2010 - Plumbing Fixtures	Showers - Fitness Club	20	2029 (Observed)	1,782.97	12	21,396	26,745
Aquarena-AQ	D2094 - Pool Piping and Equipment	Pool Water Heaters	20	2029 (Observed)	5,750.00	5	28,750	32,200
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814

Total Renewal Cost for 2029: 86,759

Year: 2030

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	B2030 - Exterior Doors	Metal Service Secondary Doors	20	2030 (Observed)	1,450.00	14	20,300	25,375
Aquarena-AQ	C3030 - Ceiling Finishes	Ceiling Finishes - Acoustical Tile L2	20	2030 (Observed)	7.96	5,228	41,615	52,019
Aquarena-AQ	D2020 - Domestic Water Distribution	Domestic Water Distribution Piping	45	2030 (Observed)	3.54	63,105	223,392	250,199

System Renewal Report
by Renewal Action FY

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Aquarena-AQ	D2020 - Domestic Water Distribution	Shower Water Heaters - Fitness Club	15	2030 (Observed)	9,169.58	1	9,170	10,270
Aquarena-AQ	D2094 - Pool Piping and Equipment	Pool Chemistry Controller	20	2030 (Observed)	6,378.74	1	6,379	7,144
Aquarena-AQ	E1090 - Other Equipment	Diving Platforms	30	2030 (Observed)	435,330.99	1	435,331	435,331
Aquarena-AQ	E1090 - Other Equipment	Fitness Equipment	1	2020 (Observed)	27,814.29	1	27,814	27,814
Aquarena-AQ	E1090 - Other Equipment	Spring Boards - boards only	5	2020 (Observed)	5,562.85	4	22,251	11,126
Aquarena-AQ	E2012 - Fixed Casework	Lockers - Coin Operated	45	2030 (Observed)	955.16	500	477,580	596,975

Total Renewal Cost for 2030: 1,416,252

Memorial University of Newfoundland - St John's Total Renewal Cost: 7,696,016

ALL REGIONS Total Renewal Cost: 7,696,016

Summary Total Renewal Cost: 7,696,016

Asset Detail Report
By Asset Name

Region: ALL REGIONS **Asset:** Aquarena
Campus: Memorial University of Newfoundland - St John's **Asset Number:** AQ

Assets are ordered by Asset Name **Currency: CAD**

Statistics

FCI Cost:	3,721,407	**FCI:**	0.21
RI Cost:	3,721,407	**RI:**	0.21
Total Requirements Cost:	3,721,408		
Current Replacement Value:	17,417,384	**Date of most Recent Assessment:**	-
Type	Building		
Area	63,105 SF		
Use	Aquatic Facility	**Construction Type**	
Floors	1	**Historical Category**	
Address 1	-	**City**	-
Address 2	-	**State/Province/Region**	-
Year Constructed	1976	**Zip/Postal Code**	
Year Renovated	-	**Architect**	-
Ownership	Partnership	**Commission Date**	-
		Decommission Date	-

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Supply/Return Fans Upper Level Fitness Renewal	Yes	D3050 - Terminal and Package Units	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	29,669
Pool Equipment and Accessories Renewal	Yes	E1090 - Other Equipment	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	1,000,000
Chemical Storage Room Floor Renewal	Yes	C3020 - Floor Finishes	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	3,980
Transformer - 225 KVA (Main) Renewal	Yes	D5010 - Electrical Service and Distribution	Beyond Useful Life	1- Currently Critical	Nov 20, 2020	39,798
Suspended Slab Renewal	Yes	B1010 - Floor Construction	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	3,740
Pool Piping Filtering Renewal	Yes	D2094 - Pool Piping and	Beyond Useful Life	3- Necessary - Not Yet	Nov 20, 2024	197,988

Asset Detail Report
By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
		Equipment		Critical		
Pool Waterproofing Renewal	Yes	C3020 - Floor Finishes	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2022	187,500
Fire Alarm Panel and Devices Renewal	Yes	D5037 - Fire Alarm Systems	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	65,831
Brick Veneers Renewal	Yes	B2010 - Exterior Walls	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	27,600
Caulking Renewal	Yes	B2010 - Exterior Walls	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	12,362
Shower Water Heaters - Fitness Club Renewal	Yes	D2020 - Domestic Water Distribution	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	10,270
Teaching Pool Piping and Circulating Pumps Renewal	Yes	D2094 - Pool Piping and Equipment	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	19,383
Fitness Equipment Renewal	Yes	E1090 - Other Equipment	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	27,814
Water Heater/ Freezer - Tim Hortons Renewal	Yes	D2020 - Domestic Water Distribution	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2023	15,784
Sanitary Drainage Renewal	Yes	D2030 - Sanitary Waste	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	160,287
Electrical Service and Distribution Renewal	Yes	D5010 - Electrical Service and Distribution	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	437,500
Ceiling Finishes - Acoustical Tile - Poor Renewal	Yes	C3030 - Ceiling Finishes	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	16,915
Plumbing Fixtures - Fitness Club L2 Renewal	Yes	D2010 - Plumbing Fixtures	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2023	26,745
Spring Boards Renewal	Yes	E1090 - Other Equipment	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	85,105
Rubber Sports Floor Renewal	Yes	C3020 - Floor	Beyond	3- Necessary	Nov 20, 2024	126,147

Asset Detail Report
By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
		Finishes	Useful Life	- Not Yet Critical		
Sprinklers - Wet Renewal	Yes	D4010 - Sprinklers	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	324,991
Lighting T12 Service Rooms Renewal	Yes	D5020 - Lighting and Branch Wiring	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	24,602
Branch Wiring Renewal	Yes	D5020 - Lighting and Branch Wiring	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 20, 2024	285,276
AHU #2 for Changing Rooms Renewal	Yes	D3050 - Terminal and Package Units	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	160,705
AHU #1 for Pool Area Renewal	Yes	D3050 - Terminal and Package Units	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	238,790
Fitness Room HVAC Renewal	Yes	D3050 - Terminal and Package Units	Beyond Useful Life	2- Potentially Critical	Nov 20, 2021	13,500
Pool Diving Air Cushion Compressor and Controls Renewal	Yes	D2094 - Pool Piping and Equipment	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	168,000
Spring Boards - boards only Renewal	Yes	E1090 - Other Equipment	Beyond Useful Life	1- Currently Critical	Nov 20, 2019	11,126
Total						**3,721,408**

Asset Detail Report
By Asset Name

Region: ALL REGIONS **Asset:** Field House
Campus: Memorial University of Newfoundland - St John's **Asset Number:** FH

Assets are ordered by Asset Name **Currency: CAD**

Statistics

FCI Cost:	3,090,580	**FCI:**	0.12
RI Cost:	3,090,580	**RI:**	0.12
Total Requirements Cost:	3,090,579		
Current Replacement Value:	24,894,294	**Date of most Recent Assessment:**	-
Type	Building		
Area	92,300 SF		
Use	Athletic Facility / Gymnasium	**Construction Type**	
Floors	1	**Historical Category**	
Address 1	-	**City**	-
Address 2	-	**State/Province/Region**	-
Year Constructed	2001	**Zip/Postal Code**	
Year Renovated	-	**Architect**	-
Ownership	Partnership	**Commission Date**	-
		Decommission Date	-

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
DHW Heater/Tanks Renewal	Yes	D2022 - Hot Water Service	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 19, 2024	23,234
Fire Alarm Panel Renewal	Yes	D5037 - Fire Alarm Systems	Beyond Useful Life	2- Potentially Critical	Nov 19, 2021	19,103
Floor Finishes - Walking Track Renewal	Yes	C3020 - Floor Finishes	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 19, 2024	119,771
Floor Finishes – Runnig Track Renewal	Yes	C3020 - Floor Finishes	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 19, 2024	455,050
~2018 Envelope Weather Proofing EPC-005-14 Renewal	Yes	B20 - Exterior Enclosure	Beyond Useful Life	1- Currently Critical	Mar 20, 2019	-47,405
Roof Membrane - Mod Bit Renewal	Yes	B3010 - Roof	Beyond	2- Potentially	Nov 19, 2021	2,424,219

Asset Detail Report
By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
		Coverings	Useful Life	Critical		
Exterior Doors - Metal Electrical and South Renewal	Yes	B2030 - Exterior Doors	Beyond Useful Life	1- Currently Critical	Nov 19, 2019	8,596
Exterior Metal Walls South Elevation - Painting Renewal	Yes	B2010 - Exterior Walls	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 19, 2022	18,543
Block Exterior Walls - Repairs/Repointing Renewal	Yes	B2010 - Exterior Walls	Beyond Useful Life	1- Currently Critical	Nov 19, 2019	50,925
Exterior Metal Walls North Elevation - Painting Renewal	Yes	B2010 - Exterior Walls	Beyond Useful Life	3- Necessary - Not Yet Critical	Nov 19, 2022	18,543
Total						**3,090,579**

System List Report
By AssetName

Currency : CAD

Region: ALL REGIONS
Campus: Memorial University of Newfoundland - St John's

Asset: Aquarena AQ
Asset Size: 63,105 SF
Asset Replacement Value: 17,417,384

System Category	System Name	Lifetime	SCI	Renewal Action FY	Date Inspected	Renewal Action Cost	Replacement Cost
A1010 - Standard Foundations	Concrete Foundations - Abutments	75	0.00	2052	Nov 20, 2019	116,744	116,744
A1030 - Slab on Grade	Slab on Grade and Pool Structure	75	0.00	2052	Nov 20, 2019	23,231	371,688
A2020 - Basement Walls	Basement Walls	75	0.00	2052	Nov 20, 2019	41,886	670,175
B10 - Superstructure	Structural Steel	40	0.00	2035	Nov 20, 2019	127,355	127,355
B1010 - Floor Construction	Suspended Slab	75	1.00	2020	Nov 20, 2019	3,740	3,740
B1020 - Roof Construction	Roof Construction	75	0.00	2052	Nov 20, 2019	82,589	1,321,419
B2010 - Exterior Walls	Brick Veneers	15	0.25	2020	Nov 20, 2019	27,600	110,400
B2010 - Exterior Walls	Caulking	15	1.00	2020	Nov 20, 2019	12,362	12,362
B2010 - Exterior Walls	Cedar Cladding - North Elevation	30	0.00	2042	Nov 20, 2019	432,666	432,666
B2010 - Exterior Walls	Cedar Cladding - South Elevation	30	0.00	2043	Nov 20, 2019	803,524	803,524
B2030 - Exterior Doors	Exterior Doors Aluminum- Main and Secondary Entrance	40	0.00	2035	Nov 20, 2019	30,000	24,000
B2030 - Exterior Doors	Metal Service Secondary Doors	20	0.00	2030	Nov 20, 2019	25,375	20,300
B3010 - Roof Coverings	Modified Bitumen Roof Membrane (2004)	20	0.00	2027	Nov 20, 2019	1,805,625	1,444,500
C1010 - Partitions	Partitions Painted Block	50	0.00	2070	Nov 20, 2019	40,294	64,367
C1020 - Interior Doors	Interior Doors	50	0.00	2035	Nov 20, 2019	113,100	150,800
C3010 - Wall Finishes	Wall Finishes	10	0.00	2028	Nov 20, 2019	199,570	159,656
C3020 - Floor Finishes	Chemical Storage Room Floor	30	1.25	2020	Nov 20, 2019	3,980	3,184
C3020 - Floor Finishes	Epoxy Floors - Locker Rooms Main Floor	20	0.00	2032	Nov 20, 2019	74,171	74,171
C3020 - Floor Finishes	Lower level Washrooms Tile Floor	45	0.00	2045	Nov 20, 2019	130,419	104,335
C3020 - Floor Finishes	Pool Waterproofing	12	1.25	2023	Nov 20, 2019	187,500	150,000
C3020 - Floor Finishes	Quary Tile Diving Platform	60	0.00	2036	Nov 20, 2019	46,578	37,262
C3020 - Floor Finishes	Rubber Sports Floor	20	1.25	2025	Nov 20, 2019	126,147	100,918
C3020 - Floor Finishes	Squash Court Flooring	40	0.00	2035	Nov 20, 2019	22,344	17,875
C3020 - Floor Finishes	Unfinished Conrete	45	0.00	2040	Nov 20, 2019	0	0
C3020 - Floor Finishes	Vinyl Sheet Flooring	25	0.00	2039	Nov 20, 2019	64,881	51,905
C3020 - Floor Finishes	Vinyl Sheet Flooring	25	0.00	2041	Nov 20, 2019	50,237	40,189
C3030 - Ceiling Finishes	Cedar Roof Planking	35	0.00	2035	Nov 20, 2019	1,535,686	1,228,549
C3030 - Ceiling Finishes	Ceiling Finishes - Acoustical Tile - L1	20	0.00	2036	Nov 20, 2019	36,118	28,895
C3030 - Ceiling Finishes	Ceiling Finishes - Acoustical Tile - Poor	20	1.25	2025	Nov 20, 2019	16,915	13,532
C3030 - Ceiling Finishes	Ceiling Finishes - Acoustical Tile Basement	20	0.00	2034	Nov 20, 2019	37,810	30,248
C3030 - Ceiling Finishes	Ceiling Finishes - Acoustical Tile L2	20	0.00	2030	Nov 20, 2019	52,019	41,615
C3030 - Ceiling Finishes	Ceiling Finishes - FRP Suspended Tile - Showers	20	0.00	2036	Nov 20, 2019	7,520	6,016
D1010 - Elevators and Lifts	Elevator	40	0.00	2043	Nov 20, 2019	255,729	255,729
D2010 - Plumbing Fixtures	Plumbing Fixtures - Fitness Club	30	0.00	2026	Nov 20, 2019	37,888	30,310
D2010 - Plumbing Fixtures	Plumbing Fixtures - Fitness Club L2	30	1.25	2024	Nov 20, 2019	26,745	21,396
D2010 - Plumbing Fixtures	Plumbing Fixtures - Public	30	0.00	2046	Nov 20, 2019	71,319	57,055
D2010 - Plumbing Fixtures	Showers - Fitness Club	20	0.00	2029	Nov 20, 2019	26,745	21,396
D2010 - Plumbing Fixtures	Showers - Public	10	0.00	2026	Nov 20, 2019	15,601	12,481
D2020 - Domestic Water Distribution	Domestic Water Distribution Piping	45	0.00	2030	Nov 20, 2019	250,199	223,392
D2020 - Domestic Water Distribution	Shower Water Heaters - Fitness Club	15	1.12	2025	Nov 20, 2019	10,270	9,170
D2020 - Domestic Water Distribution	Shower Water Heaters - Fitness Club	15	0.00	2030	Nov 20, 2019	10,270	9,170
D2020 - Domestic Water Distribution	Shower Water Heaters - Heat Exchanger	30	0.00	2040	Nov 20, 2019	48,736	43,514
D2020 - Domestic Water Distribution	Water Heater/ Freezer - Tim Hortons	20	1.12	2024	Nov 20, 2019	15,784	14,093
D2030 - Sanitary Waste	Sanitary Drainage	45	1.00	2025	Nov 20, 2019	160,287	160,287
D2094 - Pool Piping and Equipment	Pool Chemistry Controller	20	0.00	2030	Nov 20, 2019	7,144	6,379
D2094 - Pool Piping and Equipment	Pool Diving Air Cushion Compressor and Controls	30	1.12	2020	Nov 20, 2019	168,000	150,000
D2094 - Pool Piping and Equipment	Pool Piping Filtering	20	1.12	2025	Nov 20, 2019	197,988	176,775

System List Report
By AssetName

Currency : CAD

System Category	System Name	Lifetime	SCI	Renewal Action FY	Date Inspected	Renewal Action Cost	Replacement Cost
D2094 - Pool Piping and Equipment	Pool Water Circulation Motors	30	0.00	2037	Nov 20, 2019	63,677	63,677
D2094 - Pool Piping and Equipment	Pool Water Heaters	20	0.00	2029	Nov 20, 2019	32,200	28,750
D2094 - Pool Piping and Equipment	Teaching Pool Piping and Circulating Pumps	20	1.12	2020	Nov 20, 2019	19,383	17,307
D3050 - Terminal and Package Units	AHU #1 for Pool Area	25	1.25	2020	Nov 20, 2019	238,790	191,032
D3050 - Terminal and Package Units	AHU #2 for Changing Rooms	25	1.25	2020	Nov 20, 2019	160,705	128,564
D3050 - Terminal and Package Units	Fitness Room HVAC	20	1.00	2022	Nov 20, 2019	13,500	13,500
D3050 - Terminal and Package Units	HRV's for Lower Level Changing Rooms	25	0.00	2034	Nov 20, 2019	24,106	19,285
D3050 - Terminal and Package Units	Party Room \ Lower Fitness HVAC	20	0.00	2028	Nov 20, 2019	36,000	36,000
D3050 - Terminal and Package Units	Supply/Return Fans Upper Level Fitness	25	1.25	2020	Nov 20, 2019	29,669	23,735
D4010 - Sprinklers	Sprinklers - Wet	35	1.25	2020	Nov 20, 2019	324,991	259,993
D5010 - Electrical Service and Distribution	Electrical Service and Distribution	40	1.25	2025	Nov 20, 2019	437,500	350,000
D5010 - Electrical Service and Distribution	Transformer - 225 KVA (Main)	45	1.25	2021	Nov 20, 2019	39,798	31,839
D5010 - Electrical Service and Distribution	Transformer - 45KVA Tim Hortons	45	0.00	2045	Nov 20, 2019	12,736	10,188
D5020 - Lighting and Branch Wiring	Branch Wiring	40	1.25	2025	Nov 20, 2019	285,276	228,221
D5020 - Lighting and Branch Wiring	Branch Wiring - Tim Hortons	40	0.00	2040	Nov 20, 2019	21,300	17,040
D5020 - Lighting and Branch Wiring	Lighting - LED High Bay	20	0.00	2036	Nov 20, 2019	181,250	145,000
D5020 - Lighting and Branch Wiring	Lighting LED	20	0.00	2036	Nov 20, 2019	223,690	178,952
D5020 - Lighting and Branch Wiring	Lighting T12 Service Rooms	20	1.25	2020	Nov 20, 2019	24,602	19,681
D5030 - Communications and Security	Communications and Security	25	0.00	2026	Nov 20, 2019	143,274	114,620
D5037 - Fire Alarm Systems	Fire Alarm Panel and Devices	25	1.00	2025	Nov 20, 2019	65,831	65,831
D5092 - Emergency Light and Power Systems	Battery Backup	25	0.00	2037	Nov 20, 2019	73,360	58,688
D5092 - Emergency Light and Power Systems	Generator	35	0.00	2044	Nov 20, 2019	58,572	58,572
E1090 - Other Equipment	Diving Platforms	30	0.00	2030	Nov 20, 2019	435,331	435,331
E1090 - Other Equipment	Fitness Equipment	1	1.00	2020	Nov 20, 2019	27,814	27,814
E1090 - Other Equipment	Hot Tub - Fitness Club	30	0.00	2040	Nov 20, 2019	37,843	30,274
E1090 - Other Equipment	Pool Equipment and Accessories	30	1.25	2025	Nov 20, 2019	1,000,000	800,000
E1090 - Other Equipment	Sauna Equipment - Fitness Club	30	0.00	2040	Nov 20, 2019	10,044	8,035
E1090 - Other Equipment	Spring Boards	15	1.00	2025	Nov 20, 2019	85,105	85,105
E1090 - Other Equipment	Spring Boards - boards only	5	0.50	2020	Nov 20, 2019	11,126	22,251
E2012 - Fixed Casework	Lockers - Coin Operated	45	0.00	2030	Nov 20, 2019	596,975	477,580
Asset: Aquarena AQ							**12,900,400**

System List Report
By AssetName

Currency : CAD

Region: ALL REGIONS

Campus: Memorial University of Newfoundland - St John's

Asset: Field House FH

Asset Size: 92,300 SF

Asset Replacement Value: 24,894,294

System Category	System Name	Lifetime	SCI	Renewal Action FY	Date Inspected	Renewal Action Cost	Replacement Cost
A1010 - Standard Foundations	Standard Foundations	75	0.00	2077	Nov 19, 2019	11,711	187,369
A1030 - Slab on Grade	Slab on Grade	75	0.00	2077	Nov 19, 2019	34,151	546,416
B1020 - Roof Construction	Roof Construction	75	0.00	2077	Nov 19, 2019	129,393	2,070,289
B20 - Exterior Enclosure	~2018 Envelope Weather Proofing EPC-005-14	20	1.00	2019	Mar 20, 2019	-47,405	-47,405
B2010 - Exterior Walls	Block Exterior Walls - Architectural Split Face	35	0.00	2045	Nov 19, 2019	106,820	244,440
B2010 - Exterior Walls	Block Exterior Walls - Cyclical Repointing	25	0.00	2027	Nov 19, 2019	162,960	162,960
B2010 - Exterior Walls	Block Exterior Walls - Repairs/Repointing	35	1.00	2020	Nov 19, 2019	50,925	50,925
B2010 - Exterior Walls	Curtain Wall	35	0.00	2037	Nov 19, 2019	467,492	1,069,775
B2010 - Exterior Walls	Exterior Metal Walls North Elevation - Painting	10	1.00	2023	Nov 19, 2019	18,543	18,543
B2010 - Exterior Walls	Exterior Metal Walls South Elevation - Painting	10	1.00	2023	Nov 19, 2019	18,543	18,543
B2010 - Exterior Walls	Exterior Wall Panels	35	0.00	2037	Nov 19, 2019	2,445,120	2,445,120
B2020 - Exterior Windows	Exterior Windows	30	0.00	2035	Nov 19, 2019	41,783	33,427
B2030 - Exterior Doors	Exterior Doors - Main Entrance	30	0.00	2035	Nov 19, 2019	114,421	91,537
B2030 - Exterior Doors	Exterior Doors - Metal	25	0.00	2027	Nov 19, 2019	41,549	33,240
B2030 - Exterior Doors	Exterior Doors - Metal Electrical and South	25	1.25	2020	Nov 19, 2019	8,596	6,877
B2030 - Exterior Doors	Exterior Doors - Metal Overhead	25	0.00	2027	Nov 19, 2019	9,552	7,641
B3010 - Roof Coverings	Roof Membrane - Mod Bit	20	1.25	2022	Nov 19, 2019	2,424,219	1,939,375
C1010 - Partitions	Partitions	50	0.00	2052	Nov 19, 2019	119,026	190,138
C1020 - Interior Doors	Interior Doors	50	0.00	2052	Nov 19, 2019	157,601	126,081
C1030 - Fittings	Fittings	25	0.00	2035	Nov 19, 2019	48,458	38,766
C3010 - Wall Finishes	Painted Wall Finishes	10	0.00	2030	Nov 19, 2019	147,680	118,144
C3020 - Floor Finishes	Floor Finishes - Ceramic Tile	35	0.00	2037	Nov 19, 2019	161,562	129,250
C3020 - Floor Finishes	Floor Finishes - Sheet/VCT	25	0.00	2030	Nov 19, 2019	185,375	148,300
C3020 - Floor Finishes	Floor Finishes - Walking Track	8	1.25	2025	Nov 19, 2019	119,771	95,817
C3020 - Floor Finishes	Floor Finishes – Rubberized	20	0.00	2028	Nov 19, 2019	802,350	641,880
C3020 - Floor Finishes	Floor Finishes – Runnig Track	20	1.25	2025	Nov 19, 2019	455,050	364,040
C3020 - Floor Finishes	Flooring - Replace Wood Flooring	25	0.00	2030	Nov 19, 2019	231,964	185,571
C3020 - Floor Finishes	Hardwood flooring - major refinish	10	0.00	2026	Nov 19, 2019	38,631	30,905
C3020 - Floor Finishes	Hardwood flooring - Varnish	10	0.00	2026	Nov 19, 2019	9,271	7,417
D1010 - Elevators and Lifts	Passenger Elevator EDO-1648	35	0.00	2037	Nov 19, 2019	301,510	241,208
D2010 - Plumbing Fixtures	Plumbing Fixtures - Locker Rooms and Washrooms	30	0.00	2032	Nov 19, 2019	173,840	139,072
D2010 - Plumbing Fixtures	Plumbing Fixtures - Showers	30	0.00	2032	Nov 19, 2019	35,023	28,018
D2020 - Domestic Water Distribution	Domestic Water Distribution	30	0.00	2040	Nov 19, 2019	41,350	36,920
D2022 - Hot Water Service	DHW Circulator Pumps	20	0.00	2030	Nov 19, 2019	17,628	15,329
D2022 - Hot Water Service	DHW Heater/Tanks	20	1.25	2025	Nov 19, 2019	23,234	18,587
D2030 - Sanitary Waste	Sanitary Drainage	45	0.00	2047	Nov 19, 2019	234,442	234,442
D3020 - Heat Generating Systems	Main Glycol Circulating Pumps	30	0.00	2032	Nov 19, 2019	76,062	76,062
D3020 - Heat Generating Systems	Main Glycol Heat Exchanger, Deareator	30	0.00	2032	Nov 19, 2019	150,747	150,747
D3030 - Cooling Generating Systems	Condensor for AHU 6	20	0.00	2031	Nov 19, 2019	124,171	99,337
D3030 - Cooling Generating Systems	Condensors for AHU 7,8,9	20	0.00	2031	Nov 19, 2019	279,384	223,508
D3030 - Cooling Generating Systems	Lunch Area A/C Unit	20	0.00	2031	Nov 19, 2019	18,626	14,901
D3040 - Distribution Systems	AHU #'s 1;2;3;4 Main Gym Area	25	0.00	2030	Nov 19, 2019	1,194,570	955,656
D3040 - Distribution Systems	AHU #'s 7,8,9 Expansion Area	25	0.00	2027	Nov 19, 2019	1,976,910	1,581,528
D3040 - Distribution Systems	AHU# 5 for Change and Locker Rooms	25	0.00	2030	Nov 19, 2019	127,482	101,986
D3040 - Distribution Systems	AHU# 6 for Workout Cardio Area (Roof Top)	25	0.00	2027	Nov 19, 2019	247,584	198,067
D3040 - Distribution Systems	Glycol Circulating Pumps for AHU Loops	30	0.00	2032	Nov 19, 2019	88,467	88,467

System List Report
By AssetName

Currency : CAD

System Category	System Name	Lifetime	SCI	Renewal Action FY	Date Inspected	Renewal Action Cost	Replacement Cost
D3040 - Distribution Systems	Heating Hot Water Circulating Pumps for Perimeter Htg	30	0.00	2032	Nov 19, 2019	44,233	44,233
D3040 - Distribution Systems	Return Air Fans 1,2 and 3	25	0.00	2030	Nov 19, 2019	49,705	39,764
D3050 - Terminal and Package Units	Perimeter and Unit Heating	20	0.00	2035	Nov 19, 2019	118,371	94,697
D4010 - Sprinklers	Sprinklers - Wet	35	0.00	2037	Nov 19, 2019	475,345	380,276
D5010 - Electrical Service and Distribution	Electrical Distribution Local Panels	40	0.00	2042	Nov 19, 2019	722,743	578,195
D5010 - Electrical Service and Distribution	Electrical Service and Distribution	40	0.00	2042	Nov 19, 2019	586,045	468,836
D5020 - Lighting and Branch Wiring	Branch Wiring	30	0.00	2032	Nov 19, 2019	674,944	539,955
D5020 - Lighting and Branch Wiring	Lighting	30	0.00	2029	Mar 14, 2019	82,029	82,029
D5030 - Communications and Security	Communications and Security	25	0.00	2027	Nov 19, 2019	328,170	262,536
D5037 - Fire Alarm Systems	Fire Alarm Panel	20	1.00	2022	Nov 19, 2019	19,103	19,103
Asset: Field House FH							**17,668,838**
Campus: Memorial University of Newfoundland - St John's							**30,569,237**
Region: ALL REGIONS							**30,569,237**
Summary							**30,569,237**

System Renewal Report
by Renewal Action FY

Region: ALL REGIONS
Campus: Memorial University of Newfoundland - St John's

Currency: CAD **Period:** 10 years **Inflation:** 0%

Year: 2020

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	B2010 - Exterior Walls	Block Exterior Walls - Repairs/Repointing	35	2020 (Observed)	20.37	2,500	50,925	50,925
Field House-FH	B2030 - Exterior Doors	Exterior Doors - Metal Electrical and South	25	2020 (Observed)	1,146.19	6	6,877	8,596

Total Renewal Cost for 2020: 59,521

Year: 2022

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	B3010 - Roof Coverings	Roof Membrane - Mod Bit	20	2022 (Observed)	26.75	72,500	1,939,375	2,424,219
Field House-FH	D5037 - Fire Alarm Systems	Fire Alarm Panel	20	2022 (Observed)	19,103.22	1	19,103	19,103

Total Renewal Cost for 2022: 2,443,322

Year: 2023

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	B2010 - Exterior Walls	Exterior Metal Walls South Elevation - Painting	10	2023 (Observed)	18,542.85	1	18,543	18,543
Field House-FH	B2010 - Exterior Walls	Exterior Metal Walls North Elevation - Painting	10	2023 (Observed)	18,542.85	1	18,543	18,543

Total Renewal Cost for 2023: 37,086

Year: 2025

System Renewal Report
by Renewal Action FY

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	C3020 - Floor Finishes	Floor Finishes - Walking Track	8	2025 (Observed)	16.81	5,700	95,817	119,771
Field House-FH	C3020 - Floor Finishes	Floor Finishes – Runnig Track	20	2025 (Observed)	19.16	19,000	364,040	455,050
Field House-FH	D2022 - Hot Water Service	DHW Heater/Tanks	20	2025 (Observed)	9,293.69	2	18,587	23,234

Total Renewal Cost for 2025: 598,055

Year: 2026

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	C3020 - Floor Finishes	Hardwood flooring - major refinish	10	2026 (Observed)	30,904.74	1	30,905	38,631
Field House-FH	C3020 - Floor Finishes	Hardwood flooring - Varnish	10	2026 (Observed)	7,417.13	1	7,417	9,271

Total Renewal Cost for 2026: 47,902

Year: 2027

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	B2010 - Exterior Walls	Block Exterior Walls - Cyclical Repointing	25	2027 (Observed)	20.37	8,000	162,960	162,960
Field House-FH	B2030 - Exterior Doors	Exterior Doors - Metal	25	2027 (Observed)	1,146.19	29	33,240	41,549
Field House-FH	B2030 - Exterior Doors	Exterior Doors - Metal Overhead	25	2027 (Observed)	7,641.30	1	7,641	9,552
Field House-FH	D3040 - Distribution Systems	AHU #'s 7,8,9 Expansion Area	25	2027 (Observed)	527,175.99	3	1,581,528	1,976,910
Field House-FH	D3040 - Distribution Systems	AHU# 6 for Workout Cardio Area (Roof Top)	25	2027 (Observed)	198,067.41	1	198,067	247,584
Field House-FH	D5030 - Communications and Security	Communications and Security	25	2027 (Observed)	262,536.03	1	262,536	328,170

Total Renewal Cost for 2027: 2,766,725

Year: 2028

System Renewal Report
by Renewal Action FY

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	C3020 - Floor Finishes	Floor Finishes – Rubberized	20	2028 (Observed)	17.83	36,000	641,880	802,350

Total Renewal Cost for 2028: 802,350

Year: 2029

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	D5020 - Lighting and Branch Wiring	Lighting	30	2029 (Observed)	82,029.20	1	82,029	82,029

Total Renewal Cost for 2029: 82,029

Year: 2030

Asset	System	System Name	Lifetime (Years)	Modeled System Renewal FY	Unit Cost	Quantity	Replacement Cost	Renewal Action Cost
Field House-FH	C3010 - Wall Finishes	Painted Wall Finishes	10	2030 (Observed)	1.28	92,300	118,144	147,680
Field House-FH	C3020 - Floor Finishes	Flooring - Replace Wood Flooring	25	2030 (Observed)	22.91	8,100	185,571	231,964
Field House-FH	C3020 - Floor Finishes	Floor Finishes - Sheet/VCT	25	2030 (Observed)	14.83	10,000	148,300	185,375
Field House-FH	D2022 - Hot Water Service	DHW Circulator Pumps	20	2030 (Observed)	3,832.20	4	15,329	17,628
Field House-FH	D3040 - Distribution Systems	AHU# 5 for Change and Locker Rooms	25	2030 (Observed)	101,985.69	1	101,986	127,482
Field House-FH	D3040 - Distribution Systems	AHU #'s 1;2;3;4 Main Gym Area	25	2030 (Observed)	238,913.94	4	955,656	1,194,570
Field House-FH	D3040 - Distribution Systems	Return Air Fans 1,2 and 3	25	2030 (Observed)	13,254.59	3	39,764	49,705

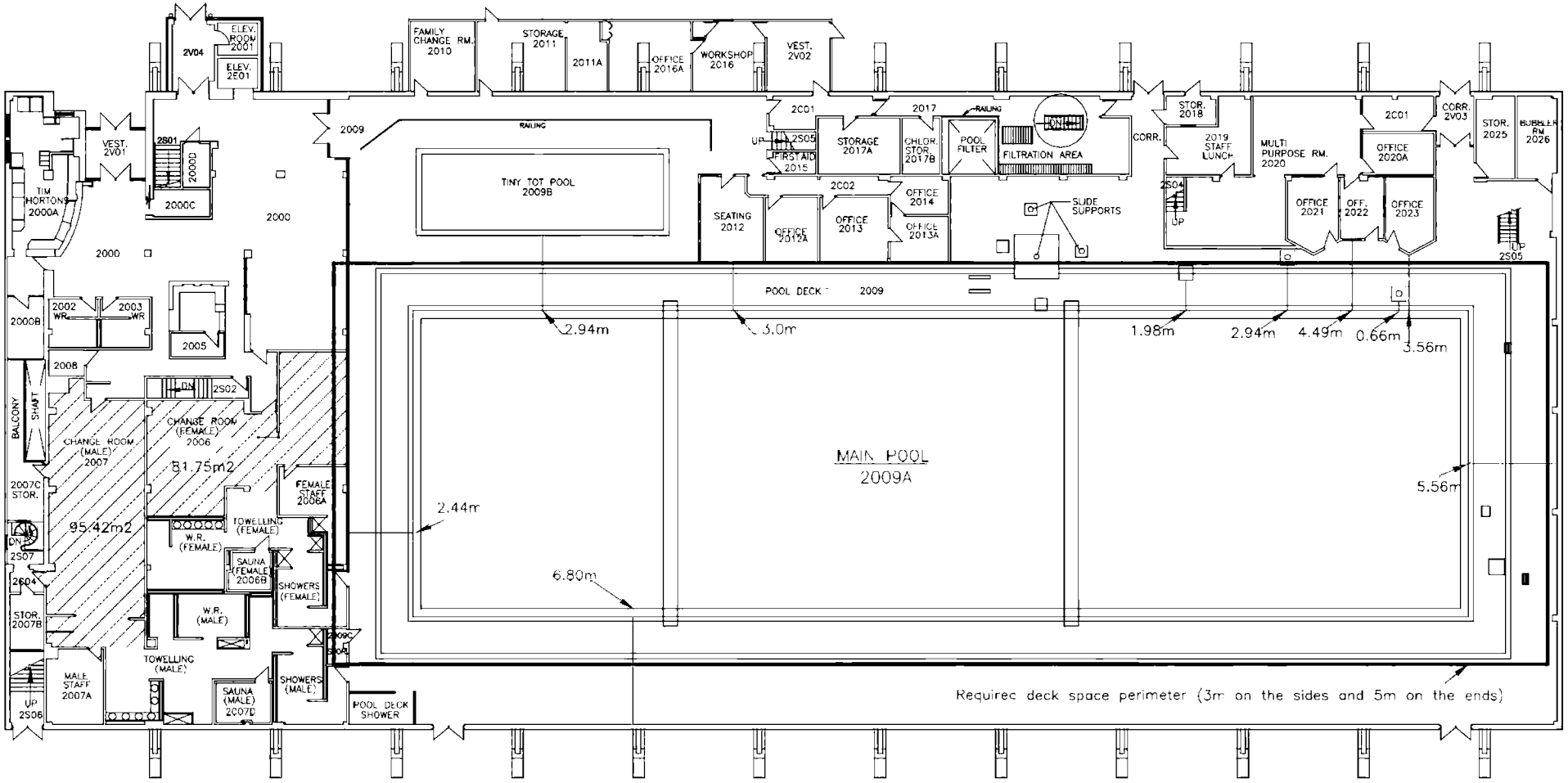
Total Renewal Cost for 2030: 1,954,403

Memorial University of Newfoundland - St John's Total Renewal Cost: 8,791,395

ALL REGIONS Total Renewal Cost: 8,791,395

Summary Total Renewal Cost: 8,791,395

Appendix D – Reference Drawings



SK-1AQ POOL DECK AND

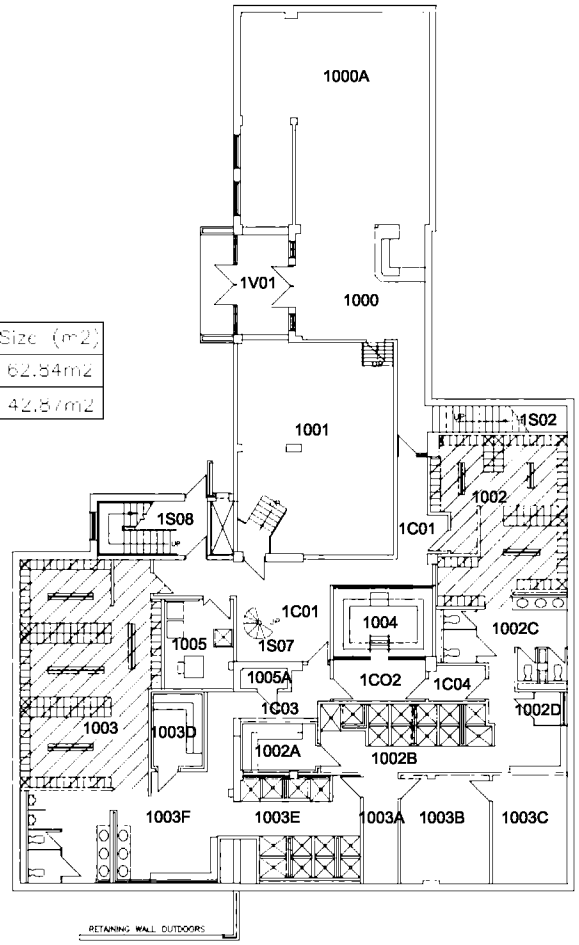
NTS CHANGE ROOM MEASUREMENTS

[redacted]

Capital Management Engineering Limited

004-17-01-24

Room #	Size (m2)
1003	62.84m2
1002	42.87m2



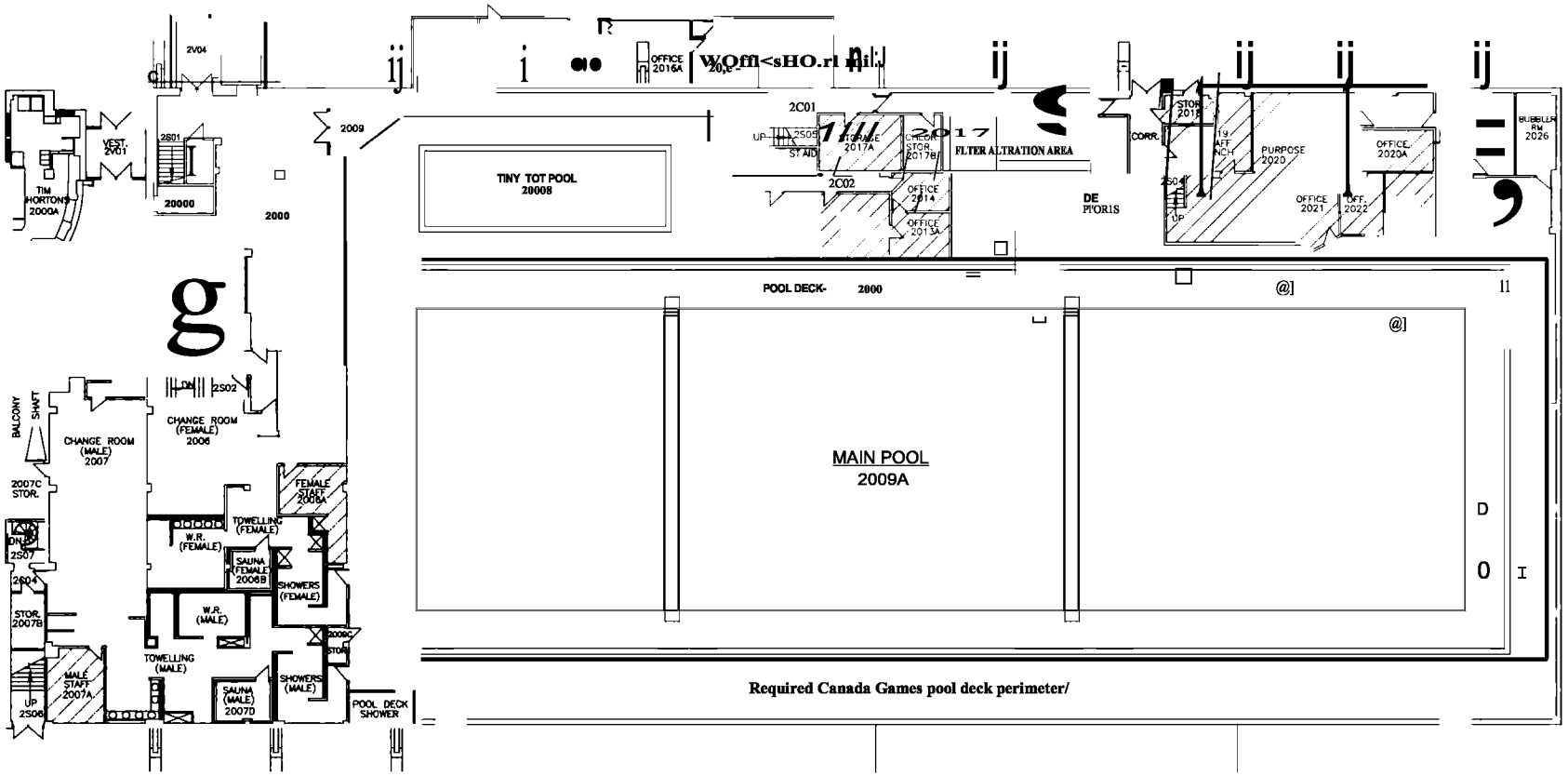
SK-2AQ CHANGE ROOM

NTS MEASUREMENTS

[redacted]

Capitol Management Engineering Limited

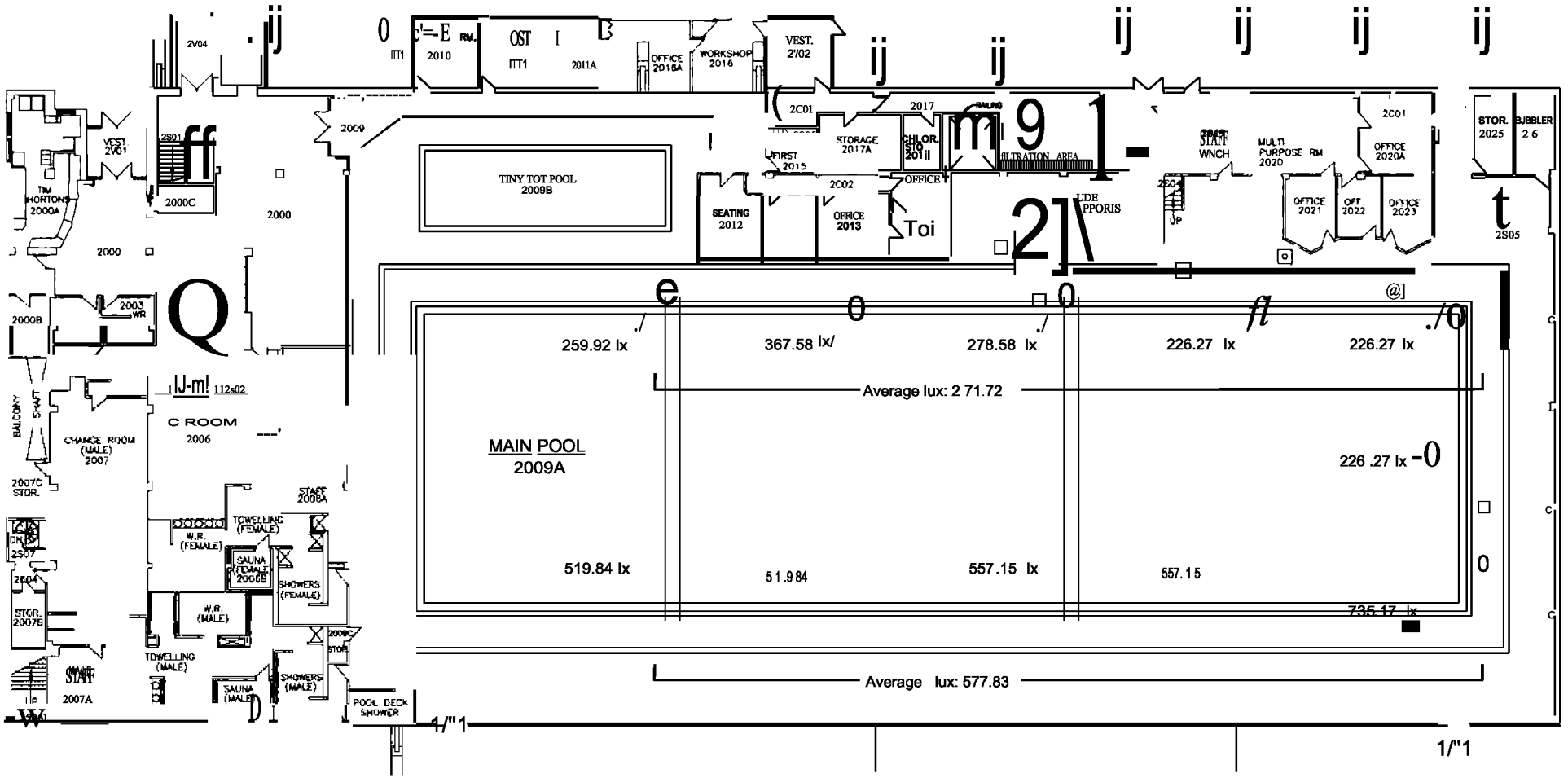
Room f	Size (m2)
2007A	16.62m2
2006A	17.58m2
2010	17.95m2
2012	19.53m2
2012A	13.30m2
2013	17.40m2
2013A	10.34m2
2014	8.63m2
2021	13.83m2
2022	10.46m2
2023	13.28m2
2017A	18.17m2
2018	5.59m2
2019	20.05m2
2020	63.53m2
2020A	11.79m21



SK-3AQ ADDITIONAL ROOMS

NTS

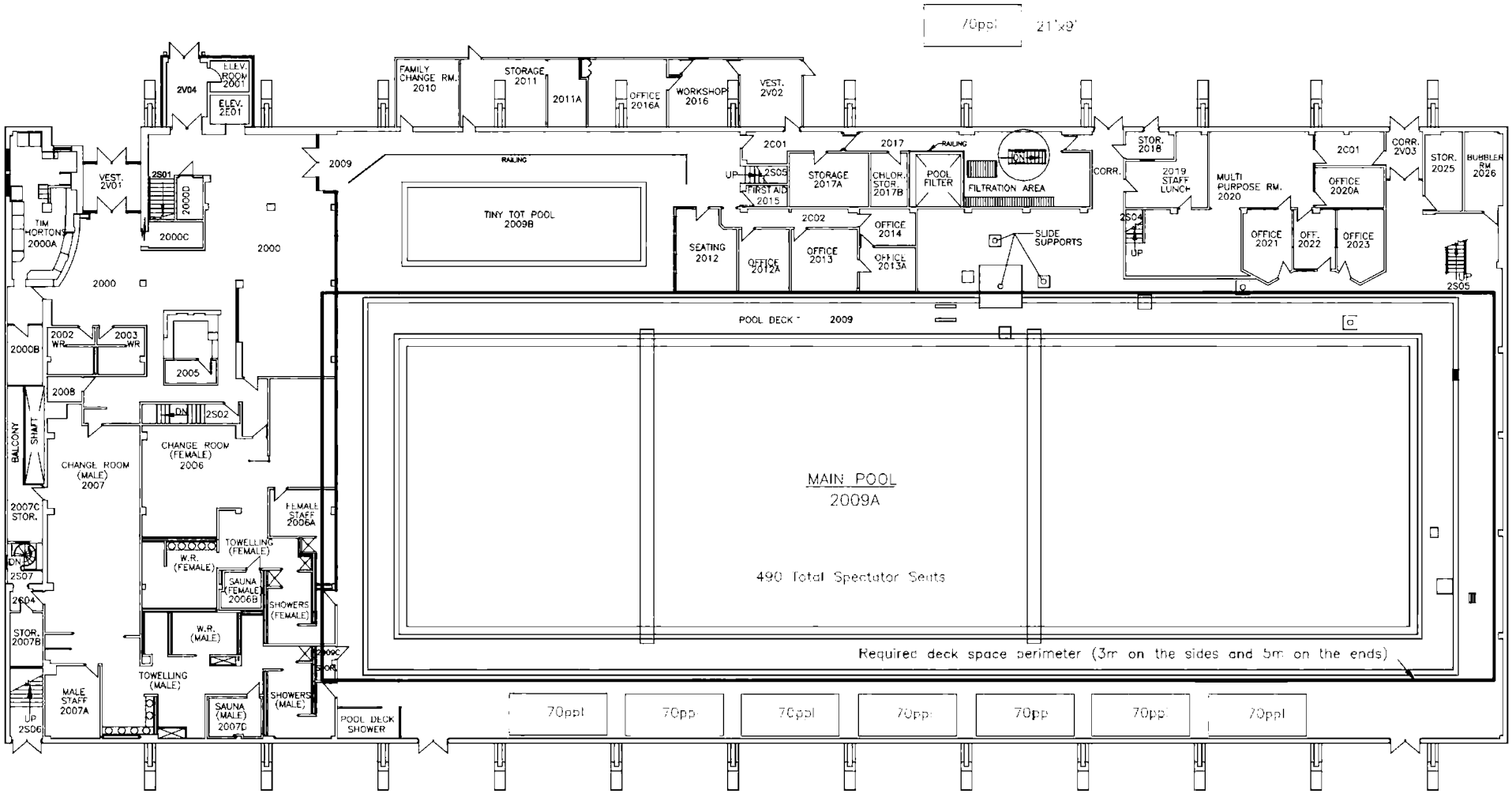
Capital Management Engineering Limited



SK-4AQ LIGHTING LEVEL

NTS MEASUREMENTS

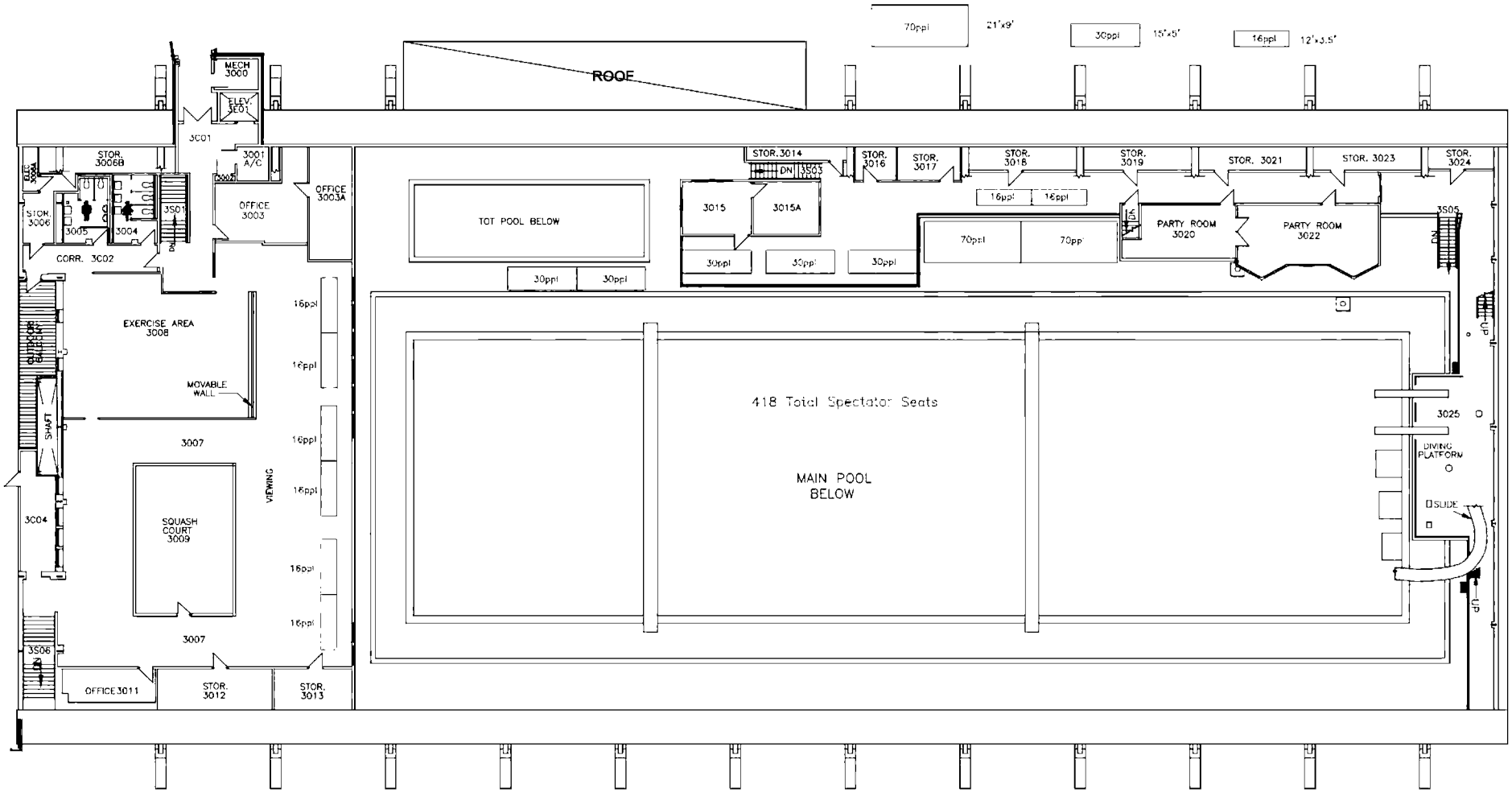
Capital Management Engineering Limited



SK-5AQ SPECTATOR SEATING

Capital Management Engineering Limited

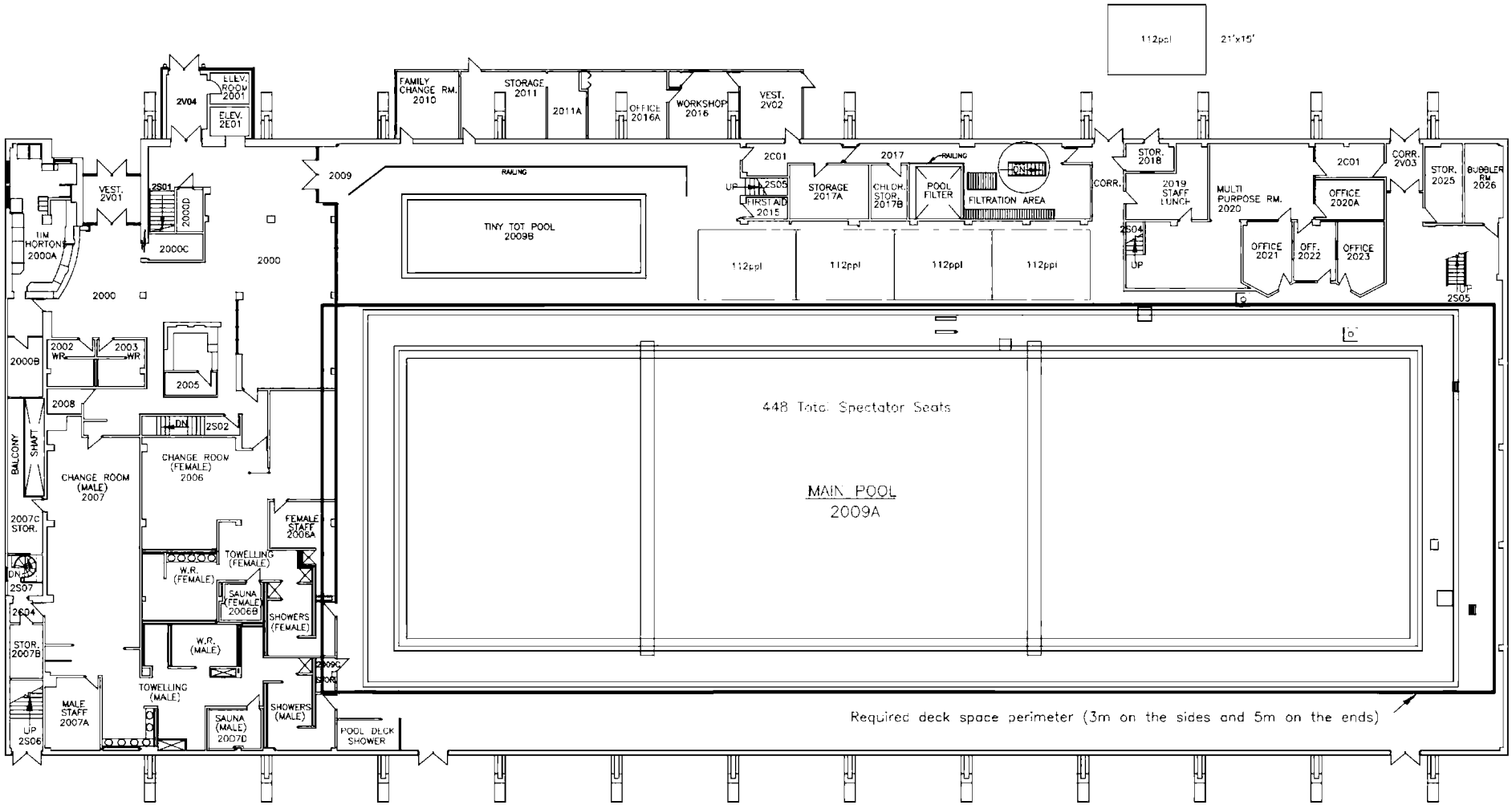
NTS OPTION A



SK-6AQ SPECTATOR SEATING

Capital Management Engineering Limited

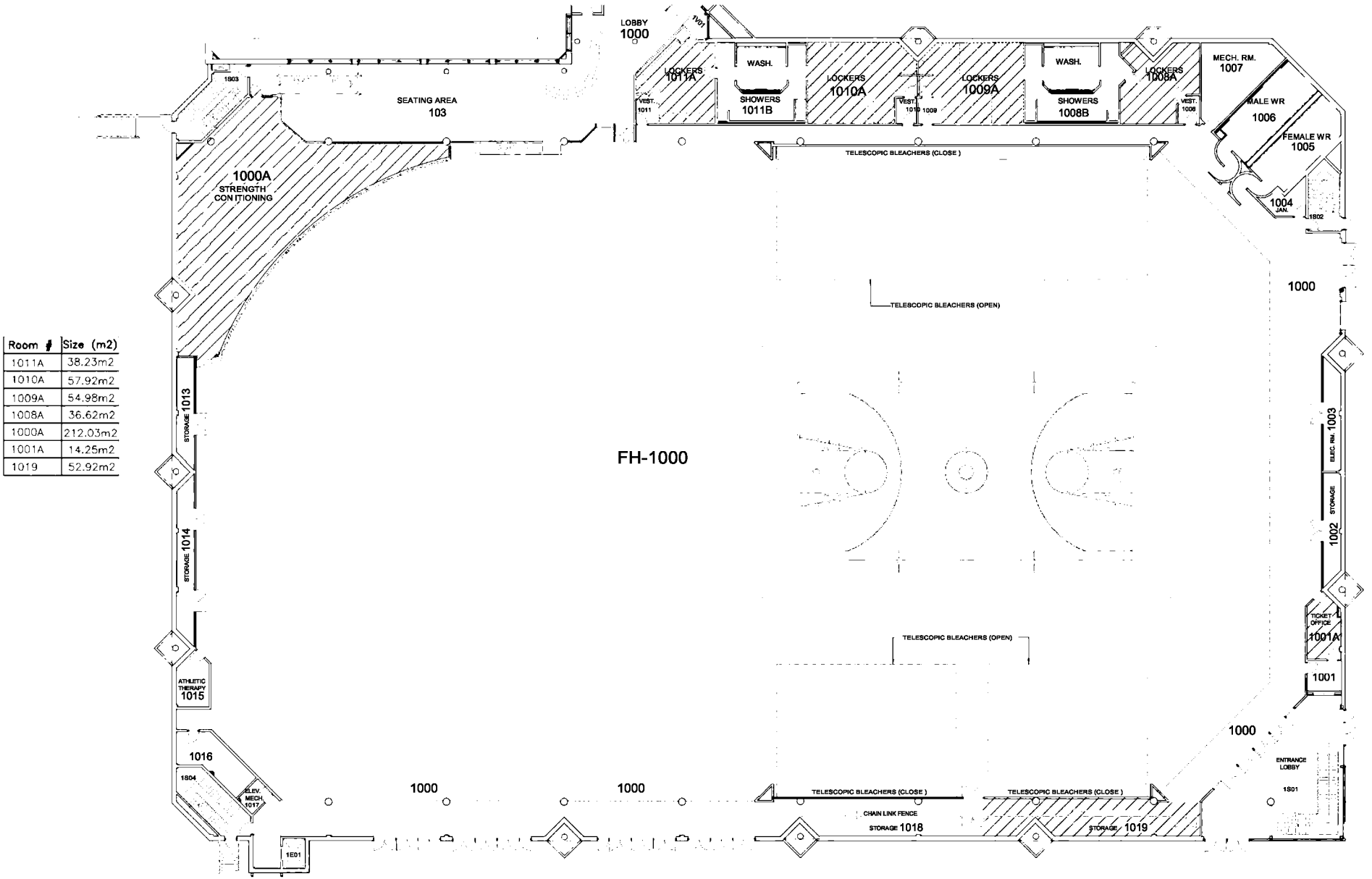
NTS OPTION B



SK-7AQ SPECTATOR SEATING

Capital Management Engineering Limited

NTS OPTION C

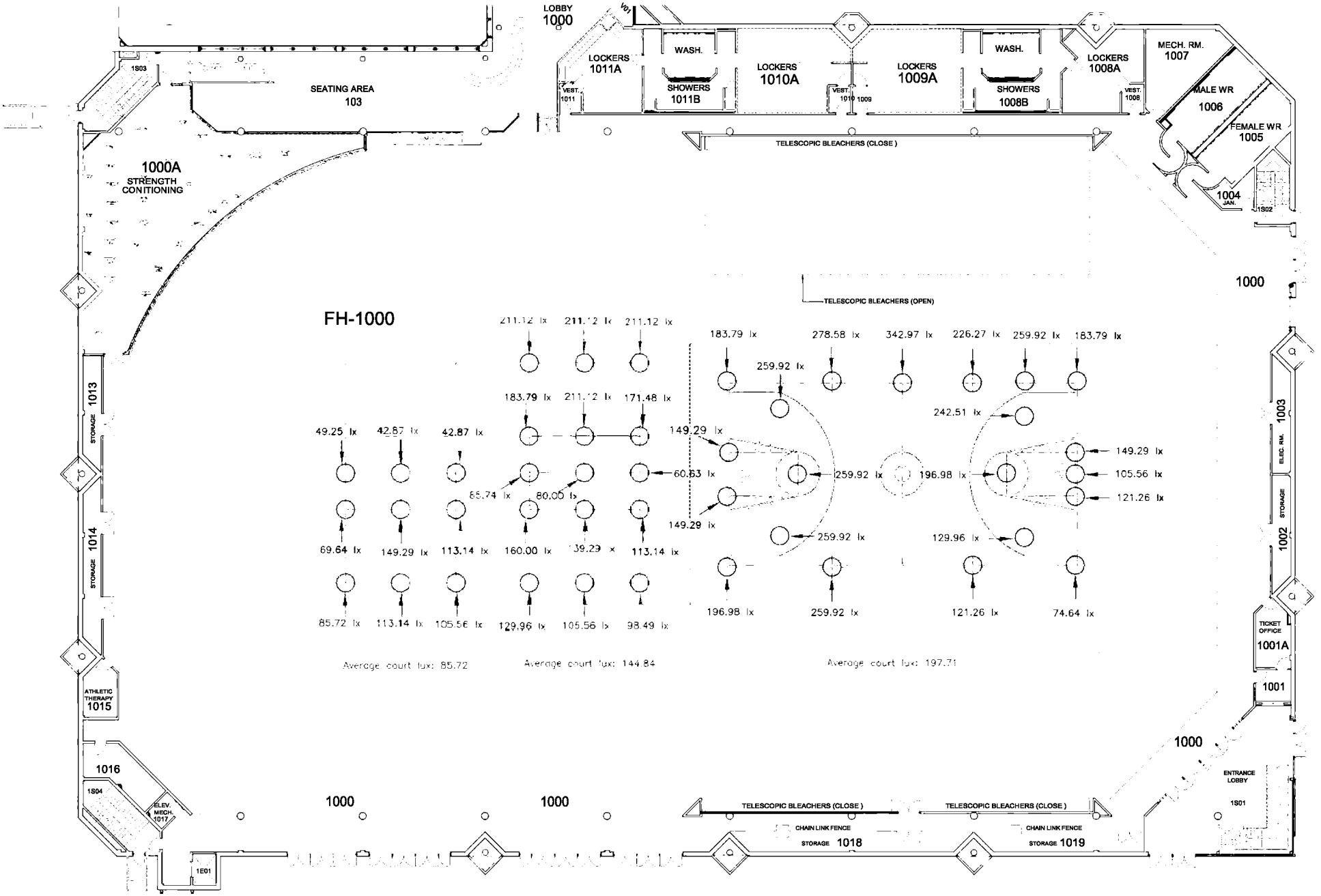


Room #	Size (m2)
1011A	38.23m2
1010A	57.92m2
1009A	54.98m2
1008A	36.62m2
1000A	212.03m2
1001A	14.25m2
1019	52.92m2

SK-1FH CHANGE ROOMS & ADDITIONAL ROOMS

NTS

Capital Management Engineering Limited

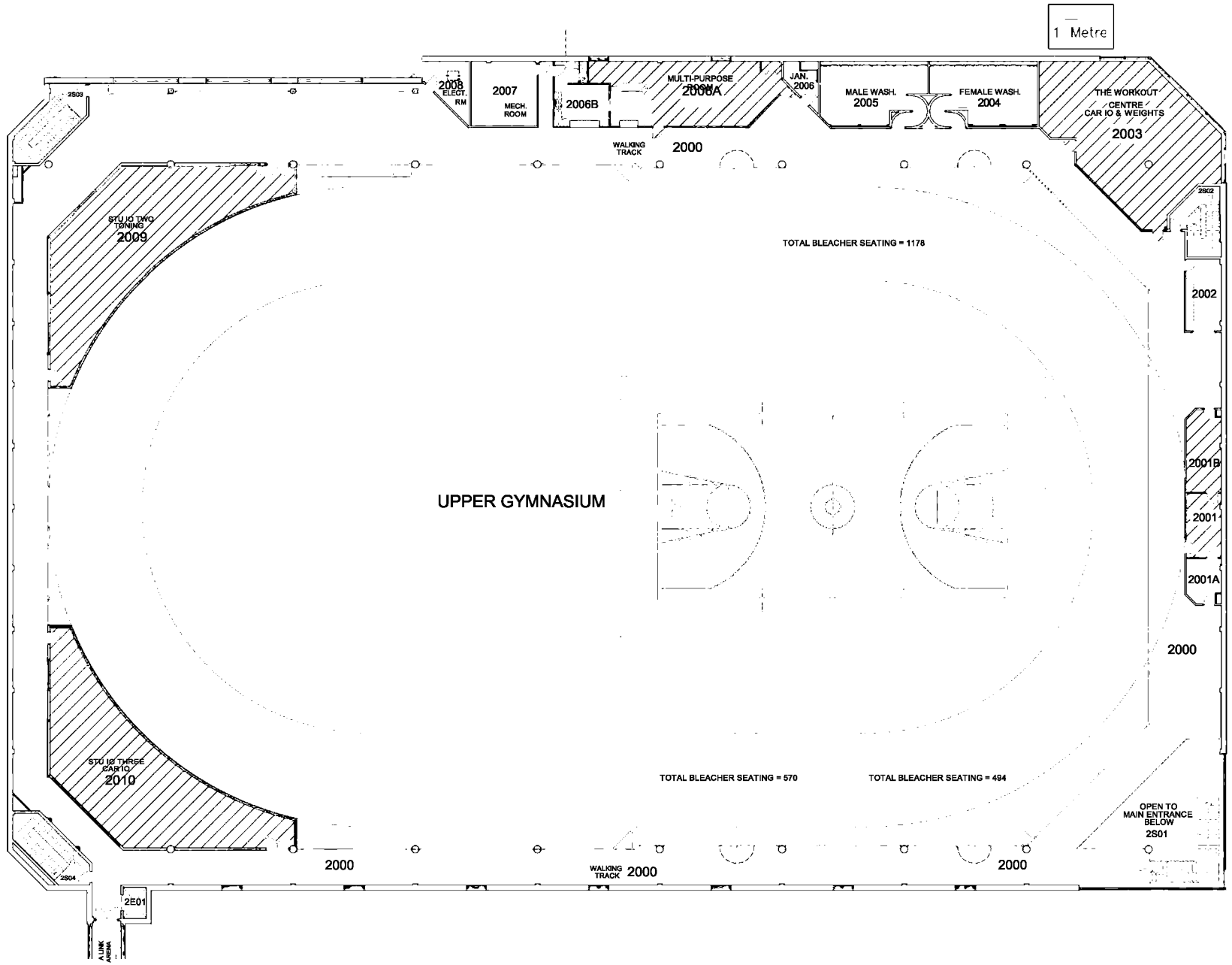


SK-2FH LIGHTING LEVEL

NTS MEASUREMENTS

Capital Management Engineering Limited

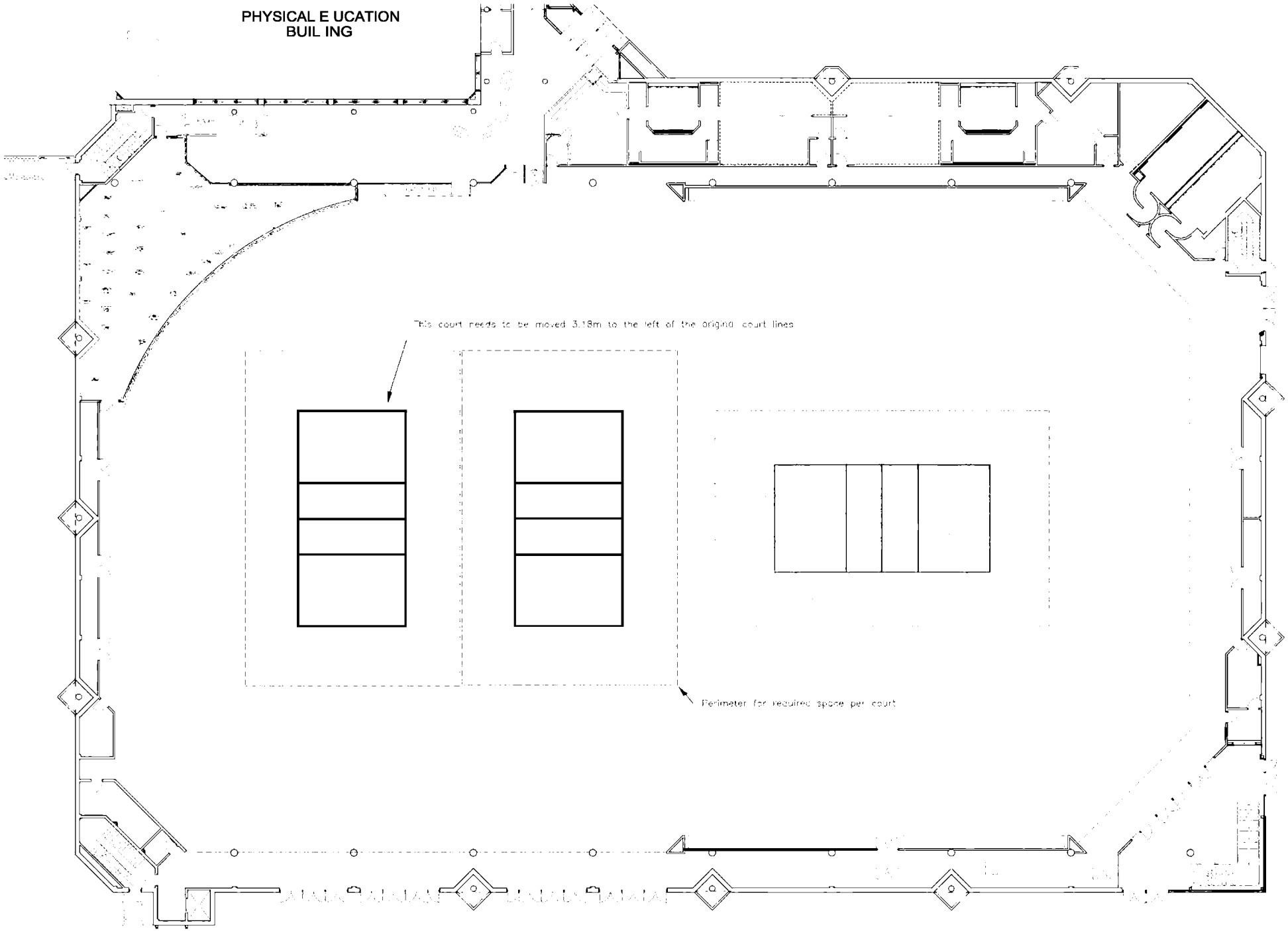
Room #	Size (m2)
2006A	38.23m2
2003	57.92m2
2001	54.98m2
2001B	36.62m2
2009	212.03m2
2010	14.25m2



SK-3FH ADDITIONAL ROOMS

Capital Management Engineering Limited

NTS



SK-4FH VOLLEYBALL COURT

NTS SIZES

Capital Management Engineering Limited

Appendix E – Gap Analysis Cost Estimate

Item#	Scope Of Work	Unit	Quantity	Unit Cost	Total Cost
S 1.3a	2.44m of deck space on northwest end of pool deemed sufficient (no work required)	-	-	-	-
S 1.3b	construct temporary deck over pool	sf	581.25	$ 20.00	$ 11,625
S 1.3c	demolish block wall	lf	65.6	$ 48.40	$ 3,175.04
S 1.3c	pool deck remediation	sf	376.55	$ 20.00	$ 7,531.00
S 1.3c	plumbing allowance per shower remove and reinstate	ea	5	$ 2,000.00	$ 10,000.00
S 1.3c	interior finishes repairs for event and then reinstate	sf	376.55	$ 72.00	$ 27,111.60
S 1.3c	remove wall and instate wall with required clearance summary	ls	1	$ 48,000.00	$ 48,000.00
S 1.3d	Removal of tubesections of waterslides supports to remain and reinstatement	ea	10	$ 500.00	$ 5,000.00
S 1.3d	Removal of open face waterslide and supports required to meet 3m clearance on side of pool	lf	22	32500 demo	$ 81,250.00
S 2.3a	Starting block slope is 1 degree less then it should be, assessed by Canada games and deemed suitable (nothing needs to be done)	-	-	-	-
S 2.3b	Remove and reinstall starting blocks with angle correction	hrly	8	$ 120.00	$ 960.00
S 2.4a	buy and install eight new starting blocks	Ea	8	$ 4,000.00	$ 32,000.00
S 3.2b	buy and install eight new ledges	Ea	8	$ 300.00	$ 2,400.00
S 5.1a	Lighting on north side is insufficient, add additional row of high bay lights	ea	36	$ 2,000.00	$ 72,000.00

Item#	Scope Of Work	Unit	Quantity	Unit Cost	Total Cost
S 5.2	Bringing in portable bleachers In order to meet required amount of seating	ea	4 to 15	$2,236.13 - $10,010.44	$ 70,073.08
S 5.2a	Estimated bleacher install time	hrly	4	$ 100.00	$ 400.00
S 5.2b	Demolish wall for spectating (room 3007)	lf	41	$ 14.00	$ 574.00
S 5.2b	Install windows	sf	228	$ 150.00	$ 34,200.00
S 5.2b	Demolish squash court	sf	742.76	$ 10.00	$ 7,427.60
S 5.2b	Interior finishes repairs	sf	742.76	$ 38.00	$ 28,224.88
S 5.2b	Estimated bleacher install time	hrly	6	$ 100.00	$ 600.00
S 5.2b	reinstatement of squash court	sf	742.76	$ 26.00	$ 19,311.76
S 5.2	LUMP SUM				$ 160,411.32
S 5.2c	Demolish part of pool deck office space	sf	1784.36	$ 14.00	$ 24,981.04
S 5.2c	pool deck remediation	sf	951.94	$ 20.00	$ 19,038.80
S 5.2c	Estimated bleacher install time	hrly	6	$ 100.00	$ 600.00
S 5.2c	reinstatement of office structures	sf	1784.36	$ 32.00	$ 57,099.52
S 5.2	total				$ 171,792.44
D 2.2	Removal of tubular waterslide behind diving boards to allow for sufficient space and reinstate	lf	100	$250 - $325	$ 81,250.00
D 2.3	Construct new 3m platform (Cedar wood)	sf	96.88	$ 200.00	$ 19,376.00
D 2.3	Construct new 10m platform (cedar wood)	sf	193.75	$ 200.00	$ 38,750.00
D 2.3	Cedar wood railing installation	lf	60.8	$ 50.00	$ 3,040.00
D 2.3	Ladder + installation	ea	1	$ 4,000.00	$ 4,000.00
D 5.1	Gymnastic floor mats	sf	800	$ 9.06	$ 7,248.00
D 5.1	Platform takeoff stations (for synchro diving)	ea	2	$ 3,150.00	$ 6,300.00

Item#	Scope Of Work	Unit	Quantity	Unit Cost	Total Cost
B 2.3	Shot clock needs to be removed & raised 223.6mm above backboard	EA	2	$ 500.00	$ 1,000.00
B 4.1	Insufficient lighting, requires new or additional lighting over basketball court	sf	4699.97	$ 14.69	$ 69,047.73
V 1.3	Remove and repaint court lines	ea	2	$ 4,000.00	$ 8,000.00
V 1.3	Relocate holes in floor for the net poles	ea	2	$ 3,000.00	$ 6,000.00
V 1.3	Remove portion of the running track install flooring and reinstate running track following event	sf	115.64	$ 64.00	$ 7,400.96
V 3.1	Insufficient lighting, requires new or additional lighting over volleyball courts	sf	3487.5	$ 14.69	$ 51,235.21
V 4.1a	Insufficient space for 2, of the required 3 warm-up courts located off site.	sf	10852	0	$ -
V 4.1b	Insufficient space for 2, of the required 3 warm-up courts construct temporary structure for two courts.	sf	10852	LS	$ 328,700.00

Appendix E-3: Mechanical and Electrical Infrastructure Assessment

AQ-001-19 AQ/FH Consulting Assessment
Aquarena and Field House, Memorial University, St. John's, NL

FINAL REPORT

Stantec

Prepared for:
Jason Daniels, P.Eng., MASc., PMP
Manager, Major Capital Projects
Department of Facilities Management
Memorial University of Newfoundland

Prepared by:
Stantec Consulting Ltd.
141 Kelsey Drive
St. John's, NL A1B 0L2

Project No: 133411716

December 4, 2020

Table of Contents

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Memorial University to perform a facility condition assessment (FCA) at the Aquarena and Field House at the campus in St. John's, Newfoundland. Thesite observation work was performed on November 3rd, 2020 by Andrew Spurrell (Mechanical), Jason Ball (Electrical), and Steve Greening (Architectural). Access to the property was provided by Memorial University to coordination with The Works operations staff. The scope of the assessment included review and validation of the January 2020 report prepared by Capital Management Engineering Limited and titled "Condition Assessment & Gap Analysis of the Aquarena and Field House'; specifically, Section 5 – Building Condition Assessment and associated estimates.

Refer to Appendix "A" Opinion of Probable Costs and Appendix "B" Site Photos.

Recommended upgrades items have been prioritized based on the facilities meeting the minimum functional criteria as defined by the Canada Games Hosting Standard 2025. The proposed upgrades include items that (a) fail to meet minimum functional criteria standards, and/or (b) could result in unacceptable risk to the Games.

Based on our findings, we have identified a total cost of:

Aquarena

$3,536,206 for Mechanical Work

$502,325 for Electrical Work

$2,369,242 for Architectural Work

Field House

$72,737 for Mechanical Work

$37,096 for Electrical Work

$1,898,012 for Architectural Work

Based on local industry costs for the 2020 Construction Season.

Anticipate an average of approximately 4% increase per year

A total of **$8,415,620** for maintenance upgrades is required to be completed prior to these facilities being ready to host the events of the 2025 Canada Games in Newfoundland and Labrador.

The following report provides detailed information on our findings and our recommendations. Cost estimates for Required Work are outlined in the tables provided in Appendix A.

The General Purpose and scope of our work and the limitations to our work are outlined in Section 1 of this report. Opinions of costs presented in this report are intended for general budgeting purposes only. Actual costs can only be determined after preparation of tender documents, understanding of site restrictions, effects of ongoing operations of the buildings and definition of a construction schedule.

1.0 GENERAL PURPOSE AND SCOPE OF WORK

The primary purpose of the property condition assessment was to visually review the existing condition of the property, and to identify and quantify major defects in materials or systems, based on our observations of the items previously identified in the 2020 CMEL Report, which might significantly affect the facilities being used for the 2025 Canada Games. The assessment of the building was performed using methods and procedures that are consistent with good commercial and customary practice. Reasonable effort was made to check the accuracy of the data forming the basis of the projection of the life expectancy and replacement costs that were developed for this report. Responsibility cannot be accepted for unknown factors that might adversely affect the accuracy of these projections.

We have estimated current dollar capital cost liabilities to repair components that require replacement or upgrade due to condition or functional requirements. Required work costs have been identified for physical deficiencies which we observed that we consider being beyond normal or routine maintenance costs or for maintenance procedures which are currently not enforced but are required to maintain the system under consideration.

When preparing the Class "D" Cost Estimates we have no control over the cost of labor, materials, equipment or services provided by others, or over the contractor's methods of determining prices, or over the competitive bidding or market conditions. Therefore, the opinion of probable capital cost estimates are provided based on our best professional judgment, experience and information available to us at the time the estimate is prepared. According to the Association for the Advancement of Cost Engineer International (AACEI) guidelines, this opinion of probable capital cost is a Class "D" estimate based on the conceptual level of study and available information. The expected accuracy of the Class "D" estimates is -30% to +30%. The estimated cost should only be used for project screening, feasibility determination, concept evaluation, and budgeting forecasting purposes.

The findings of our maintenance assessment of this property are based on the areas observed. The scope of our work included visual reviews by professional engineers and technologists to observe and document existing conditions and interviews with site representatives. Our work did not include destructive testing, testing of life safety systems or quantitative testing. The major components and systems observed by Stantec, aligning with the 2020 CMEL Report, were as follows:

- Site
- Building Structure
- Building Exterior
- Building Interior
- Building Mechanical
- Building Electrical

- Building Life Safety
- Building Pool Specialty Systems

The recommendations and our opinions of probable costs (OPC) associated with these recommendations presented in this report are based on portions of the building which were accessible during our investigation. The opinions of costs presented in this report are also based on information received during interviews with the site representatives. During our assessment, we have attempted to verify information received. However, Stantec cannot be held responsible for incorrect information received during the interview process.

The opinions of cost presented in this report are intended for general budgeting purposes only. Actual costs for work recommended can only be determined after preparation of tender documents, understanding of site restrictions, effects of ongoing operations of the buildings and definition of the construction schedule. The scope of recapitalization work recommended in this report must be confirmed with a more detailed site investigation prior to implementation. Stantec expressly waives any responsibility for the effects of any action taken as a result of this service unless we are specifically advised and participate in the action, in which case our responsibility will be agreed to at that time. No other warranty expressed or implied is made.

Hazardous materials (asbestos, lead in paint, PCBs, radioactive materials, halocarbons, mercury, mold, silica, etc.) may be present in the subject buildings. The costs allocated to future capital expenditure projects do not include the identification of or cost for any potential remediation and removal of these hazardous materials, which are regulated under the provisions of the Newfoundland & Labrador Occupational Health and Safety Act. If not done so already, a Hazardous Building Materials assessment should be performed for the purpose of quantifying hazardous building materials which will be disturbed during any future renovation or demolition activities.

No legal survey, soil tests, detailed engineering calculations, or quantity surveying compilations were made during this assessment. No responsibility, therefore, is assumed concerning these matters. Stantec did not design or construct the buildings or structures and therefore will not be held responsible for the impact of any design or construction defects, whether or not described in our final report. No evaluation of environmental conditions at the site was carried out within the scope of work.

The information and opinions expressed in this report are solely for the benefit of the Aquarena and Field House buildings. No party shall distribute the final report or any portion or copy thereof without the express written permission of Stantec, except that the client may make copies of the report as are reasonable for their own use. It shall not be relied upon for any purpose other than intended for the buildings without the express written consent of Stantec.

Any use which a third party makes of this report, or any reliance or decisions to be made based on it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

2.0 AUDIT TEAM

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3.0 SYSTEMS DESCRIPTIONS, OBSERVATIONS & RECOMMENDATIONS

3.1 SITE

Our review of the site at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The review included all parking areas and the site on all four sides of the building.

3.1.1 Assessment and Recommendations

Aquarena

From CMEL Report:
The parking and pedestrian areas around the Aquarena associated to the building include two parking areas, one to the north and a second to the east, and concrete flat work as well as a parking attendant's structure. The area is generally in fair to good condition. The parking area to the north has accessible stalls noted however these lead to the lower fitness area which has no accessible access to the upper floors. The eastern parking area has accessible stalls marked however they do not align to the recommended size and layout. Small scale changes to line painting, and vertical as well as horizontal signage are required. The number of spots should exceed the required minimum due to the usage of the building. Direct access from the spots to the sidewalk without entering the parking area is recommended. Due to the possible confusion with the lower level, orientation signage to direct people to the accessible spots and to the venue's main entrance is recommended.

From Stantec's site observations the assessment from CMEL is accurate. In addition, there is significant cracking in the asphalt in isolated locations and some of the concrete curbs and walkways have cracked / deteriorated to the point where they need replacement. Line repainting and isolated asphalt & curb repair are recommended.

Field House

From CMEL:
The parking and pedestrian areas around the Field House associated to the building include a parking area and concrete flat work. The area is generally in good condition. The parking area has accessible stalls marked however they do not align to the recommended size and layout. Small-scale changes to line painting and vertical as well as horizontal signage are required. The number of spots should exceed the required minimum due to the usage of the building for a Para games event. Direct access from the spots to the sidewalk without entering the vehicular is recommended with a clear pedestrian pathway to the building entrance. An allowance for line painting and signage has been included in the Cost Estimate.

From Stantec's site observations CMEL's assessment is accurate. Overall the site is in good to fair condition but there is isolated cracking of the asphalt and concrete curbs. At the main entrance there is some settling of concrete leaving a lip at the door threshold. Line repainting and isolated asphalt & curb repair are recommended.

3.2 BUILDING STRUCTURE

Our review of the structure at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The review included steel and concrete structure that was exposed to view.

3.2.1 Assessment and Recommendations

Aquarena

From CMEL:
The building structure was observed to be in fair condition. Major repairs have been completed to the steel supports of the diving area and replacement of the end walls in the last ten years. The building's main electrical room is below a shower area. Evidence of deterioration to the concrete slab in the form of spalling concrete and rust staining were observed. It was reported that the area above has been repaired and the building operator has directions for the repair from a structural engineer. At the time of the site visit the repair has not been completed and an allowance has been included in the cost estimate for repair.

The buildings structure overall is still in accordance with the statement above. The isolated damage to the suspended concrete slab in the electrical room has not been repaired, spalling and cracking is still evident and there is exposed rebar in the slab. In addition, the foundation wall on the South East corner of the building is showing signs of damage. While this doesn't present am immediate risk further deterioration could result in movement and damage of the masonry wall above. Repairs to both the concrete slab and foundation are recommended.

Field House

The existing structure of the field house is in good to excellent condition, there are no recommendations for any immediate repairs.

3.3 BUILDING EXTERIOR

Our review of the building exterior at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The review included all four elevations of the building and the visible portions of the roof including all masonry & wood cladding, eaves and soffits and the roofing system. Window and door installations were inspected for and signs of damage or leaking

3.3.1 Assessment and Recommendations

Aquarena

From CMEL:
The building's exterior and roof were in fair to good condition. Although there are current repairs required to masonry within the term of five years, they are not considered a risk to the games. The main entrance doors were in fair condition. Prior to the event the doors will need to be tested to ensure that they are accessible. Adjustments to hardware could be sufficient. Operators could be considered if the adjustments to the tare force to open the doors cannot be

brought into the required range. An allowance for renovations has been included. The building roof will be nearing the end of its useful life and an allowance for repairs has been included.

The Statement from CMEL above is still relevant but to add commentary there are many areas on the exterior of the building where the masonry cladding is spalling and / or needs to be repointed. The masonry control joints need to be redone as well. The metal and wood facias are in poor condition and the eavestrough and downspouts need replacing.
The roof is in good condition but is nearing the end of its life and preparation for roof repairs / replacement should be considered in the next 5-10 years.
Cosmetic items that need attention are the removal of graffiti and repainting of concrete piers.
The main entrance doors are in good condition but need new hardware to meet accessibility requirements.
The exterior balcony off the fitness area has moss growing on the deck surface and the guard rail does not meet current code and is corroding.
It is recommended to replace eavestrough and downspouts in the short term with plans to replace the roof and carry out repairs to the masonry in the long term.

Field House

From CMEL:
The building's exterior was in fair condition. Although there are current repairs required to masonry in the term of five years, they are not considered a risk to the games. The main entrance doors were in fair condition and have automatic door operators. Corrosion was observed on many of the building exit doors. Partial replacement is required in the term. The building roof will reach the end of its useful life in the five year term. A roof in poor condition is not considered an acceptable risk. The roof should be replaced by scheduled maintenance however as the roof was not accessible at the time of the site visit, and working conservatively, the cost to repair 10 % of the roof every year for the next five years has been included in the Cost Estimate.

CMEL's commentary on the exterior of the building is accurate but in addition there is some minor damage to the metal panels at the entrance and some masonry repointing needs to be carried out. Some foundation protection material is delaminating from the foundation. In one location there is evidence of constant moisture on the exterior with moss growing on the façade. In reference to corrosion at the steel exterior door frames it appears that water is infiltrating the frame from the top and pooling at the bottom causing rust and deterioration. We suggest that the source of the rusting be investigated, and repairs made so that if new doors are installed, they do not rust again. The source of moisture and moss growth should also be investigated to prevent further growth. There is a piece of missing aluminum composite panel on the exterior along Westerland Road, it is understood that this piece will be replaced.

3.4 BUILDING INTERIOR

Our review of the building exterior at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The review included all levels and accessible spaces of the building.

3.4.1 Assessment and Recommendations

Aquarena

From CMEL:
The building's interior finishes were observed to be in generally good condition and have been renovated or replaced in the last ten years. This included major renovation of the fitness change rooms, the public change rooms, the entrance areas and to some of the ancillary rentable spaces off the pool deck. This work has created good quality space with little or no need for improvements to support the games. These are also some of the most used spaces and the renovations made significant improvements to the buildings aesthetics and day to day maintenance.
Although a component of the pool, the pool surface coating is an interior finish. The pool interior finish and line painting is in fair condition however it was reported it is stripped down and completed reinstalled during a maintenance cycle. It is recommended that this is completed included line installation under an official inspection prior to the games. A cost for this work has been included in the Cost Estimate.

The Statement from CMEL above is still relevant but in addition there are multiple areas where ceiling tiles are water stained or damaged and there is staining on the entrance doors coming from above the entrance. Some of the finishes in the members changes rooms are wearing out and need replacing. The elevator currently has no finished floor but it is understood that this is a work in progress. The wall panels of the elevator are missing some of the caps that go over the fasteners. The pool deck is showing many signs of wear, there is aggregate showing and signs of cracking. An epoxy top coat has been started near the change rooms and it is recommended that this be finished to cover the entire pool deck.

Additional Aquarena Items
The following items were not noted in the CMEL report but are worth noting in that the upgrades may be required if significant renovations are made to the building.

The Aquarena does not meet current accessibility requirements in various spaces including:

- No automatic operators on the entrance doors on level 0 or level 1.
- No wheel chair access from level 0 to level 1.
- Stair handrails do not meet NBCC requirements.
- Female change room does not have an accessible toilet stall.
- Level 0 sinks do not meet accessibility requirements.
- Level 1 public washrooms in lobby have grab bars installed at different heights.
- Squash courts are not accessible due to step up into court.

Fire ratings of partitions and firestopping at penetrations through those partitions does not exist. In every fire rated wall that was noticed there was no evidence of firestopping at the perimeter of the walls or at any penetration through the wall.

There are two openings in the exterior wall that allow cold air to flow inside of the building envelope. These pose a temperature and a safety concern in the building.

Field House

From CMEL:
The building's interior finishes were observed to be in generally good condition resulting in space with little need for improvements to support the games. The exception to this is that the wood strip floor may require refinishing. An allowance for refinishing has been included in the Cost Estimate.

Generally the interior finishes are in acceptable condition, there is cracking in the finish of the walkway floor on level two but does not pose any great concern. There are various cosmetic items that should be repaired such as holes in walls and unfinished trims at devices. Some interior masonry needs repointing.

Additional Field House Items

There is concern in the lack of consistent fire stopping in fire rated walls. In some cases, there are large openings in walls that are supposed to be fire rated.

3.5 BUILDING MECHANICAL

Our review of the mechanical systems at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The scope was also limited to accessible equipment only. The review included air handling units, cooling units, plumbing components, fire protection systems, and pool systems.

3.5.1 Assessment and Recommendations

Aquarena

The plumbing fixtures were confirmed to have been replaced in recent renovations and are in good working order. Barrier free requirements are discussed in the architectural portion of this report. The four domestic water tanks range in age from 2009 to 2018 and, as mentioned in the CMEL report, these units can be isolated and replaced as needed. There is also a heat exchanger being fed from the central plant to supplement the domestic hot water requirements if required. While assessing the domestic hot water tanks it was noted that most of the pipe insulation and jacketing has been removed from the domestic hot and cold water pipes above the heaters and should be reinstated. It was also noted that neither the existing domestic water entrance, nor the existing fire protection water entrance, have premises isolation as per the City of St. John's Premises Isolation By-law. While not required to meet these requirements, due to being a provincially owned facility, typically these buildings are being updated in good will.

The air handling unit serving the main pool change rooms and lobby was confirmed to be in fair condition and serving the space without complaints or issues. The change rooms serving the fitness area have a rooftop heat recovery ventilator unit which appears to be recently added, likely during recent renovations to the change rooms. These change rooms are cooled by 3 ductless systems consisting of ceiling cassettes and outdoor condensing units mounted on the lower roof and also appear to be recent additions to the facility.

The ventilation system to the natatorium is original to the facility and, as noted in the CMEL report, the controls for the fresh air intake have been removed and it is now manually operated based on humidity levels in the building. This unit has no active dehumidification system. The unit delivers air to the natatorium through wall grilles on the north end of the facility and return air is brought back to the unit using a single round duct with return grilles that is run from the south end back to the unit on the north end. Facility management advised that this arrangement lends itself to difficulty heating the facility as well as difficulty cooling the fitness area as the warm are is delivered directly over the fitness area. It is recommended to replace the existing ventilation unit with a new unit which has dehumidification. It is also recommended that the distribution of the air within the natatorium be investigated and either new ductwork installed, or the current arrangement of supply grilles and a return duct with grilles be reversed.

The ventilation system for the fitness area was not witnessed on site, however facility management advised that it is strictly fresh air and exhaust air with no heat recovery, nor any heat on the fresh air resulting in heating difficulties in the winter months and thus a reduction in ventilation to suit. Cooling for the fitness area is by three domestic water-cooled units with supply ductwork and return back to the units via grilles or in one case the unit sits in the space. It is recommended that heat recovery and fresh air tempering be added to the system, as well as a more environmentally acceptable method of cooling be implemented, perhaps by way of an air handling unit/ heat recovery unit with a cooling coil and remote condensing unit.

Parts of the sprinkler piping and heads in the natatorium have been replaced as convenient due to aging and corrosion which, facility management advised, was causing some occasional weeping. Currently the lower horizontal branches have been replaced with galvanized pipe, as well as the main cross over piping as well. The balance of the system should be replaced as a preventative measure.

Field House

The Field House review found the facility to be in excellent condition with the only finding to be a lack of premises isolation protection on the domestic and fire protection water entrances. This facility falls under the same situation for premises isolation requirements as the Aquarena facility.

3.6 BUILDING ELECTRICAL

Our review of the electrical systems at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The scope was also limited to accessible equipment only. The review included the main service, distribution equipment, lighting, and electric heating systems.

3.6.1 Assessment and Recommendations

Aquarena

Inspection of the main 347/600V service entrance board and distribution confirmed the recommendations of past reports that the equipment is at the end of its useful life. Much of the original equipment in the main electrical room is heavily corroded and should be replaced. This is also true for distribution equipment (panels, splitters, disconnects, etc.) in the Mechanical Room. It was reported by building staff

that the feeder to a pool equipment panel was recently replaced due to the conduit having corroded away underground. This provides further evidence as to the poor condition of other original panel feeders. Most of the emergency power distribution was replaced during the 2008 generator installation and appears to still be in good condition.

It was reported on site that the distribution panel powering the main pool pump and heaters is not connected to emergency power. In the event of a power outage, water circulation and heating of the pool would be disabled. If the pool is required to operate during a power outage during the Canada Games, it is recommended that this equipment be powered from the emergency distribution. However, the existing 200kW generator likely has insufficient capacity to support the 50hp main pool pump and heaters. A generator load test would be required to confirm capacity. However, it is not clear whether this is a requirement of the Games, nor does it present any significant risk, so costs for any required emergency distribution or generator upgrades have not been included in this report.

Most of the building has been converted to LED lighting. Various T12 fluorescent fixtures remain in service spaces. Fluorescent T8 fixtures remain in the members-only locker room and main lobby. The T8 fixtures are in good condition except for some fixtures in the members-only locker room, where they are becoming corroded. Recommended to replace the corroded fixtures with new LED fixtures however this is not a requirement of the Games nor does it present any significant risk so costs for lighting upgrades have not been included in this report. New lighting fixtures, controls and inverter were installed in the upstairs fitness area in 2017. The building mounted exterior lighting is LED and appears to be adequate and in good operating condition.

The 2020 CMEL Report noted deficient lighting levels in the pool area which did not meet the minimum 600 lux requirements of the Canada Games at the starting and turning ends of the pool. Stantec completed site measurements in this area and all measurements were well in excess of 600 lux (>1000 lux in many areas). New LED lighting fixtures and controls (GrafikEye) were installed in the pool area in 2016. Lighting levels at pool level appear to meet those required for competition and no further upgrades are recommended.

Other deficiencies noted during the inspection which pose no immediate risk and so cost for correcting have not been included herein:

- In various service spaces, it was observed that BX cabling has been installed without being properly supported.
- Abandoned mechanical piping has been used to run cabling for CCTV systems. These cables should be run in the proper conduits or in free air with proper supports.
- Armored cabling to mechanical equipment damaged in various locations. Damaged cabling should be replaced.
- Area of low illumination over toilet stalls in non-member locker room. Recommend adding new fixtures to these areas.
- Various code violations in service spaces with device boxes/receptacles not proper supported, junction boxes missing covers, etc.

- Various electric baseboard and console heaters throughout building with corrosion (particularly in members only locker room). Corroded heaters should be replaced.
- Recommended to add new lighting over open water filtration pit. Current fixture is a residential style, PAR38 flood light.
- Various conduits on ceiling of pool area appear to be heavily corroded and should be replaced.
- Various pole mounted fixtures in main parking are original metal halide design and should be replaced with new LED fixtures to improve safety and security around the site.

Field House

The existing distribution system, including the main service entrance board and panels, all appear to be in good working order. The equipment is approximately 18 years old and well within its expected reliable service life for the 2025 Canada Games. No upgrades or replacements are recommended at this time.

Lighting systems and heating pumps are connected to emergency power. However, the associated mechanical controls are not currently on emergency power. In order for these systems to properly operate during a power outage it is recommended to have the mechanical control systems moved to emergency power. However, it is not clear whether this is a requirement of the Games, nor does it present any significant risk, so costs have not been included in this report.

Currently, lighting levels on both volleyball and basketball courts do not meet the minimum required lighting levels for competition. According to Maintenance staff, the lighting fixtures over the basketball court are scheduled to be replaced with new LED fixtures in the near future and this may solve the issue over that court. It is recommended to add additional fixtures over the volleyball court to bring lighting levels to minimum required.

3.7 BUILDING LIFE SAFETY

Our review of the life safety systems at this property was based on visual conditions, existing drawings, and interviews with the building operations personnel. The scope was also limited to accessible equipment only. The review included the fire alarm system, sprinkler system, emergency lighting and exit lighting systems.

3.7.1 Assessment and Recommendations

Aquarena

Exit signs were noted as being deficient in some areas per current National Building Code requirements. Signs are not visible in all areas of egress (i.e. leading from main electrical room into the members-only locker room). Additional signs should be added as required.

Much of the original fire alarm system has been replaced with new devices. All equipment and devices appeared to be in good working order. No upgrades are recommended leading up to the 2025 Canada Games.

Emergency lighting systems and emergency power systems all appeared to be in good operating condition. No upgrades are recommended leading up to the 2025 Canada Games.

Field House

All fire alarm, emergency lighting and exit lighting systems appeared to be in in good working order. No upgrades are recommended leading up to the 2025 Canada Games.

3.8 BUILDING POOL SPECIALTY SYSTEMS

3.8.1 Assessment and Recommendations

The pool systems continue to operate with equipment being repaired or replaced as needed. The main return pump has recently been replaced and the associated motor is approximately 18 years old. There is no redundancy for this pump, which is the main circulator for the pool water. Ideally an additional pump would be installed in parallel to offer redundancy to the system, however it may be acceptable to simply have a spare pump and motor nearby to expedite replacement and minimize downtime in case of failure. It was also noted that the panel which feeds the main return pump is not on emergency power.

The air cushion (bubbler) system is not functional and, as stated in the CMEL report, is beyond its useful life. Currently the three electrically actuated valves to the three outlets are also not functioning. It should be noted that the current compressor and tank skid will not fit through the existing door to the room in which it is located.

4.0 Risk Assessment

1	**Very Unlikely**	**1-10%**	Event **may occur** only in exceptional circumstances (i.e. it has occurred elsewhere or is expected to occur once every five years) (1-10% likely to happen)
2	**Unlikely**	**10-30%**	Event **could occur** at some time (i.e. event has not yet occurred but could occur at some time, or is expected to occur once every year) (10-30% likely to happen)
3	**Possible**	**30-50%**	Event **might occur** at some time (i.e. the event could occur or is expected to occur monthly) (30-50% likely to happen)
4	**Likely**	**50-90%**	Event **will probably occur** in most circumstances (i.e. has occurred or is expected to occur weekly) (50-90% likely to happen)
5	**Almost Certain**	**90-100%**	Event **is expected to occur** in most circumstances (i.e. likely to occur daily) (>90% likely to happen)

1	**Insignificant**	Negative outcomes from risk or lost opportunities do not impact performance or reputation
2	**Minor**	Negative outcomes from risk or lost opportunities that will not have a permanent or significant impact on performance or reputation
3	**Moderate**	Negative outcomes from risk or lost opportunities that will have a significant effect but can be managed without major impact
4	**Major**	Negative outcomes from risk or lost opportunities with a significant impact that will require major efforts to manage and resolve but do not threaten the viability of the facility in the medium term or long term
5	**Severe**	Negative outcomes from risk or lost opportunities which, if not resolved in the near term, will threaten the viability of the facility

[redacted]	(1-4)	Low level of risk - manage by routine procedures and operations; would not require much attention but should be reviewed at least every six months
Moderate Risk	**(5-10)**	Moderate level of risk - manage by specific monitoring or response procedures; should be monitored and reviewed every three months.
High Risk	**(11-18)**	High level of risk - should be constantly monitored and reviewed every month.
[redacted]	**(19-25)**	Top level of risk - should be constantly monitored and reviewed weekly.

	(1) Insignificant	**(2) Minor**	**(3) Moderate**	**(4) Major**	**(5) Catastrophic**
(5) Almost Certain	5	10	15	[redacted]	[redacted]
(4) Likely	[redacted]	8	12	16	[redacted]
(3) Possible	[redacted]	6	9	12	15
(2) Unlikely	[redacted]	[redacted]	6	8	10
(1) Very Unlikely	[redacted]	[redacted]	[redacted]	[redacted]	5

Fac.	Risk Identification	P[1]	I[1]	Mitigation Measures	Risk Rating	Cost[2]
AQ	Structural failure of Aquarena floor	2	4	- Structural reinforcing and repair of the damaged floor	8	43,642
AQ	Incomplete / non-existent fire ratings	2	5	- Complete and fire stopping in all fire rated partitions	10	n/a[3]
FH	Incomplete / non-existent fire ratings	2	5	- Complete and fire stopping in all fire rated partitions	10	n/a[3]
FH	Corrosion of emergency exit door frames	5	3	- Repair source of water entry and replace doors and frames	15	54,117
AQ	Aging roof systems	4	4	- Repair / replace roofing systems	16	1,851,897
FH	Aging roof system	4	4	- Repair / replace roofing systems	16	1,704,967
AQ	Natatorium Air Handling Unit & Dehumidification	5	5	- Replacement of unit	25	2,909,500
AQ	Sprinkler system replacement in Natatorium	1	3	- Replacement of piping and heads in Natatorium	3	218,212
AQ	Aquarena Service Entrance	4	5	- Short term infrared scan - Replace service board - Upgrade service transformer	20	136,747
AQ	Aquarena Distribution	3	4	- Short term infrared scan - Replace panels, focusing on key areas - Replace key feeders	12	360,487
AQ	Aquarena Exit Signage	3	5	- Install additional signage	15	5,092
FH	Field House Court Lighting	5	4	- Install additional lighting or replace fixtures	20	37,096

AQ	Pool circulating pump	2	5	- Redundant pump installed in parallel - Spare pump on site at minimum	10	43,642
AQ	Water Cushion (Bubbler)	5	5	- Replacement of unit, controls, and control valves	25	109,106

[1]P = Probability / Likelihood, I = Impact
[2]Includes general conditions and contingencies
[3]Extent of corrective work could not be accurately determined under the scope of this project. Detailed investigation would be required.

5.0 Opinion of Cost Summary

5.1 ARCHITECTURAL

- Aquarena - $2,369,242
- Field House - $1,898,012

5.2 MECHANICAL

- Aquarena - $3,536,200
- Field House - $72,737

5.3 ELECTRICAL

- Aquarena - $502,325
- Field House - $37,096

Based on local industry costs for the 2020 Construction Season.

Anticipate an average of approximately 4% increase per year

A total of **$8.415.620** for maintenance upgrades is required to be completed prior to these facilities being ready to host the events of the 2025 Canada Games in Newfoundland and Labrador.

6.0 Closure

Stantec has completed an Assessment of the Aquarena and Field House at Memorial University in St. John's, Newfoundland. The work was performed at the request of Memorial University, utilizing methods and procedures that are consistent with customary commercial practice and industry standards. The independent conclusions represent Stantec's professional judgments based on conditions that existed and information and data made available to Stantec during the assessment. Information received has been assumed to be correct and complete.

Stantec recommends that this report be reviewed annually so that adjustments may be made to reflect actual costs of work, changes to timing and cost of work expected for coming years.

Should any clarification be required regarding the content or conclusions of this report, please contact the undersigned at the contact information provided below.

Respectfully submitted,

STANTEC CONSULTING LTD.

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7.0 APPENDICES

APPENDIX A
OPINION OF PROBABLE COSTS

Stantec

Cost Estimate	**Project: Aquarena and Field House Assessment**	**Stantec Project:**	
	Class D Estimate		
Prepared by:	Stantec	**Proposed for:**	Budgeting
Date	12/4/2020	**Building Area (m2):**	5900

DIVISION	DESCRIPTION				AMOUNT	
Electrical	**Electrical (Mat & Lab)**		**Unit Cost or Cost/SQM**			
	Aquarena Service	1	$94,000.00	ea	$94,000	
	Aquarena Distribution	1	$42.00	per sqm	$247,800	
	Field House Court Lighting	30	$850.00	ea	$25,500	
	Aquarena Exit Signage	10	$350.00	per	$3,500	
	Electrical Subtotal			.		**$370,800.00**
Mechanical	**Mechanical (Mat & Lab)**		**Unit Cost or Cost/SQM**			
	Aquarena Pipe Insulation at DHWTs	1	$4,000.00	ea	$4,000	
	Aquarena Premises Isolation	1	$50,000.00	ea	$50,000	
	Natatorium Ventilation and Dehumidification	1	$2,000,000.00	ea	$2,000,000	
	Fitness Area Heat Recovery & Heat	515	$120.00	per sqm	$61,800	
	Fitness Area Cooling	12	$5,000.00	per ton	$60,000	
	Sprinkler Piping/Heads in Natatorium	3000	$50.00	per sqm	$150,000	
	Field House Premises Isolation	1	$50,000.00	ea	$50,000	
	Redundant Pool Circulator Pump & Motor	1	$30,000.00	ea	$30,000	
	Air Cushion & Zone Valves/Controls	1	$75,000.00	ea	$75,000	
				lot	$0	
	Mechanical Subtotal			.		**$2,480,800.00**
Architectural	**Architectural (Mat & Lab)**		**Unit Cost or Cost/SQM**			
	Aquarena line Painting	1	$8,000.00	lot	$8,000	
	Aquarena partial curb removal & replacement	100	$125.00	per lm	$12,500	
	Aquarena partial asphalt removal & replacement	1000	$110.00	per sqm	$110,000	
	Aquarena foundation repair	1	$7,000.00	lot	$7,000	
	Aquarena concrete slab repair	1	$30,000.00	lot	$30,000	
	Aquarena eavestrough replacement	45	$75.00	per lm	$3,375	
	Aquarena epoxy covering on pool deck	1065	$150.00	per sqm	$159,750	
	Aquarena roof replacement (Long Term)	6365	$200.00	per sqm	$1,273,000	
	Aquarena masonry repairs (Long Term)	1	$25,000	lot	$25,000	
	Field House line Painting	1	$5,000	lot	$5,000	
	Field House partial curb removal & replacement	100	$125	per lm	$12,500	
	Field House partial asphalt removal & replacement	500	$110	per sqm	$55,000	
	Field House exit door replacement	31	$1,200	per door	$37,200	
	Field House leak investigation at doors	1	$3,000	lot	$3,000	
	Field House roof replacement	5860	$200	per sqm	$1,172,000	
	Field House masonry repairs	1	$20,000	lot	$20,000	
	Architectural Subtotal			.		**$2,933,325.00**

Subtotal Costing		**$5,784,925**
General Conditions (calculated)		**$867,739**
Subtotal Costing -with General Conditions		**$6,652,664**
Added General Contractors OH&P	**15%**	**$997,900**
Anticipated Construction Bid Price		**$7,650,563**
Added Renovation Contingency	**10%**	**$765,056**
Recommended Construction Budget (HST Excluded)		**$8,415,620**

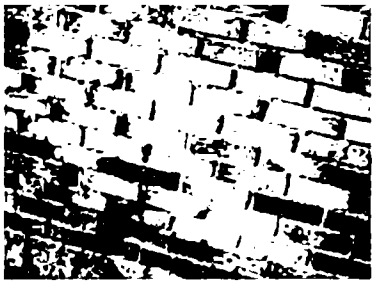
APPENDIX B
PHOTOS – AQUARENA AND FIELD HOUSE

AQUARENA

Stantec

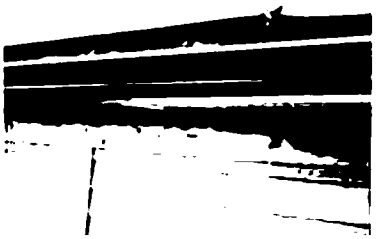
Structure

Exterior

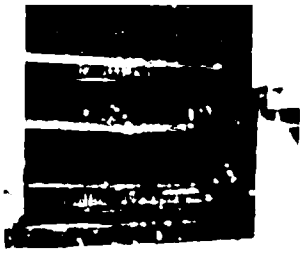
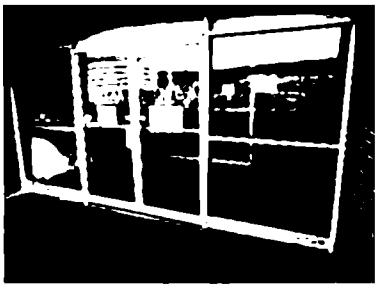



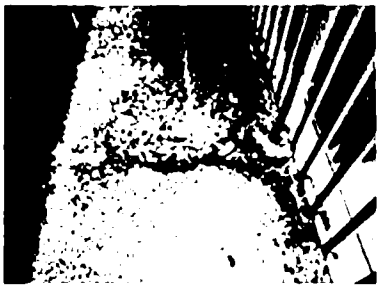






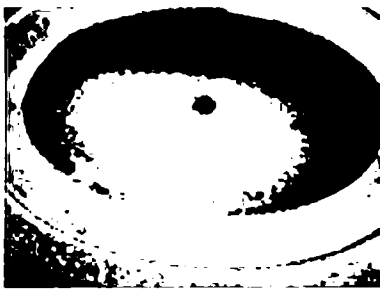
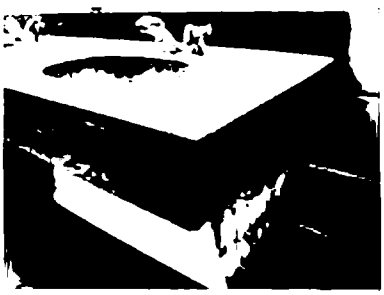


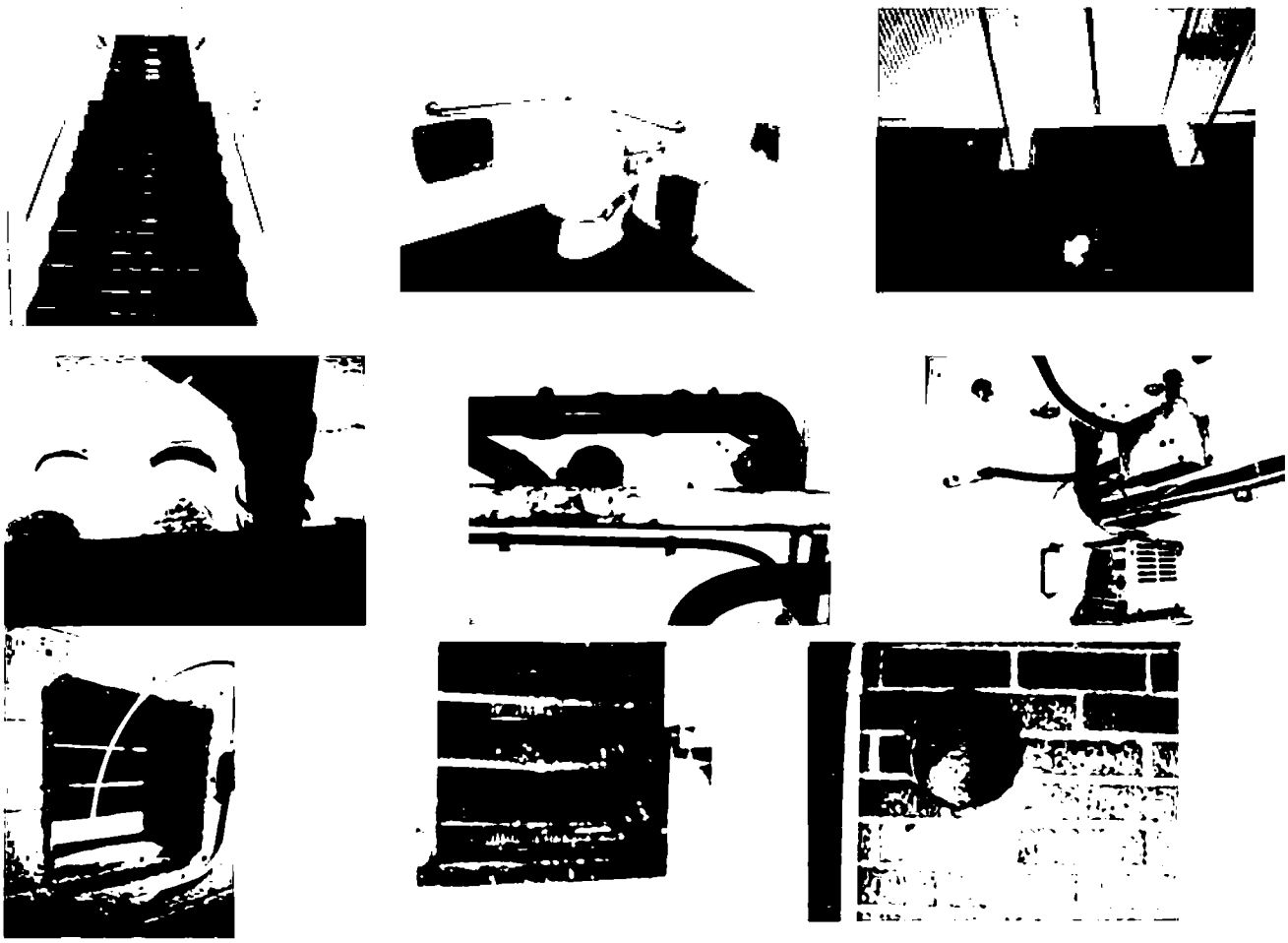


Interior

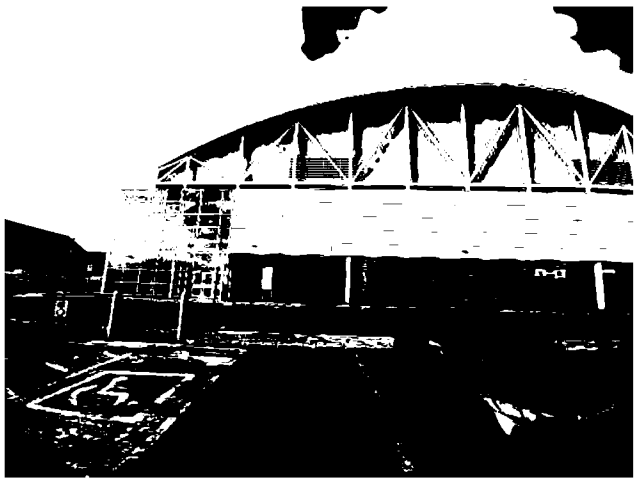


Additional Items

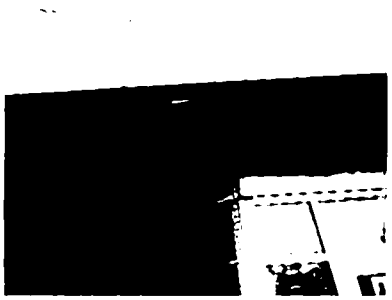


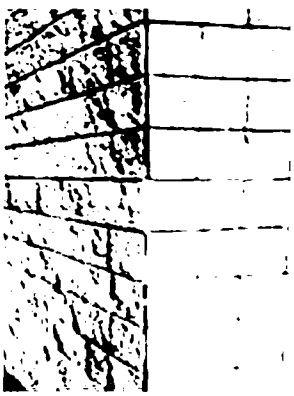
FIELD HOUSE



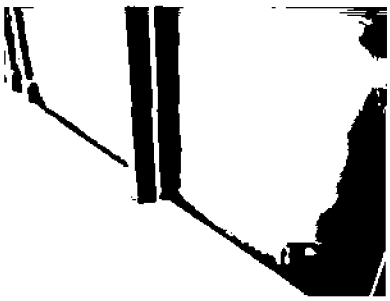
Site

Exterior

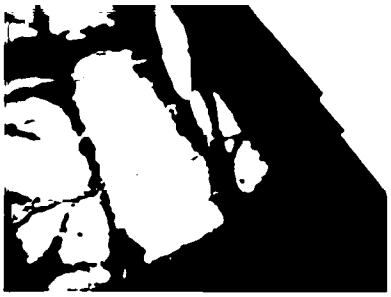


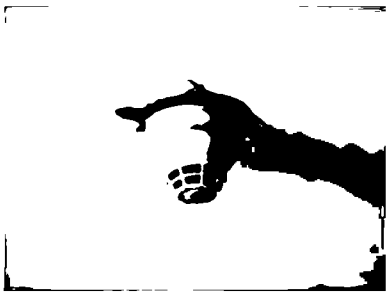


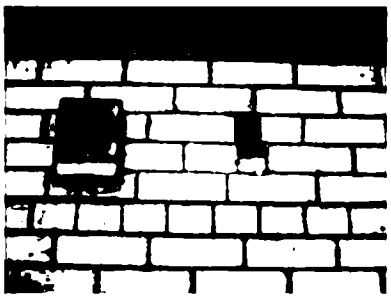




Interior








Additional Items