

Annex A
STATEMENT OF WORK
Radon Mitigation

OBJECTIVE

Royal Canadian Mounted Police (RCMP) requires reduction of the annual radon concentration levels within the noted 15 properties (found on Appendix B) throughout different communities in Manitoba, to be below 100 bq/m³.

BACKGROUND

RCMP has established radon mitigation systems in 76 of their properties for Phase 1 of their radon mitigation program. RCMP is now entering into Phase 2 of the program. RCMP Environmental Services has tested 27 locations throughout Manitoba and have established radon results over 100 bq/m³ for 15 properties. See Appendix A for current radon level results.

The properties are located throughout Manitoba; specifically in the following areas:

- Fisher Branch
- God's Lake Narrows
- Grand Marais
- Gypsumville
- Island Lake
- Lundar
- Whitemouth
- Winnipegosis

Details of properties will be provided in Appendix B.

REGULATIONS AND REQUIREMENTS

All work shall be performed by a certified Radon Mitigation Contractor for the duration of the contract and listed by the Canadian National Radon Proficiency Program (C-NRPP).

All work shall be in accordance with the following guidelines:

1. Health Canada Guidelines and the publication "*Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors.*" Electronic .pdf format or paper copy is available at http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radon_contractors-entrepreneurs/index-eng.php
2. CAN/CGSB-149.12-2015 CD-01 – Radon mitigation options for existing low rise residential buildings. Electronic copy available at: <http://www.carst.ca/Resources/Documents/mitigation.pdf>

All work processes will be adhered to throughout this contract:

1. Guarantee that long term radon concentration are below 100 bq/m³ for 1 year after the date of completion.
2. All radon test results shall be certified and provided by a nationally accredited laboratory.

3. Any additional requirements to the work outlined in the scope of work below will need to be pre-approved by the Project Authority prior to work performed and supplies procured.

SCOPE OF WORK

1. Facilities with foundations that have concrete basement or crawlspace slabs or with concrete slab on grade construction or with pressure treated foundation walls and wooden basement floors:
 - a. All accessible floor openings (at perimeter joint with exterior walls and all shrinkage and control cracks, at joints with piping/mechanical/electrical penetrations, and structural supports) shall be filled or caulked with polyurethane sealants with particular attention given to filling all potential air leaks nearest the proposed sub-slab depressurization suction point(s). Move furniture, boxes, appliances etc. as required to access cracks and penetration points. Ensure an effective bond between the new sealant and the concrete by removing all loose or weak material or paint to expose solid concrete. After application or sealant is complete, move items back to their original location.
 - b. Supply and install a radon ball trap or mechanical trap seal on drains that drain to a sump pit or if the weeping tile drain to the sewer.
 - c. Provide a lid and seal to sump pit with caulked seal around pipe and electrical cord penetration.
 - d. Conduct a feasibility test as detailed in the Health Canada Guide *“Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors”* to determine the number and locations of required suction points and to size the sub-slab depressurization fan.
 - e. Upon completion of the feasibility test, install the required 100mm Schedule 40 PVC or ABS piping along with appropriate cavity and course fill, poly, grout, and seal around pipe for an airtight fit. Suction/fan points to be located for best effectiveness and also to minimize impact to useable space in the basement of the facility.
 - f. Supply and install a new in-line sub-slab depressurization fan so that the flow is vertical. Fan to be located in the crawlspace or basement and then run pipe to the exterior with a through wall penetration complete with appropriate weatherproof flashing/sealant. Exit points should be away from windows and air intakes and at least 30 cm above grade or snow line in accordance with CSA-B149. 1 Natural Gas and Propane Installation Code. Exhaust pipe to be kept short in length and slightly sloped down to reduce condensation and frost problems. Install a rodent/bird screen over the end of the pipe. Fan to be sized in accordance with the information determined from feasibility test. Care to be taken to ensure that the fan’s operation does not cause back-drafting of combustion appliances such as furnace, water heater, fireplace, or wood stove. FOR THE PURPOSE OF THE TENDER, ALLOW FOR ONE FAN/SUCTION POINT PER FACILITY WITH AN ASSUMED FAN SIZE OF 157 CFM @ 0”wg (Acceptable product to be Fantech Model HP190 (radon) 4” or equivalent). If the feasibility test identifies the need for additional suction points or larger capacity fans to be used, these instances will be dealt with on a

case by case basis with the Project Authority and the contract will be amended accordingly.

- g. All wiring shall comply with relevant electrical codes and electrical components shall be CSA or UL listed or equivalent. Install the fan disconnect switch or plug within eyesight of the fan. Outlet will be labelled to unplug.
 - h. Install manometer on the vent pipe to monitor fan performance.
 - i. Label the new piping system in a prominent location indicating that it is part of a radon mitigation system. Similar labels shall be placed on the service panel circuit breaker, fan disconnect switch, and sump pit cover.
2. Facilities with exposed soil crawlspaces:
- a. Install a 100 mm diameter, Schedule 40 PVC or ABS pipe in a perimeter loop around the building area. Pipe to be perforated with multiple holes.
 - b. Over the pipe, install high density, cross-laminated polyethylene sheeting (acceptable product to be Permalon PLY X-150 white in color or equal). Membrane shall run up each wall 100 mm to 300 mm and be attached with pressure treated wooden battens and caulking (ensure caulking is compatible with membrane). Membrane to be lapped a minimum of 300 mm and sealed with appropriate adhesive caulk and tape. A collar is to be cut from the material to fit around each penetration and attached and caulked to the penetration. The membrane is then to be caulked to the collar. Where the system exhaust is brought out through a hole in the membrane, special attention must be paid to prevent air leakage at this point. Use vinyl roof soil stack flashing and caulk to create an air tight seal to the exhaust duct.
 - c. Supply and install a new in-line depressurization fan so that the flow is vertical. Fan to be located in the crawlspace or basement and then run pipe to the exterior with a through wall penetration complete with appropriate weatherproof flashing/sealant. Exit points should be away from windows and air intakes and at least 30 cm above grade or snow line in accordance with CSA-B149.1 Natural Gas and Propane Installation Code. Exhaust Pipe to be kept short in length and slightly sloped down to reduce condensation and frost problems. Install a rodent/bird screen over the end of the pipe. Care to be taken to ensure that the fan's operation does not cause back-drafting of combustion appliances such as furnace, water, heater, fireplace, or wood stove. FOR THE PURPOSE OF THIS TENDER, ALLOW FOR ONE FAN/SUCTION POINT PER FACILITY WITH AN ASSUMED FAN SIZE OF 157 CFM @ 0" wg (Acceptable product to be FanTech Model HP190 (radon) 4" or equivalent). If the specific situation requires for additional suction points or larger capacity fans to be used, these instances will be dealt with on a case by case basis with the Project Authority and the contract will be amended accordingly.

- d. All wiring shall comply with relevant electrical codes and electrical components shall be CSA or UL listed or equivalent. Install the fan disconnect switch or plug within eyesight of the fan.
- e. Install manometer on the vent pipe to monitor fan performance.
- f. Label the new piping system in a prominent location indicating that it is part of a radon mitigation system. Similar labels shall be placed on the service panel circuit breaker, fan disconnect switch, and sump pit cover.
- g. Install patio blocks over the membrane from crawlspace access to mechanical equipment to allow servicing of equipment with protection to the membrane.
- h. Complete and provide final radon test (7 day test) to confirm levels are below 100 bq/m3.

APPENDIX A – CURRENT RADON LEVELS

Building Unit #	Community	Building Type	Address	Basement Type	Radon Results
313	Fisher Branch	House	3 Moyer	Basement	164
318	Fisher Branch	House	4 Moyer	Basement	186
287	Fisher Branch	House	7 Moyer	Basement	422
95	God's Lake Narrows	House	1 Poplar Ave.	Crawlspace	229
377	God's Lake Narrows	Detachment	Poplar Ave.	Basement & Crawlspace	122
365	Grand Marais	House	365 Hwy 12	Basement	347
307	Gypsumville	House	102 First St.	Basement	158
308	Gypsumville	House	103 First St.	Basement	219
310	Gypsumville	House	201 Second St.	Basement	741
343	Island Lake	House	3 Main St.	Crawlspace	194
346	Island Lake	House	1 Main St.	Crawlspace	116
366	Island Lake	House	7 Main St.	Crawlspace	126
283	Lundar	House	17 Third Ave.	Crawlspace	363
278	Whitemouth	House	100-4 Front Ave.	Basement	201
276	Winnipegosis	House	193 Bridge St.	Basement	172

APPENDIX B – SITE DETAIL

Building Unit #	Community	Building Type	Address	Construction Year	Total Inside Gross (m2)	Basement Type
313	Fisher Branch	Single Family Detached	3 Moyer	1981	255.40	Basement
318	Fisher Branch	Single Family Detached	4 Moyer	1995	237.10	Basement
287	Fisher Branch	Single Family Detached	7 Moyer	1981	217.17	Basement
95	God's Lake Narrows	Bungalow	1 Poplar Ave.	1995	119.40	Crawlspace
377	God's Lake Narrows	Detachment	Poplar Ave.	2003	529.40	Crawlspace & Basement
365	Grand Marais	Single Wide Mobile Home	365 Hwy 12	1983	233.80	Basement
307	Gypsumville	Bungalow	102 First St.	1987	250.30	Basement
308	Gypsumville	Bungalow	103 First St.	1987	250.30	Basement
310	Gypsumville	Bungalow	201 Second St.	1987	250.30	Basement
343	Island Lake	Single Wide Mobile Home	3 Main St.	1969	135.90	Crawlspace
346	Island Lake	Single Wide Mobile Home	1 Main St.	1990	85.50	Crawlspace
366	Island Lake	Single Wide Mobile Home	7 Main St.	1998	233.80	Crawlspace
283	Lundar	Single Wide Mobile Home	17 Third Ave.	1981	217.70	Crawlspace
278	Whitemouth	Single Family Detached	100-4 Front Ave.	1981	217.70	Basement
276	Winnipegosis	Bungalow	193 Bridge St.	1979	196.50	Basement