

APPENDIX A

Specifications for Electrical Work — Single-Family Dwelling

1. **GENERAL:** The “General Clause and Conditions” shall be and are hereby made a part of this division.
2. **SCOPE:** The electrical contractor shall furnish and install a complete electrical system as shown on the drawings and/or in the specifications. Where there is no mention of the responsible party to furnish, install, or wire for a specific item on the electrical drawings, the electrical contractor will be responsible completely for all purchases and labour for a complete operating system for this item.
3. **WORKMANSHIP:** All work shall be executed in a neat and workmanlike manner. All exposed conduits shall be routed parallel or perpendicular to walls and structural members. Junction boxes shall be securely fastened, set true and plumb, and set flush with the finished surface when the wiring method is concealed.
4. **LOCATION OF OUTLETS:** The electrical contractor shall verify location, heights, outlet and switch arrangements, and equipment prior to rough-in. No additions to the contract sum will be permitted for outlets in wrong locations, in conflict with other work, and so on. The owner reserves the right to relocate any device up to 3 metres prior to rough-in, without any charge by the electrical contractor.
5. **CODES:** The electrical installation is to be in accordance with the latest edition of the *Canadian Electrical Code Part I*, all local and provincial electrical codes, and the utility company’s requirements.
6. **MATERIALS:** All materials shall be new and shall be listed and bear the appropriate label of the Canadian Standards Association or another nationally recognized testing laboratory for the specific purpose. The material shall be of the size and type specified on the drawings and/or in the specifications.
7. **WIRING METHOD:** Wiring, unless otherwise specified, shall be nonmetallic-sheathed cable, armored cable, or EMT adequately sized and installed according to the latest edition of the *Canadian Electrical Code, Part I* and local ordinances.

8. **PERMITS AND INSPECTION FEES:** The electrical contractor shall pay for all permit fees, plan review fees, licence fees, inspection fees, and taxes applicable to the electrical installation and these amounts shall be included in the base bid as part of this contract.
9. **TEMPORARY WIRING:** The electrical contractor shall furnish and install all temporary wiring for hand-held tools and construction lighting per latest C.E.C. and Canadian Building Code standards and include all cost in the base bid.
10. **WORKSHOP:** Workshop wiring is to be installed in EMT using steel set-screw fittings.
11. **NUMBER OF OUTLETS PER CIRCUIT:** In general, not more than 12 lighting and/or receptacle outlets shall be connected to any one branch circuit. Exceptions may be made in the case of low-current-consuming outlets.
12. **CONDUCTORS:** General lighting and power branch circuits shall be No. 14 AWG copper protected by 15-ampere overcurrent devices.
All other circuits: wire and overcurrent device as required by the *C.E.C., Part I*. All conductors shall be part of an approved cable assembly or, if installed in raceway, type T90/TWN75, unless specified otherwise.
13. **LOAD BALANCING:** The electrical contractor shall connect all loads, branch circuits, and feeders per Panel Schedule, but shall verify and modify these connections as required to balance connected and computed loads to within 10% variation.
14. **SPARE CONDUITS:** The electrical contractor shall furnish and install two empty $\frac{1}{2}$ -in (16-mm) thinwall (EMT) conduits between the workshop and the attic for future use.
15. **GUARANTEE OF INSTALLATION:** The electrical contractor shall guarantee all work and materials for a period of one full year after final acceptance by the architect/engineer and owner.
16. **APPLIANCE CONNECTIONS:** The electrical contractor shall furnish all wiring materials and make all final electrical connections for all permanently installed appliances such as, but not limited to, furnace, water heater, water pump, built-in ovens and ranges, food waste disposer, dishwasher, central vacuum, food processor power unit, and clothes dryer.
These appliances are to be furnished by owner.
17. **CHIMES:** Furnish and install two (2) two-tone door chimes where indicated on the plans, complete with two (2) push buttons and suitable chime transformer. Allow \$150 for above items. Chimes and buttons to be selected by the owner.
18. **DIMMERS:** Furnish and install dimmer switches where indicated.
19. **EXHAUST FANS:** Furnish, install, and provide connections for all exhaust fans indicated on the plans, including, but not limited to, ducts, louvers, trims, speed controls, and lamps. Included are recreation room, laundry, rear-entry powder room, range hood, and

bedroom hall ceiling fan. Allow a sum of \$1500 in the base bid for this. This allowance does not include the two bathroom heat/vent/light fixtures.

20. **FIXTURES:** A fixture allowance of \$2250 shall be included in the electrical contractor's bid. This allowance shall include the furnishing and installation of all surface, recessed, track, strip, pendant, and/or hanging fixtures, complete with lamps. This allowance includes the three bathroom medicine cabinets with lights.

This allowance does not include the two bathroom ceiling heat/vent/light fixtures.

Labour for installation of the fixtures shall be included in the base bid.

21. **HEAT/VENT/LIGHT CEILING FIXTURES:** Furnish and install two (2) heat/vent/light units where indicated on the plans complete with switch assembly, ducts, and louvers required to perform the heating, venting, and lighting operations as recommended by the manufacturer.

22. **PLUG-IN STRIP:** Where noted in the workshop, furnish and install a multioutlet assembly with outlets 450 mm (18 in) on centre. Total outlets: 6.

23. **SWITCHES, RECEPTACLES, AND FACEPLATES:** All flush switches shall be of the quiet ac-rated toggle type. They shall be mounted 1300 mm to centre above the finished floor unless otherwise noted.

Receptacle outlets shall be mounted 300 mm to centre above the finished floor unless otherwise noted. All convenience receptacles shall be of the grounding type. Furnish and install GFCI receptacles where indicated, to provide ground-fault circuit protection as required by the *C.E.C., Part I*. All wiring devices are to be provided with ivory handles or faces and shall be trimmed with ivory faceplates except in the kitchen, where chrome-plated steel faceplates shall be used.

Receptacle outlets, where indicated, shall be split-switched.

24. **TELEVISION OUTLETS:** Furnish and install 4-in square, 1½-in-deep outlet boxes with single-gang raised plaster covers at each television outlet where noted on the plans. Mount at the same height as receptacle outlets. Furnish and install 75-ohm coaxial cable to each television outlet from a point in the workshop near the main service-entrance switch. Allow 2 m of cable in workshop. Furnish and install television plug-in jacks at each location. Faceplates are to match other faceplates in home. All remaining work done by others.

25. **TELEPHONES:** Furnish and install a 3-in-deep device box or 4-inch square box, 1½-in deep with suitable single-gang raised plaster cover, at each telephone location, as indicated on the plans.

Furnish and install four-conductor No. 22 AWG copper telephone cable to each designated telephone location, terminate in proper modular jack, complete with faceplates.

Installation shall be according to any and all applicable *C.E.C., Part I*, and local code regulations.

26. **SERVICE ENTRANCE:** Furnish and install one (1) thirty-(30-) circuit, 200-ampere, 120/240-volt single-phase, three-wire combination panel (rated for continuous operation at 80%) complete with a 200-ampere main breaker in the workshop where indicated

on the plans. Branch-circuit protection in the panel is to incorporate circuit breakers. The panel is to have a 100 000-ampere interrupting rating.

27. Service-entrance underground consumer's service conductors are to be furnished and installed by utility. The meter equipment model number is to be furnished by the utility and installed by the electrical contractor where indicated on plans. The electrical contractor is to furnish and install all panels, conduits, fittings, conductors, and other materials required to complete the service-entrance installation from the demarcation point of the utility's equipment to and including the main panel.
28. Service-entrance conductors supplied by the electrical contractor shall be three (3) No. 3/0 RW90 XLPE (600 V) or equivalent for the phase conductors and neutral conductor. Install 2-in (41 mm) trade size PVC conduit from main panel A to the meter base.
29. Bond and ground service-entrance equipment in accordance with the latest edition of the *Canadian Electrical Code, Part I* and local and utility code requirements. Install No. 3 AWG copper system grounding conductor.
30. **SUBPANEL:** Furnish and install one (1) 24-circuit, 120/240-volt, single-phase, three-wire load centre in the recreation room. The load centre is to have 100-ampere mains. Feed the load centre with two (2) No. 3 T90/TWN75 conductors or equivalent protected by a 100-ampere, two-pole overcurrent device in the main panel. Install conductors in 1-in (27-mm) EMT. Branch-circuit protection in this panel is to incorporate circuit breakers.
31. **CIRCUIT IDENTIFICATION:** All panelboards shall be furnished with typed-card directories with proper designation of the branch-circuit feeder loads and equipment served. The directories shall be located in the panel in a holder for clear viewing. If GFCI breakers are installed in panel, the test chart will be located on panel enclosure.
32. The electrical contractor shall seal and weatherproof all penetrations through foundations, exterior walls, and roofs.
33. Upon completion of the installation, the electrical contractor shall review and check the entire installation, clean equipment and devices, and remove surplus materials and rubbish from the owner's property, leaving the work in neat and clean order and complete working condition. The electrical contractor shall be responsible for the removal of any cartons, debris, and rubbish for equipment installed by the electrical contractor, including equipment furnished by the owner or others and removed from the carton by the electrical contractor.
34. **SPECIAL-PURPOSE OUTLETS:** The electrical contractor shall install, provide, and connect all wiring for all special-purpose outlets, see *Table S-1*. Upon completion of the job, all fixtures and appliances shall be operating properly. See plans and other sections of the specifications for information as to who is to furnish the fixtures and appliances.

SYMBOL	DESCRIPTION	VOLTS	HORSE-POWER	APPLIANCE AMPERE RATING	TOTAL APPLIANCE WATTAGE RATING (OR VA)	CIRCUIT AMPERE RATING	POLES	WIRE SIZE NMD90	CIRCUIT NUMBER	COMMENTS
⊕ A	Hydromassage tub, master bedroom	120	1/2	10	1200	15	1	12	A9	Connect to Class A GFCI. Separate circuit.
⊕ B	Water pump	240	1	8	1920	20	2	12	A5/A7	Run circuit to disconnect switch on wall adjacent to pump; protect with Fusetron dual-element time-delay fuses sized at 125% of motor's F.L.A.
⊕ C	Water heater: top element 2000 W. Bottom element 3000 W.	240	-0-	8.33 12.50	2000 3000	20	2	12	A6/A8	Connected for limited demand.
⊕ D	Dryer	120/240	120 V 1/6 Motor Only	23.75	5700 Total	30	2	10	B1/B3	Provide flush mounted 30-A dryer receptacle. 14-30R. <i>Diagram 1, Part I CEC.</i>
⊕ E	Overhead garage door opener	120	1/4	5.8	696	15	1	14	B22	Unit comes with 3 W cord. Unit has integral protection. Connect to garage lighting circuit.
⊕ F	Wall-mounted oven	120/240	-0-	27.5	6600	40	2	10	B6/B8	
⊕ G	Countertop range	120/240	-0-	31	7450	40	2	8	B2/B4	
⊕ H	Food waste disposer	120	1/3	7.2	864	15	1	14	B19	Controlled by S.P. switch on wall.
⊕ I	Dishwasher	120	1/4 Motor Only	Motor 5.80 Htr. 6.25 Total 12.05	696 750 1446	15	1	14	B5	Motor and heater are not on simultaneously.
⊕ J	Heat/vent/light master B.R. bath	120	-0-	12.3	1475	15	1	14	A12	
⊕ K	Heat/vent/light front B.R. bath	120	-0-	12.3	1475	15	1	14	A11	
⊕ L	Attic exhaust fan	120	1/4	5.8	696	15	1	14	A10	Run circuit to 14" square box. Locate near fan in attic. Unit has integral protection.
⊕ M	Electric furnace	240	1/3 Motor	Motor 3.5 Htr. 50.7 Total 54.2	13000	70	2	4	A1/A3	The overcurrent device shall not be less than 125% of the total load of the heaters and motor. $54.2 \times 1.25 = 67.75$ (Section 62-114(7)(a)(b); 62-114(8)).
⊕ N	Air conditioner	240	-0-	30	7200	40	2	8	A2/A4	Compressor rated load amperes 27.8 Compressor locked rotor amperes 135.0 Condenser fan full load amperes 2.2 Condenser locked rotor amperes 4.5 Branch-circuit dual-element fuse 40.0 Minimum circuit ampacity 37.5
⊕ O	Freezer	120	1/4	5.8	696	15	1	14	A13	Install single receptacle outlet. Do not provide GFCI protection.
⊕ P	Kitchen NuTone Food Center	120	7/8	5.5	650	15	1	14	B24	Run circuit to power unit below counter near sink.
⊕ Q	Central vac. power unit	125	2	12	1492	15	1	14	A26	Receptacle in garage.

Table S-1 Schedule of Special-Purpose Outlets

35. **ALTERNATIVE BID LOW-VOLTAGE, REMOTE-CONTROL SYSTEM:** The electrical contractor shall submit an alternative bid on the following:

Furnish and install a complete extra-low-voltage, remote-control system to accomplish the same results as would be obtained with the conventional switching arrangement as indicated on the electrical plans.

Furnish and install one (1) 12-position master selector switch in the master bedroom or as directed by the architect or owner. Outlets to be controlled by this switch are to be selected by the owner.

Furnish and install two motorized 25-circuit masters. These motor-operated controls shall be controlled from the front hall and master bedroom, or as indicated by the architect or owner. Connect the motor-operated master control in such a manner that each and every switch-controlled lighting outlet and switch-controlled receptacle outlet may be turned off or on from the aforementioned control stations.

All extra-low-voltage wiring to conform to the *Canadian Electrical Code, Part I*.