

SITE NAME: MNINSALE HOMES CORP  
 BUILDER: GREENPARK HOMES

 LOT 17  
 TYPE: MILLWOOD 2

GFA: 2654

 DATE: Oct-18  
 LOW 80550

 WINTER NATURAL AIR CHANGE RATE 0.345  
 SUMMER NATURAL AIR CHANGE RATE 0.112

 HEAT LOSS  $\Delta T$  °F. 74  
 HEAT GAIN  $\Delta T$  °F. 11

 CSA-F280-12  
 SB-12 PACKAGE A1

| ROOM USE                       | MBR                   | ENS          | BED-2       | BED-3        | BED-4       | BATH       | ENS-2      |
|--------------------------------|-----------------------|--------------|-------------|--------------|-------------|------------|------------|
| EXP. WALL                      | 34                    | 29           | 26          | 33           | 11          | 10         | 16         |
| CLG. HT.                       | 10                    | 9            | 9           | 10           | 9           | 9          | 9          |
| FACTORS                        |                       |              |             |              |             |            |            |
| GRS.WALL AREA                  | 340                   | 261          | 234         | 330          | 99          | 90         | 135        |
| GLAZING                        | LOSS GAIN             | LOSS GAIN    | LOSS GAIN   | LOSS GAIN    | LOSS GAIN   | LOSS GAIN  | LOSS GAIN  |
| NORTH                          | 20.8 15.5 0 0 0       | 0 0 0        | 0 0 0       | 0 0 0        | 0 0 0       | 0 0 0      | 0 0 0      |
| EAST                           | 20.8 41.0 0 0 0       | 0 0 0        | 20 416 821  | 30 623 1231  | 0 0 0       | 0 0 0      | 0 0 0      |
| SOUTH                          | 20.8 24.4 0 0 0       | 10 208 244   | 0 0 0       | 0 0 0        | 12 249 293  | 8 166 195  | 8 166 195  |
| WEST                           | 20.8 41.0 32 685 1314 | 12 248 493   | 0 0 0       | 0 0 0        | 0 0 0       | 0 0 0      | 0 0 0      |
| SKYL.T.                        | 36.4 100.7 0 0 0      | 0 0 0        | 0 0 0       | 0 0 0        | 0 0 0       | 0 0 0      | 0 0 0      |
| DOORS                          | 24.7 3.7 0 0 0        | 0 0 0        | 0 0 0       | 0 0 0        | 0 0 0       | 0 0 0      | 0 0 0      |
| NET EXPOSED WALL               | 4.4 0.5 308 1342 199  | 239 1041 154 | 214 932 138 | 300 1307 194 | 87 379 66   | 82 357 53  | 127 653 82 |
| NET EXPOSED BSMT WALL ABOVE GR | 3.5 0.5 0 0 0         | 0 0 0        | 0 0 0       | 0 0 0        | 0 0 0       | 0 0 0      | 0 0 0      |
| EXPOSED CLG                    | 1.3 0.5 280 351 195   | 204 256 114  | 165 207 92  | 195 244 109  | 220 276 123 | 176 221 98 | 168 210 94 |
| NO ATTIC EXPOSED CLG           | 2.7 1.2 0 0 0         | 0 0 0        | 0 0 0       | 40 107 48    | 0 0 0       | 0 0 0      | 0 0 0      |
| EXPOSED FLOOR                  | 2.5 0.4 0 0 0         | 0 0 0        | 165 411 61  | 0 0 0        | 0 0 0       | 0 0 0      | 168 415 62 |
| BASEMENT/CRAWL HEAT LOSS       | 0                     | 0            | 0           | 0            | 0           | 0          | 0          |
| SLAB ON GRADE HEAT LOSS        | 0                     | 0            | 0           | 0            | 0           | 0          | 0          |
| SUBTOTAL HT LOSS               | 2356                  | 1764         | 1965        | 2282         | 904         | 744        | 1345       |
| SUB TOTAL HT GAIN              |                       | 1669         |             | 1112         |             | 472        | 433        |
| LEVEL FACTOR / MULTIPLIER      | 0.20 0.25             | 0.20 0.25    | 0.20 0.25   | 0.20 0.25    | 0.20 0.25   | 0.20 0.25  | 0.20 0.25  |
| AIR CHANGE HEAT LOSS           | 593                   | 441          | 495         | 574          | 227         | 187        | 339        |
| AIR CHANGE HEAT GAIN           |                       | 118          | 79          | 112          | 33          | 24         | 31         |
| DUCT LOSS                      | 0                     | 0            | 246         | 0            | 0           | 0          | 169        |
| DUCT GAIN                      | 0                     | 0            | 200         | 0            | 0           | 0          | 45         |
| HEAT GAIN PEOPLE               | 240                   | 2            | 1           | 240          | 1           | 240        | 0          |
| HEAT GAIN APPLIANCES/LIGHTS    | 627                   | 627          | 627         | 627          | 627         | 627        | 0          |
| TOTAL HT LOSS BTUH             | 2951                  | 2195         | 2706        | 2856         | 1131        | 931        | 1856       |
| TOTAL HT GAIN x 1.3 BTUH       | 3762                  | 2214         | 2943        | 3329         | 1784        | 1297       | 663        |

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| ROOM USE                       | LIV                  | KTIFM        | LAUN       | WIR        | POY         | MUD         | WOD          | BAS        |
|--------------------------------|----------------------|--------------|------------|------------|-------------|-------------|--------------|------------|
| EXP. WALL                      | 38                   | 78           | 8          | 12         | 27          | 17          | 50           | 154        |
| CLG. HT.                       | 10                   | 10           | 9          | 11         | 10          | 11          | 9            | 9          |
| FACTORS                        |                      |              |            |            |             |             |              |            |
| GRS.WALL AREA                  | 380                  | 780          | 72         | 132        | 270         | 187         | 460          | 1224       |
| GLAZING                        | LOSS GAIN            | LOSS GAIN    | LOSS GAIN  | LOSS GAIN  | LOSS GAIN   | LOSS GAIN   | LOSS GAIN    | LOSS GAIN  |
| NORTH                          | 20.8 15.5 0 0 0      | 0 0 0        | 0 0 0      | 0 0 0      | 0 0 0       | 0 0 0       | 0 0 0        | 0 0 0      |
| EAST                           | 20.8 41.0 0 0 0      | 0 0 0        | 10 208 410 | 0 0 0      | 6 125 245   | 0 0 0       | 0 0 0        | 0 0 0      |
| SOUTH                          | 20.8 24.4 40 831 976 | 0 0 0        | 0 0 0      | 10 208 244 | 0 0 0       | 0 0 0       | 0 0 0        | 10 208 244 |
| WEST                           | 20.8 41.0 0 0 0      | 72 1496 2955 | 0 0 0      | 0 0 0      | 0 0 0       | 0 0 0       | 10 208 410   | 0 0 0      |
| SKYL.T.                        | 36.4 100.7 0 0 0     | 0 0 0        | 0 0 0      | 0 0 0      | 0 0 0       | 0 0 0       | 0 0 0        | 0 0 0      |
| DOORS                          | 24.7 3.7 0 0 0       | 20 493 73    | 0 0 0      | 0 0 0      | 40 886 145  | 20 493 73   | 0 0 0        | 20 493 73  |
| NET EXPOSED WALL               | 4.4 0.5 340 1481 220 | 688 2968 444 | 62 270 40  | 122 532 79 | 224 976 145 | 167 728 108 | 0 0 0        | 0 0 0      |
| NET EXPOSED BSMT WALL ABOVE GR | 3.5 0.5 0 0 0        | 0 0 0        | 0 0 0      | 0 0 0      | 0 0 0       | 0 0 0       | 290 1019 151 | 162 569 84 |
| EXPOSED CLG                    | 1.3 0.5 0 0 0        | 0 0 0        | 128 160 71 | 0 0 0      | 0 0 0       | 0 0 0       | 0 0 0        | 0 0 0      |
| NO ATTIC EXPOSED CLG           | 2.7 1.2 0 0 0        | 36 97 43     | 0 0 0      | 0 0 0      | 0 0 0       | 0 0 0       | 0 0 0        | 0 0 0      |
| EXPOSED FLOOR                  | 2.5 0.4 0 0 0        | 0 0 0        | 128 319 47 | 0 0 0      | 0 0 0       | 0 0 0       | 0 0 0        | 0 0 0      |
| BASEMENT/CRAWL HEAT LOSS       | 0                    | 0            | 0          | 0          | 0           | 0           | 0            | 9224       |
| SLAB ON GRADE HEAT LOSS        | 0                    | 0            | 0          | 0          | 0           | 0           | 0            | 0          |
| SUBTOTAL HT LOSS               | 2312                 | 5063         | 957        | 739        | 2087        | 1221        | 1227         | 6494       |
| SUB TOTAL HT GAIN              |                      | 1195         | 3516       | 568        | 323         | 537         | 562          | 401        |
| LEVEL FACTOR / MULTIPLIER      | 0.30 0.41            | 0.30 0.41    | 0.30 0.25  | 0.30 0.41  | 0.30 0.41   | 0.30 0.41   | 0.30 0.41    | 0.50 1.00  |
| AIR CHANGE HEAT LOSS           | 939                  | 2064         | 241        | 300        | 847         | 496         |              | 7744       |
| AIR CHANGE HEAT GAIN           | 85                   | 249          | 40         | 23         | 38          | 13          |              | 68         |
| DUCT LOSS                      | 0                    | 0            | 120        | 9          | 0           | 0           |              | 0          |
| DUCT GAIN                      | 0                    | 0            | 124        | 0          | 0           | 0           |              | 0          |
| HEAT GAIN PEOPLE               | 240                  | 0            | 0          | 0          | 0           | 0           | 0            | 0          |
| HEAT GAIN APPLIANCES/LIGHTS    | 627                  | 627          | 627        | 627        | 627         | 627         | 0            | 0          |
| TOTAL HT LOSS BTUH             | 3262                 | 7147         | 1318       | 1040       | 2934        | 1716        | 1227         | 14238      |
| TOTAL HT GAIN x 1.3 BTUH       | 2479                 | 5709         | 1785       | 449        | 749         | 1067        | 730          | 610        |

TOTAL HEAT GAIN BTUH:

29789

TONS: 2.48

LOSS DUE TO VENTILATION LOAD BTUH: 1593

STRUCTURAL HEAT LOSS: 47498

TOTAL COMBINED HEAT LOSS BTUH: 49091

SITE NAME: MINNISALE HOMES CORP  
BUILDER: GREENPARK HOMES

LOT 17  
TYPE: MILLWOOD 2

DATE: Oct-18

GFA: 2654 LO# 80550

HEATING CFM 1131 COOLING CFM 1131  
TOTAL HEAT LOSS 47,490 TOTAL HEAT GAIN 29,553  
AIR FLOW RATE CFM 23.81 AIR FLOW RATE CFM 38.27

furnace pressure 0.8  
furnace filter 0.05  
a/c coil pressure 0.2  
available pressure for s/a & r/a 0.35

#GOODMAN  
GMEC960803BNA 60  
FAN SPEED LOW  
MEDLOW  
MEDIUM  
MEDIUM HIGH  
HIGH 1131

AFUE = 96 %  
INPUT (BTU/H) = 60,000  
OUTPUT (BTU/H) = 57,600  
DESIGN CFM = 1131  
CFM @ 8" E.S.P.

| RUN COUNT | 4th | 3rd | 2nd | 1st | Bas |
|-----------|-----|-----|-----|-----|-----|
| S/A       | 0   | 0   | 11  | 7   | 4   |
| R/A       | 0   | 0   | 4   | 2   | 1   |

All S/A diffusers 4"x10" unless noted otherwise on layout.

All S/A runs 5"Ø unless noted otherwise on layout.

plenum pressure s/a 0.18 r/a pressure 0.17  
max s/a dif press. loss 0.02 r/a grille press. Loss 0.02  
min adjusted pressure s/a 0.16 adjusted pressure r/a 0.15

| RUN #                     | 1    | 2    | 4     | 5     | 6     | 7    | 8     | 9     | 10   | 11    | 12   | 14    | 15    | 16    | 17   | 18   | 19   | 20   | 21   | 22   | 23   | 24   |
|---------------------------|------|------|-------|-------|-------|------|-------|-------|------|-------|------|-------|-------|-------|------|------|------|------|------|------|------|------|
| ROOM NAME                 | MBR  | ENS  | BED-2 | BED-3 | BED-4 | BATH | BED-2 | BED-3 | MBR  | ENS-2 | LIV  | KT/FM | KT/FM | KT/FM | LAUN | W/R  | FOY  | MUD  | BAS  | BAS  | BAS  | BAS  |
| RM LOSS MBH               | 1.48 | 2.20 | 1.35  | 1.43  | 1.13  | 0.93 | 1.35  | 1.43  | 1.48 | 1.86  | 3.25 | 2.38  | 2.38  | 2.38  | 1.32 | 1.04 | 2.93 | 1.72 | 3.87 | 3.87 | 3.87 | 3.87 |
| CFM PER RUN HEAT          | 35   | 52   | 32    | 34    | 27    | 22   | 32    | 34    | 35   | 44    | 77   | 57    | 57    | 57    | 31   | 25   | 70   | 41   | 92   | 92   | 92   | 92   |
| RM GAIN MBH               | 1.88 | 2.21 | 1.47  | 1.66  | 1.78  | 1.30 | 1.47  | 1.66  | 1.88 | 0.66  | 2.48 | 1.90  | 1.90  | 1.90  | 1.77 | 0.45 | 0.75 | 1.07 | 0.34 | 0.34 | 0.34 | 0.34 |
| CFM PER RUN COOLING       | 72   | 85   | 56    | 64    | 68    | 50   | 56    | 64    | 72   | 25    | 95   | 73    | 73    | 73    | 68   | 17   | 29   | 41   | 13   | 13   | 13   | 13   |
| ADJUSTED PRESSURE         | 0.17 | 0.16 | 0.17  | 0.17  | 0.17  | 0.17 | 0.17  | 0.17  | 0.17 | 0.17  | 0.16 | 0.17  | 0.17  | 0.17  | 0.17 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.16 | 0.16 |
| ACTUAL DUCT LGH           | 55   | 54   | 46    | 33    | 15    | 37   | 47    | 47    | 45   | 38    | 15   | 48    | 44    | 49    | 39   | 39   | 39   | 32   | 39   | 39   | 20   | 10   |
| EQUIVALENT LENGTH         | 190  | 160  | 140   | 140   | 160   | 110  | 140   | 160   | 150  | 140   | 120  | 130   | 110   | 140   | 130  | 140  | 90   | 160  | 150  | 160  | 110  | 150  |
| TOTAL EFFECTIVE LENGTH    | 245  | 214  | 186   | 173   | 175   | 147  | 187   | 207   | 195  | 178   | 135  | 178   | 154   | 189   | 169  | 179  | 119  | 192  | 189  | 199  | 130  | 160  |
| ADJUSTED PRESSURE         | 0.07 | 0.08 | 0.09  | 0.1   | 0.1   | 0.12 | 0.09  | 0.08  | 0.09 | 0.1   | 0.12 | 0.1   | 0.11  | 0.09  | 0.1  | 0.1  | 0.14 | 0.09 | 0.09 | 0.08 | 0.12 | 0.1  |
| ROUND DUCT SIZE           | 6    | 6    | 5     | 5     | 5     | 4    | 5     | 5     | 6    | 4     | 6    | 5     | 5     | 5     | 5    | 4    | 5    | 4    | 6    | 6    | 6    | 6    |
| HEATING VELOCITY (ft/min) | 178  | 265  | 235   | 250   | 198   | 252  | 235   | 250   | 178  | 505   | 393  | 419   | 419   | 419   | 228  | 287  | 514  | 470  | 469  | 469  | 469  | 469  |
| COOLING VELOCITY (ft/min) | 367  | 433  | 411   | 470   | 499   | 574  | 411   | 470   | 367  | 287   | 484  | 536   | 536   | 536   | 499  | 195  | 213  | 470  | 66   | 66   | 66   | 66   |
| OUTLET GRILL SIZE         | 4X10 | 4X10 | 3X10  | 3X10  | 3X10  | 3X10 | 3X10  | 3X10  | 4X10 | 3X10  | 4X10 | 3X10  | 3X10  | 3X10  | 3X10 | 3X10 | 3X10 | 3X10 | 4X10 | 4X10 | 4X10 | 4X10 |
| TRUNK                     | A    | B    | D     | C     | B     | D    | D     | C     | A    | D     | C    | A     | A     | A     | D    | B    | C    | B    | A    | A    | C    | B    |

RUN #  
ROOM NAME  
RM LOSS MBH  
CFM PER RUN HEAT  
RM GAIN MBH  
CFM PER RUN COOLING  
ADJUSTED PRESSURE  
ACTUAL DUCT LGH  
EQUIVALENT LENGTH  
TOTAL EFFECTIVE LENGTH  
ADJUSTED PRESSURE  
ROUND DUCT SIZE  
HEATING VELOCITY (ft/min)  
COOLING VELOCITY (ft/min)  
OUTLET GRILL SIZE  
TRUNK

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## SUPPLY AIR TRUNK SIZE

| TRUNK   | STATIC | ROUND | RECT | VELOCITY | TRUNK | STATIC | ROUND | RECT | VELOCITY |
|---------|--------|-------|------|----------|-------|--------|-------|------|----------|
| CFM     | PRESS. | DUCT  | DUCT | (ft/min) | CFM   | PRESS. | DUCT  | DUCT | (ft/min) |
| TRUNK A | 425    | 0.07  | 10.5 | 14       | x     | 8      | 546   |      |          |
| TRUNK B | 662    | 0.07  | 12.4 | 18       | x     | 8      | 662   |      |          |
| TRUNK C | 307    | 0.08  | 9    | 10       | x     | 8      | 553   |      |          |
| TRUNK D | 468    | 0.08  | 10.6 | 14       | x     | 8      | 602   |      |          |
| TRUNK E | 0      | 0.00  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK F | 0      | 0.00  | 0    | 0        | x     | 8      | 0     |      |          |

## RETURN AIR TRUNK SIZE

| TRUNK   | STATIC | ROUND | RECT | VELOCITY | TRUNK | STATIC | ROUND | RECT | VELOCITY |
|---------|--------|-------|------|----------|-------|--------|-------|------|----------|
| CFM     | PRESS. | DUCT  | DUCT | (ft/min) | CFM   | PRESS. | DUCT  | DUCT | (ft/min) |
| TRUNK O | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK P | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK Q | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK R | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK S | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK T | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK U | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK V | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK W | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| TRUNK X | 1131   | 0.07  | 15.2 | 30       | x     | 8      | 679   |      |          |
| TRUNK Y | 265    | 0.07  | 8.8  | 10       | x     | 8      | 477   |      |          |
| TRUNK Z | 0      | 0.07  | 0    | 0        | x     | 8      | 0     |      |          |
| DRIP    | 1131   | 0.07  | 15.2 | 24       | x     | 10     | 679   |      |          |

| RETURN AIR #       | 1    | 2    | 3    | 4    | 5    | 6    | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22    | 23    | 24    |
|--------------------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AIR VOLUME         | 130  | 155  | 130  | 95   | 135  | 310  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| PLENUM PRESSURE    | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  |
| ACTUAL DUCT LGH    | 58   | 43   | 42   | 48   | 38   | 15   | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| EQUIVALENT LENGTH  | 150  | 135  | 175  | 175  | 145  | 135  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| TOTAL EFFECTIVE LH | 208  | 178  | 217  | 223  | 183  | 150  | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| ADJUSTED PRESSURE  | 0.07 | 0.08 | 0.07 | 0.07 | 0.08 | 0.10 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 |
| ROUND DUCT SIZE    | 6.8  | 7    | 6.8  | 6    | 6.6  | 8.6  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| INLET GRILL SIZE   | 8    | 8    | 8    | 8    | 8    | 8    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| INLET GRILL SIZE   | X    | X    | X    | X    | X    | X    | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     |
| INLET GRILL SIZE   | 14   | 14   | 14   | 14   | 14   | 30   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |

TYPE: MILLWOOD 2  
SITE NAME: MINNISALE HOMES CORP

LO # 80550  
LOT 17

**RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY**

| COMBUSTION APPLIANCES       |                                                      | 9.32.3.1(1) |
|-----------------------------|------------------------------------------------------|-------------|
| a) <input type="checkbox"/> | Direct vent (sealed combustion) only                 |             |
| b) <input type="checkbox"/> | Positive venting induced draft (except fireplaces)   |             |
| c) <input type="checkbox"/> | Natural draft, B-vent or induced draft gas fireplace |             |
| d) <input type="checkbox"/> | Solid Fuel (including fireplaces)                    |             |
| e) <input type="checkbox"/> | No Combustion Appliances                             |             |

| HEATING SYSTEM                      |                     |
|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Forced Air          |
| <input type="checkbox"/>            | Non Forced Air      |
| <input type="checkbox"/>            | Electric Space Heat |

| HOUSE TYPE               |                                                         | 9.32.1(2) |
|--------------------------|---------------------------------------------------------|-----------|
| <input type="checkbox"/> | I Type a) or b) appliance only, no solid fuel           |           |
| <input type="checkbox"/> | II Type I except with solid fuel (including fireplaces) |           |
| <input type="checkbox"/> | III Any Type c) appliance                               |           |
| <input type="checkbox"/> | IV Type I, or II with electric space heat               |           |
| <input type="checkbox"/> | Other: Type I, II or IV no forced air                   |           |

| SYSTEM DESIGN OPTIONS               |                                                 | O.N.H.W.P. |
|-------------------------------------|-------------------------------------------------|------------|
| <input type="checkbox"/>            | 1 Exhaust only/Forced Air System                |            |
| <input type="checkbox"/>            | 2 HRV with Ducting/Forced Air System            |            |
| <input checked="" type="checkbox"/> | 3 HRV Simplified/connected to forced air system |            |
| <input type="checkbox"/>            | 4 HRV with Ducting/non forced air system        |            |
| <input type="checkbox"/>            | Part 6 Design                                   |            |

| TOTAL VENTILATION CAPACITY |              | 9.32.3.3(1) |
|----------------------------|--------------|-------------|
| Basement + Master Bedroom  | 2 @ 21.2 cfm | 42.4 cfm    |
| Other Bedrooms             | 3 @ 10.6 cfm | 31.8 cfm    |
| Kitchen & Bathrooms        | 5 @ 10.6 cfm | 53 cfm      |
| Other Rooms                | 6 @ 10.6 cfm | 63.6 cfm    |
| Table 9.32.3.A.            | TOTAL        | 190.8 cfm   |

| PRINCIPAL VENTILATION CAPACITY REQUIRED |      | 9.32.3.4(1) |
|-----------------------------------------|------|-------------|
| 1 Bedroom                               | 31.8 | cfm         |
| 2 Bedroom                               | 47.7 | cfm         |
| 3 Bedroom                               | 63.6 | cfm         |
| 4 Bedroom                               | 79.5 | cfm         |
| 5 Bedroom                               | 95.4 | cfm         |
| TOTAL                                   | 79.5 | cfm         |

| SUPPLEMENTAL VENTILATION CAPACITY |       | 9.32.3.5. |
|-----------------------------------|-------|-----------|
| Total Ventilation Capacity        | 190.8 | cfm       |
| Less Principal Ventil. Capacity   | 79.5  | cfm       |
| Required Supplemental Capacity    | 111.3 | cfm       |

| PRINCIPAL EXHAUST FAN CAPACITY                   |                |
|--------------------------------------------------|----------------|
| Model: VANEE 65H                                 | Location: BSMT |
| 79.5 cfm                                         | 3.0 sones      |
| <input checked="" type="checkbox"/> HVI Approved |                |

| PRINCIPAL EXHAUST HEAT LOSS CALCULATION |       |        |        |
|-----------------------------------------|-------|--------|--------|
| CFM                                     | ΔT °F | FACTOR | % LOSS |
| 79.5 CFM                                | 74 F  | 1.08   | 0.25   |

| SUPPLEMENTAL FANS |             | PANASONIC |       |
|-------------------|-------------|-----------|-------|
| Location          | Model       | cfm       | Sones |
| ENS               | FV-05-11VK1 | 50        | ✓ 0.3 |
| BATH              | FV-05-11VK1 | 50        | ✓ 0.3 |
| ENS-2             | FV-05-11VK1 | 50        | ✓ 0.3 |
| W/R               | FV-05-11VK1 | 50        | ✓ 0.3 |

| HEAT RECOVERY VENTILATOR |                                                  | 9.32.3.11. |
|--------------------------|--------------------------------------------------|------------|
| Model: VANEE 65H         |                                                  |            |
| 155 cfm high             | 64 cfm low                                       |            |
| 75 % Sensible Efficiency | <input checked="" type="checkbox"/> HVI Approved |            |
| @ 32 deg F ( 0 deg C)    |                                                  |            |

| LOCATION OF INSTALLATION |                   |
|--------------------------|-------------------|
| Lot:                     | Concession        |
| Township                 | Plan:             |
| Address                  |                   |
| Roll #                   | Building Permit # |

| BUILDER:        |  |
|-----------------|--|
| GREENPARK HOMES |  |
| Name:           |  |
| Address:        |  |
| City:           |  |
| Telephone #:    |  |

| INSTALLING CONTRACTOR |  |
|-----------------------|--|
| Name:                 |  |
| Address:              |  |
| City:                 |  |
| Telephone #:          |  |
| Fax #:                |  |

| DESIGNER CERTIFICATION                                                                                        |                         |
|---------------------------------------------------------------------------------------------------------------|-------------------------|
| I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code. |                         |
| Name:                                                                                                         | HVAC Designs Ltd.       |
| Signature:                                                                                                    | <i>Michael O'Rourke</i> |
| HRAJ #                                                                                                        | 001820                  |
| Date:                                                                                                         | October-18              |

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.3 OF THE BUILDING CODE.  
INDIVIDUAL BCIN: 19669 *Michael O'Rourke* MICHAEL O'ROURKE

**HEAT LOSS AND GAIN SUMMARY SHEET**

|                   |           |                            |
|-------------------|-----------|----------------------------|
| MODEL: MILLWOOD 2 | LOT 17    | BUILDER: GREENPARK HOMES   |
| SFQT: 2654        | LO# 80550 | SITE: MINNISALE HOMES CORP |

**DESIGN ASSUMPTIONS**

|                      |    |                                |    |
|----------------------|----|--------------------------------|----|
| HEATING              | *F | COOLING                        | *F |
| OUTDOOR DESIGN TEMP. | -2 | OUTDOOR DESIGN TEMP.           | 86 |
| INDOOR DESIGN TEMP.  | 72 | INDOOR DESIGN TEMP. (MAX 75°F) | 75 |

**BUILDING DATA**

|                                     |                 |                           |          |
|-------------------------------------|-----------------|---------------------------|----------|
| ATTACHMENT:                         | DETACHED        | # OF STORIES (+BASEMENT): | 3        |
| FRONT FACES:                        | SOUTH           | ASSUMED (Y/N):            | Y        |
| AIR CHANGES PER HOUR:               | 3.57            | ASSUMED (Y/N):            | Y        |
| AIR TIGHTNESS CATEGORY:             | AVERAGE         | ASSUMED (Y/N):            | Y        |
| WIND EXPOSURE:                      | SHELTERED       | ASSUMED (Y/N):            | Y        |
| HOUSE VOLUME (ft³):                 | 33860.0         | ASSUMED (Y/N):            | Y        |
| INTERNAL SHADING:                   | BLINDS/CURTAINS | ASSUMED OCCUPANTS:        | 5        |
| INTERIOR LIGHTING LOAD (Btu/h/ft²): | 1.65            | DC BRUSHLESS MOTOR (Y/N): | Y        |
| FOUNDATION CONFIGURATION            | BCIN_1          | DEPTH BELOW GRADE:        | 6.0 ft   |
| LENGTH: 46.0 ft                     | WIDTH: 31.0 ft  | EXPOSED PERIMETER:        | 154.0 ft |

**2012 OBC - COMPLIANCE PACKAGE****Component**

|                                                                            |
|----------------------------------------------------------------------------|
| Ceiling with Attic Space Minimum RSI (R)-Value                             |
| Ceiling Without Attic Space Minimum RSI (R)-Value                          |
| Exposed Floor Minimum RSI (R)-Value                                        |
| Walls Above Grade Minimum RSI (R)-Value                                    |
| Basement Walls Minimum RSI (R)-Value                                       |
| Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value |
| Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value        |
| Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value             |
| Windows and Sliding Glass Doors Maximum U-Value                            |
| Skylights Maximum U-Value                                                  |
| Space Heating Equipment Minimum AFUE                                       |
| HRV Minimum Efficiency                                                     |
| Domestic Hot Water Heater Minimum EF                                       |

**CITY OF BRAMPTON  
BUILDING DIVISION  
REVIEWED****NOV 26 2018****HVAC BY  
MONICA CRISAN****Compliance Package  
A1**

| Nominal | Min. Eff. |
|---------|-----------|
| 60      | 59.22     |
| 31      | 27.65     |
| 31      | 29.80     |
| 22      | 17.03     |
| 20 ci   | 21.12     |
| -       | -         |
| 10      | 10        |
| 10      | 11.13     |
| 0.28    | -         |
| 0.49    | -         |
| 0.96    | -         |
| 75%     | -         |
| 0.8     | -         |

INDIVIDUAL BCIN: 19669  
MICHAEL O'ROURKE

**CSA F280-12 Residential Heat Loss and Heat Gain Calculations**
**Formula Sheet (For Air Leakage / Ventilation Calculation)**

LO#: 80550

Model: MILLWOOD 2

Builder: GREENPARK HOMES

Date: 10/31/2018

**Volume Calculation**
**House Volume**

| Level  | Floor Area (ft <sup>2</sup> ) | Floor Height (ft) | Volume (ft <sup>3</sup> ) |
|--------|-------------------------------|-------------------|---------------------------|
| Bsmt   | 1148                          | 9                 | 10332                     |
| First  | 1148                          | 10                | 11480                     |
| Second | 1506                          | 8                 | 12048                     |
| Third  | 0                             | 9                 | 0                         |
| Fourth | 0                             | 9                 | 0                         |
| Total: |                               |                   | 33,860.0 ft <sup>3</sup>  |
| Total: |                               |                   | 958.8 m <sup>3</sup>      |

**Air Change & Delta T Data**

|                                |       |
|--------------------------------|-------|
| WINTER NATURAL AIR CHANGE RATE | 0.345 |
| SUMMER NATURAL AIR CHANGE RATE | 0.112 |

| Design Temperature Difference |                    |                     |       |       |
|-------------------------------|--------------------|---------------------|-------|-------|
|                               | T <sub>in</sub> °C | T <sub>out</sub> °C | ΔT °C | ΔT °F |
| Winter DTD <sub>h</sub>       | 22                 | -19                 | 41    | 74    |
| Summer DTD <sub>c</sub>       | 24                 | 30                  | 6     | 11    |

**5.2.3.1 Heat Loss due to Air Leakage**

$$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$$

$$0.345 \times 266.34 \times 41^\circ\text{C} \times 1.2 = 4540 \text{ W}$$

$$= 15489 \text{ Btu/h}$$

**6.2.6 Sensible Gain due to Air Leakage**

$$HG_{salb} = LR_{alrc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$$

$$0.112 \times 266.34 \times 6^\circ\text{C} \times 1.2 = 219 \text{ W}$$

$$= 747 \text{ Btu/h}$$

**5.2.3.2 Heat Loss due to Mechanical Ventilation**

$$HL_{vailrb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

$$80 \text{ CFM} \times 74^\circ\text{F} \times 1.08 \times 0.25 = 1593 \text{ Btu/h}$$

**6.2.7 Sensible heat Gain due to Ventilation**

$$HL_{vailrb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

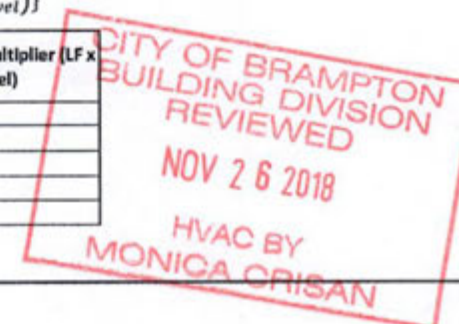
$$80 \text{ CFM} \times 11^\circ\text{F} \times 1.08 \times 0.25 = 236 \text{ Btu/h}$$

**5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)**

$$HL_{alrr} = \text{Level Factor} \times HL_{airbv} \times ((HL_{agcr} + HL_{bgcr}) + (HL_{agcleve} + HL_{bgcleve}))$$

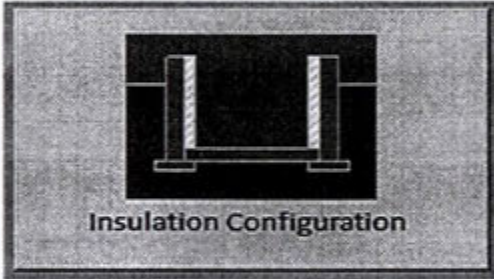
| Level | Level Factor (LF) | HL <sub>airbv</sub> Air Leakage + Ventilation Heat Loss (Btu/h) | Level Conductive Heat Loss: (HL <sub>level</sub> ) | Air Leakage Heat Loss Multiplier (LF x HL <sub>airbv</sub> / HL <sub>level</sub> ) |
|-------|-------------------|-----------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------|
| 1     | 0.5               | 15,489                                                          | 7,720                                              | 1.003                                                                              |
| 2     | 0.3               |                                                                 | 11,442                                             | 0.406                                                                              |
| 3     | 0.2               |                                                                 | 12,313                                             | 0.252                                                                              |
| 4     | 0                 |                                                                 | 0                                                  | 0.000                                                                              |
| 5     | 0                 |                                                                 | 0                                                  | 0.000                                                                              |

\*HL<sub>airbv</sub> = Air leakage heat loss + ventilation heat loss

\*For a balanced or supply only ventilation system HL<sub>airve</sub> = 0


## Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

| Weather Station Description    |                                           |                                                                                                                 |
|--------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Province:                      | Ontario                                   |                                                                                                                 |
| Region:                        | Brampton                                  |                                                                                                                 |
| Site Description               |                                           |                                                                                                                 |
| Soil Conductivity:             | Normal conductivity: dry sand, loam, clay |                                                                                                                 |
| Water Table:                   | Normal (7-10 m, 23-33 ft)                 |                                                                                                                 |
| Foundation Dimensions          |                                           |                                                                                                                 |
| Floor Length (m):              | 14.0                                      | <br>Insulation Configuration |
| Floor Width (m):               | 9.4                                       |                                                                                                                 |
| Exposed Perimeter (m):         | 0.0                                       |                                                                                                                 |
| Wall Height (m):               | 2.7                                       |                                                                                                                 |
| Depth Below Grade (m):         | 1.83                                      |                                                                                                                 |
| Window Area (m <sup>2</sup> ): | 1.9                                       |                                                                                                                 |
| Door Area (m <sup>2</sup> ):   | 1.9                                       |                                                                                                                 |
| Radiant Slab                   |                                           |                                                                                                                 |
| Heated Fraction of the Slab:   | 0                                         |                                                                                                                 |
| Fluid Temperature (°C):        | 33                                        |                                                                                                                 |
| Design Months                  |                                           |                                                                                                                 |
| Heating Month                  | 1                                         |                                                                                                                 |
| Foundation Loads               |                                           |                                                                                                                 |
| Heating Load (Watts):          | 1531                                      |                                                                                                                 |

TYPE: MILLWOOD 2  
LO# 80550

LOT 17

CITY OF BRAMPTON  
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## Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

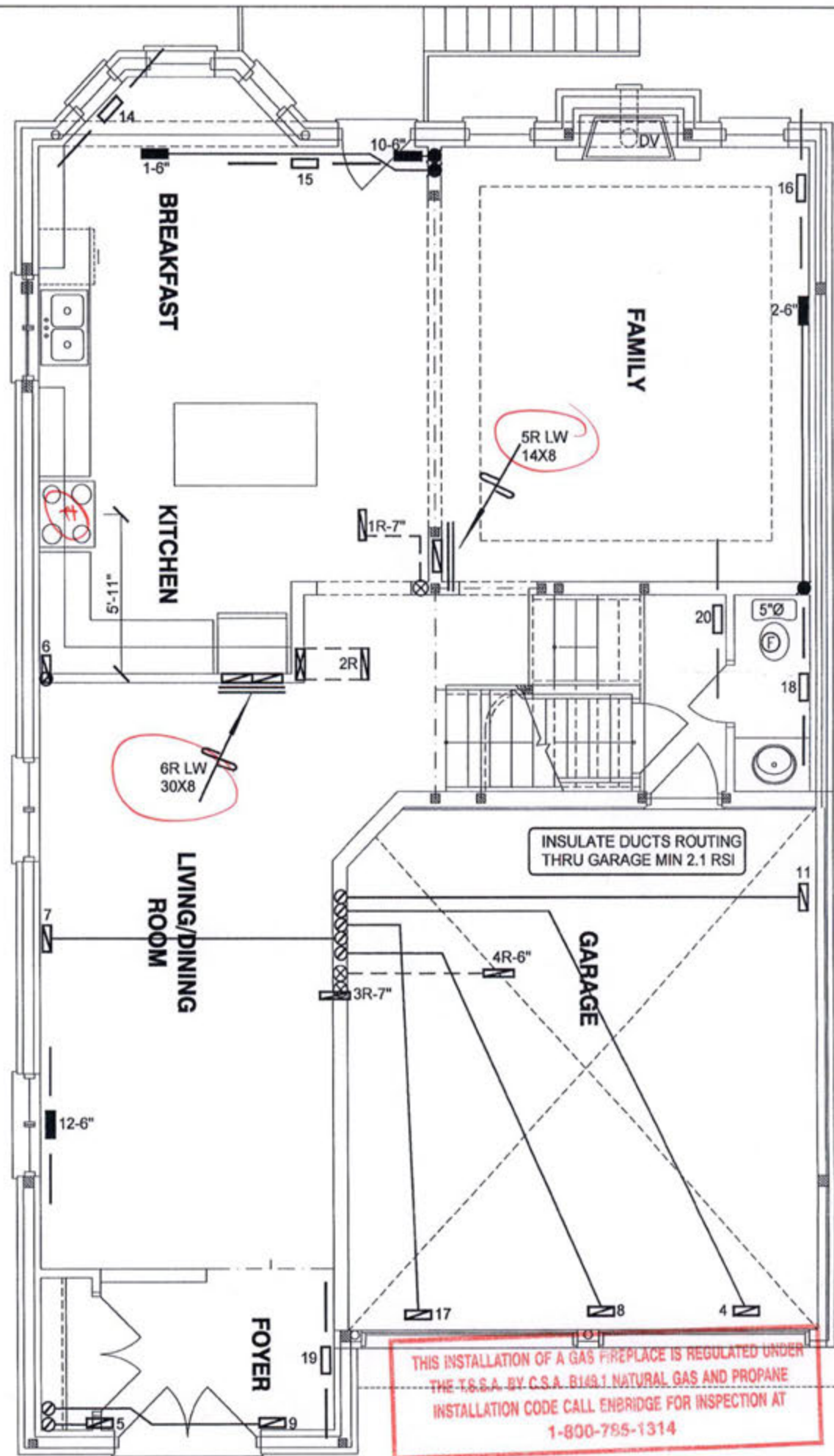
| Weather Station Description       |                            |                        |       |
|-----------------------------------|----------------------------|------------------------|-------|
| Province:                         | Ontario                    |                        |       |
| Region:                           | Brampton                   |                        |       |
| Weather Station Location:         | Open flat terrain, grass   |                        |       |
| Anemometer height (m):            | 10                         |                        |       |
| Local Shielding                   |                            |                        |       |
| Building Site:                    | Suburban, forest           |                        |       |
| Walls:                            | Heavy                      |                        |       |
| Flue:                             | Heavy                      |                        |       |
| Highest Ceiling Height (m):       | 7.32                       |                        |       |
| Building Configuration            |                            |                        |       |
| Type:                             | Detached                   |                        |       |
| Number of Stories:                | Two                        |                        |       |
| Foundation:                       | Full                       |                        |       |
| House Volume (m <sup>3</sup> ):   | 958.8                      |                        |       |
| Air Leakage/Ventilation           |                            |                        |       |
| Air Tightness Type:               | Present (1961-) (3.57 ACH) |                        |       |
| Custom BDT Data:                  | ELA @ 10 Pa.               | 1278.1 cm <sup>2</sup> |       |
|                                   | 3.57                       | ACH @ 50 Pa            |       |
| Mechanical Ventilation (L/s):     | Total Supply               | Total Exhaust          |       |
|                                   | 37.5                       | 37.5                   |       |
| Flue Size                         |                            |                        |       |
| Flue #:                           | #1                         | #2                     | #3 #4 |
| Diameter (mm):                    | 0                          | 0                      | 0 0   |
| Natural Infiltration Rates        |                            |                        |       |
| Heating Air Leakage Rate (ACH/H): | 0.345                      |                        |       |
| Cooling Air Leakage Rate (ACH/H): | 0.112                      |                        |       |

TYPE: MILLWOOD 2  
LO# 80550

LOT 17

CITY OF BRAMPTON  
BUILDING DIVISION  
REVIEWED  
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MONICA CRISAN





THIS INSTALLATION OF A GAS FIREPLACE IS REGULATED UNDER THE T.S.S.A. BY C.S.A. B149.1 NATURAL GAS AND PROPANE INSTALLATION CODE CALL ENBRIDGE FOR INSPECTION AT 1-800-785-1314

THE INSTALLATION OF CARBON MONOXIDE DETECTOR(S) SHALL COMPLY WITH OBC DIV. B, 9.33.4 REQUIREMENTS.

MECHANICAL VENTILATION SHALL BE PROVIDED IN CONFORMANCE WITH OBC DIV. B, 9.32.3 REQUIREMENTS.

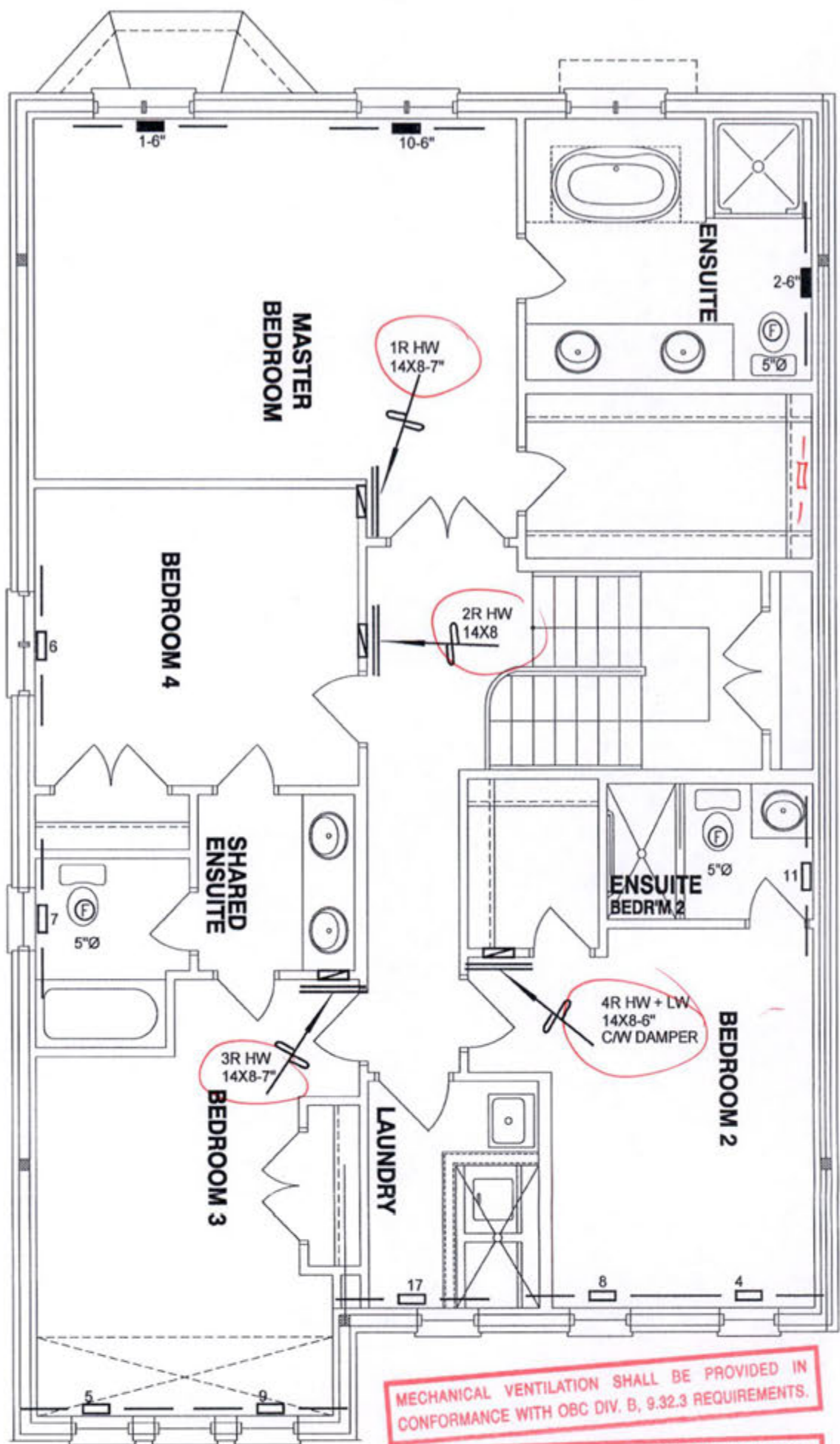
I MICHAEL OSBORNE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 12.3 OF THE BUILDING CODE.  
*Michael Osborne*  
Michael Osborne, BCIN 19669  
HVAC DESIGNS LTD.

LOT 17  
CSA-F280-12  
WOD PACKAGE A1

| HVAC LEGEND |                                 |        |                                 |        |                              |        |                            | 3.        |                  |
|-------------|---------------------------------|--------|---------------------------------|--------|------------------------------|--------|----------------------------|-----------|------------------|
| SYMBOL      | DESCRIPTION                     | SYMBOL | DESCRIPTION                     | SYMBOL | DESCRIPTION                  | SYMBOL | DESCRIPTION                | 2.        |                  |
|             | FLOOR SUPPLY AIR GRILLE         |        | 6" SUPPLY AIR BOOT ABOVE        |        | 14"x8" RETURN AIR GRILLE     |        | RETURN AIR STACK ABOVE     | 1.        |                  |
|             | FLOOR SUPPLY AIR GRILLE 6" BOOT |        | SUPPLY AIR STACK FROM 2nd FLOOR |        | 30"x8" RETURN AIR GRILLE     |        | RETURN AIR STACK 2nd FLOOR | No.       | Description Date |
|             | SUPPLY AIR BOOT ABOVE           |        | 6" SUPPLY AIR STACK 2nd FLOOR   |        | FRA- FLOOR RETURN AIR GRILLE |        | REDUCER                    | REVISIONS |                  |

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|                                                                                                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                              |  |                                                                                                                           |  |
|---------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------|--|
| Client<br>GREENPARK HOMES<br>Project Name<br>MINNISALE HOMES CORP.<br>BRAMPTON, ONTARIO<br>LOT 17<br>MILLWOOD 2 2654 sqft |  | <b>HVAC DESIGNS LTD.</b><br>375 Finley Ave. Suite 202 - Ajax, Ontario<br>L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375<br>Email: info@hvacdsgns.ca<br>Web: www.hvacdsgns.ca<br>Specializing in Residential Mechanical Design Services<br>Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed. |  | CITY OF BRAMPTON<br>BUILDING DIVISION<br>REVIEWED<br>NOV 27 2018<br>HVAC BY<br>MONICA CRISAN |  | Sheet Title<br>FIRST FLOOR<br>HEATING<br>LAYOUT<br>Date<br>OCT/2018<br>Scale<br>3/16" = 1'-0"<br>BCIN# 19669<br>LO# 80550 |  |
|---------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------|--|



MECHANICAL VENTILATION SHALL BE PROVIDED IN CONFORMANCE WITH OBC DIV. B, 9.32.3 REQUIREMENTS.

THE INSTALLATION OF CARBON MONOXIDE DETECTOR(S) SHALL COMPLY WITH OBC DIV. B, 9.33.4 REQUIREMENTS.

I HEREBY CERTIFY THAT I HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.3 OF THE BUILDING CODE.

*Michael O'Rourke*  
Michael O'Rourke, UCB# 19669  
HVAC DESIGNS LTD.

LOT 17  
CSA-F280-12  
WOD PACKAGE A1

| HVAC LEGEND |                                 |        |                                 |        |                              |        |                            | 3.   |             |
|-------------|---------------------------------|--------|---------------------------------|--------|------------------------------|--------|----------------------------|------|-------------|
| SYMBOL      | DESCRIPTION                     | SYMBOL | DESCRIPTION                     | SYMBOL | DESCRIPTION                  | SYMBOL | DESCRIPTION                | 2.   |             |
|             | FLOOR SUPPLY AIR GRILLE         |        | 6" SUPPLY AIR BOOT ABOVE        |        | 14"x8" RETURN AIR GRILLE     |        | RETURN AIR STACK ABOVE     | 1.   |             |
|             | FLOOR SUPPLY AIR GRILLE 6" BOOT |        | SUPPLY AIR STACK FROM 2nd FLOOR |        | 30"x8" RETURN AIR GRILLE     |        | RETURN AIR STACK 2nd FLOOR | No.  | Description |
|             | SUPPLY AIR BOOT ABOVE           |        | 6" SUPPLY AIR STACK 2nd FLOOR   |        | FRA- FLOOR RETURN AIR GRILLE |        | REDUCER                    | Date |             |

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|                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                          |                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Client</b><br>GREENPARK HOMES                                                                             | <b>HVAC DESIGNS LTD.</b><br>375 Finley Ave. Suite 202 - Ajax, Ontario<br>L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375<br>Email: info@hvacdesigns.ca<br>Web: www.hvacdesigns.ca<br>Specializing in Residential Mechanical Design Services<br>Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed. | <b>CITY OF BRAMPTON<br/>BUILDING DIVISION<br/>REVIEWED<br/>NOV 27 2018<br/>HVAC BY<br/>MONICA CRISAN</b> | <b>Sheet Title</b><br>SECOND FLOOR<br>HEATING<br>LAYOUT<br><br><b>Date</b> OCT/2018<br><b>Scale</b> 3/16" = 1'-0"<br><b>BCIN#</b> 19669<br><b>LO#</b> 80550 |
| <b>Project Name</b><br>MINNISALE HOMES CORP.<br>BRAMPTON, ONTARIO<br><br>LOT 17<br>MILLWOOD 2      2654 sqft |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                          |                                                                                                                                                             |