



May 1, 2006

Mr. Tom Errico, P.E.
Wilbur Smith Associates
59 Middle Street
Portland, ME 04101

RE: Signal Warrant Analysis
Lowe's Driveway at Rand Road
Portland, Maine

Dear Tom:

As a condition of site plan approval from the City of Portland for the redevelopment of the Pine Tree Shopping Center, completion of a signal warrant analysis was required for the intersection of the Lowe's driveway (across from Quirk Motors) at Rand Road. In order to comply with this condition, Gorrill-Palmer Consulting Engineers, Inc. has completed a traffic signal warrant analysis for this four-way intersection. The analysis is based on a 12-hour turning movement count starting at 7:00 AM and ending at 7:00 PM, at the above intersection, performed by Gorrill-Palmer Consulting Engineers, Inc. on Tuesday, April 10, 2007. As early April is representative of regular and repeatable volumes (as required by the MUTCD), the raw volumes were utilized without adjustment.

Traffic Signal Evaluation

In order for a traffic signal to be installed, the location should meet one or more of the traffic signal warrants published in the 2003 Edition of the Manual on Uniform Traffic Control Devices, which are listed below:

| Warrant # | Description |
|-----------|-----------------------------|
| 1 | Eight-Hour Vehicular Volume |
| 2 | Four-Hour Vehicular Volume |
| 3 | Peak Hour |
| 4 | Pedestrian Volume |
| 5 | School Crossing |
| 6 | Coordinated Signal System |
| 7 | Crash Experience |
| 8 | Roadway Network |

Gorrill-Palmer Consulting Engineers, Inc. completed a signal warrant analysis for the intersection based on the adjusted turning movement count as mentioned above. The minor street approaches do not include the right turn volumes, as they have their own approach lanes. Warrants 1, 2, and 3 are most applicable for this intersection and were used for the basis of the signal warrant analyses, which are summarized below.

Mr. Tom Errico, P.E.
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Analysis

Warrant #1 – Eight-Hour Vehicular Volume - This warrant requires that one of the following conditions be met:

1. The vehicles per hour given in both of the 100% columns of Condition A in Table 4C-1 exist on the major street and on the higher volume minor-street approaches, respectively, to the intersection, or
2. The vehicles per hour given in both of the 100% columns of Condition B in Table 4C-1 exist on the major street and on the higher volume minor-street approaches, respectively, to the intersection.

In order for Condition 1 to be met at this intersection, there must be 150 vehicles per hour approaching from one of the minor streets and 600 vehicles per hour approaching for the major street for eight hours of a day. In order for Condition 2 to be met there must be 75 vehicles per hour approaching from one of the minor streets and 900 vehicles per hour approaching for the major street for eight hours of a day. Based on the volumes obtained at this intersection as shown on the attached spreadsheet, **the eight-hour warrant is not met for either Condition.**

Warrant #2 – Four-Hour Vehicular Volume - This warrant requires that for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor-street approach (one direction only) all fall above the applicable curve in figure 4C-1 as published in the MUTCD for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these four hours.

In order for this condition to be met, there must be at least 80 vehicles per hour exiting the minor street for four hours in the day. Based on the count data, exiting traffic from the side street does not reach this minimum volume for any of the hours of the day, and therefore **the four-hour warrant is not met.**

Warrant #3 – Peak Hour - This warrant requires that the criteria in either of the following two categories be met:

1. If all three of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:
 - a. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceeds: four vehicle-hours for a one-lane approach; or five vehicle-hours for a two-lane approach, and
 - b. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and

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- c. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

Gorrill-Palmer Consulting Engineers, Inc. did not review the above condition (although operations during the turning movement count do not indicate significant levels of delay); rather Condition 2 was utilized for the peak hour warrant analysis.

2. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for one hour (any for consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 published in the MUTCD for the existing combination of approach lanes.

In order for this condition to be met, there must be at least 100 vehicles per hour exiting the minor street for the peak hour. Based on the count data, exiting traffic from the side street does not reach this minimum volume for any of the hours of the day, and therefore **the four-hour warrant is not met.**

In summary, it is the opinion of Gorrill-Palmer Consulting Engineers, Inc. that the installation of a traffic signal is not warranted or recommended at this time based on average volume conditions; based on the information, our office does not anticipate the need for a signal any time in the foreseeable future. Enclosed for your review, please find the raw volumes from the turning movement count and the completed eight-hour signal warrant sheet.

Please contact us with questions.

Sincerely,

Gorrill-Palmer Consulting Engineers, Inc.



Jeremiah J. Bartlett, P.E., PTOE
Project Engineer

Enclosure

Copy: Paul Cincotta, Packard Development
Barbara Barhydt, City of Portland

Gorrill-Palmer Consulting Engineers, Inc.

15 Shaker Road, P.O. Box 1237

Gray, Maine 04039

(207) 657-6910

Location: Portland

Counter: EB & SF

DB-400: Gp4

Weather: Clear

File Name : Rand @ Lowes_12h

Site Code : 00000935

Start Date : 4/10/2007

Page No : 1

Groups Printed- CARS - SINGLE UNIT - COMBINATION VEHICLES

| Start Time | RAND RD From North | | | | | QUIRK From East | | | | | RAND RD From South | | | | | LOWES From West | | | | | Int. Total |
|--------------|-----------------------|------------|-----------|----------|------------|--------------------|----------|-----------|----------|------------|-----------------------|------------|-----------|----------|------------|--------------------|----------|-----------|----------|------------|------------|
| | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | |
| 07:00 AM | 1 | 42 | 2 | 1 | 46 | 4 | 0 | 0 | 0 | 4 | 9 | 78 | 5 | 0 | 92 | 1 | 0 | 2 | 0 | 3 | 145 |
| 07:15 AM | 4 | 59 | 3 | 0 | 66 | 2 | 0 | 0 | 0 | 2 | 5 | 132 | 10 | 0 | 147 | 1 | 0 | 1 | 2 | 4 | 219 |
| 07:30 AM | 2 | 70 | 3 | 1 | 76 | 3 | 0 | 0 | 0 | 3 | 5 | 151 | 4 | 0 | 160 | 0 | 0 | 3 | 1 | 4 | 243 |
| 07:45 AM | 1 | 86 | 1 | 0 | 88 | 0 | 0 | 1 | 0 | 1 | 5 | 139 | 4 | 0 | 148 | 3 | 0 | 4 | 1 | 8 | 245 |
| Total | 8 | 257 | 9 | 2 | 276 | 9 | 0 | 1 | 0 | 10 | 24 | 500 | 23 | 0 | 547 | 5 | 0 | 10 | 4 | 19 | 852 |
| 08:00 AM | 0 | 59 | 0 | 0 | 59 | 2 | 0 | 2 | 0 | 4 | 8 | 140 | 5 | 0 | 153 | 0 | 2 | 3 | 0 | 5 | 221 |
| 08:15 AM | 1 | 64 | 3 | 0 | 68 | 3 | 1 | 0 | 0 | 4 | 6 | 142 | 3 | 0 | 151 | 1 | 0 | 4 | 0 | 5 | 228 |
| 08:30 AM | 2 | 54 | 7 | 0 | 63 | 3 | 0 | 0 | 0 | 3 | 10 | 105 | 1 | 0 | 116 | 3 | 0 | 2 | 0 | 5 | 187 |
| 08:45 AM | 2 | 69 | 2 | 0 | 73 | 3 | 1 | 5 | 0 | 9 | 6 | 108 | 2 | 0 | 116 | 3 | 2 | 5 | 0 | 10 | 208 |
| Total | 5 | 246 | 12 | 0 | 263 | 11 | 2 | 7 | 0 | 20 | 30 | 495 | 11 | 0 | 536 | 7 | 4 | 14 | 0 | 25 | 844 |
| 09:00 AM | 1 | 56 | 4 | 0 | 61 | 4 | 1 | 3 | 0 | 8 | 9 | 85 | 5 | 0 | 99 | 2 | 0 | 6 | 0 | 8 | 176 |
| 09:15 AM | 1 | 43 | 5 | 0 | 49 | 4 | 1 | 8 | 0 | 13 | 3 | 71 | 4 | 0 | 78 | 3 | 0 | 2 | 0 | 5 | 145 |
| 09:30 AM | 5 | 35 | 4 | 1 | 45 | 7 | 0 | 1 | 0 | 8 | 13 | 91 | 5 | 0 | 109 | 5 | 0 | 9 | 1 | 15 | 177 |
| 09:45 AM | 2 | 59 | 6 | 0 | 67 | 3 | 0 | 4 | 0 | 7 | 12 | 96 | 8 | 0 | 116 | 5 | 1 | 3 | 0 | 9 | 199 |
| Total | 9 | 193 | 19 | 1 | 222 | 18 | 2 | 16 | 0 | 36 | 37 | 343 | 22 | 0 | 402 | 15 | 1 | 20 | 1 | 37 | 697 |
| 10:00 AM | 2 | 58 | 2 | 1 | 63 | 1 | 0 | 2 | 0 | 3 | 9 | 58 | 1 | 0 | 68 | 6 | 0 | 7 | 0 | 13 | 147 |
| 10:15 AM | 3 | 54 | 4 | 0 | 61 | 4 | 0 | 4 | 0 | 8 | 11 | 65 | 4 | 0 | 80 | 4 | 0 | 5 | 0 | 9 | 158 |
| 10:30 AM | 1 | 50 | 10 | 0 | 61 | 2 | 0 | 2 | 0 | 4 | 7 | 71 | 4 | 0 | 82 | 8 | 0 | 6 | 0 | 14 | 161 |
| 10:45 AM | 3 | 49 | 11 | 0 | 63 | 1 | 1 | 6 | 0 | 8 | 16 | 65 | 6 | 0 | 87 | 9 | 0 | 7 | 0 | 16 | 174 |
| Total | 9 | 211 | 27 | 1 | 248 | 8 | 1 | 14 | 0 | 23 | 43 | 259 | 15 | 0 | 317 | 27 | 0 | 25 | 0 | 52 | 640 |
| 11:00 AM | 1 | 39 | 3 | 0 | 43 | 6 | 0 | 2 | 0 | 8 | 9 | 72 | 1 | 0 | 82 | 3 | 0 | 9 | 0 | 12 | 145 |
| 11:15 AM | 6 | 52 | 14 | 0 | 72 | 8 | 0 | 3 | 0 | 11 | 14 | 87 | 5 | 0 | 106 | 8 | 0 | 5 | 0 | 13 | 202 |
| 11:30 AM | 4 | 62 | 10 | 1 | 77 | 2 | 1 | 3 | 0 | 6 | 12 | 82 | 2 | 0 | 96 | 10 | 2 | 6 | 0 | 18 | 197 |
| 11:45 AM | 7 | 52 | 7 | 1 | 67 | 5 | 0 | 0 | 1 | 6 | 16 | 75 | 5 | 0 | 96 | 6 | 1 | 9 | 0 | 16 | 185 |
| Total | 18 | 205 | 34 | 2 | 259 | 21 | 1 | 8 | 1 | 31 | 51 | 316 | 13 | 0 | 380 | 27 | 3 | 29 | 0 | 59 | 729 |
| 12:00 PM | 3 | 63 | 6 | 0 | 72 | 5 | 3 | 5 | 0 | 13 | 10 | 83 | 1 | 0 | 94 | 5 | 0 | 13 | 0 | 18 | 197 |
| 12:15 PM | 5 | 83 | 9 | 0 | 97 | 3 | 0 | 4 | 0 | 7 | 18 | 91 | 3 | 0 | 112 | 7 | 0 | 17 | 0 | 24 | 240 |
| 12:30 PM | 4 | 54 | 14 | 0 | 72 | 6 | 3 | 6 | 0 | 15 | 12 | 90 | 3 | 1 | 106 | 5 | 2 | 12 | 0 | 19 | 212 |
| 12:45 PM | 2 | 72 | 6 | 0 | 80 | 5 | 1 | 4 | 0 | 10 | 14 | 90 | 3 | 1 | 108 | 3 | 1 | 13 | 0 | 17 | 215 |
| Total | 14 | 272 | 35 | 0 | 321 | 19 | 7 | 19 | 0 | 45 | 54 | 354 | 10 | 2 | 420 | 20 | 3 | 55 | 0 | 78 | 864 |
| 01:00 PM | 4 | 60 | 7 | 0 | 71 | 7 | 0 | 3 | 0 | 10 | 12 | 91 | 3 | 0 | 106 | 6 | 3 | 18 | 0 | 27 | 214 |
| 01:15 PM | 4 | 73 | 12 | 0 | 89 | 6 | 0 | 1 | 0 | 7 | 11 | 69 | 3 | 0 | 83 | 9 | 0 | 6 | 0 | 15 | 194 |
| 01:30 PM | 6 | 64 | 12 | 0 | 82 | 1 | 0 | 4 | 1 | 6 | 14 | 68 | 3 | 0 | 85 | 9 | 0 | 17 | 0 | 26 | 199 |
| 01:45 PM | 4 | 58 | 8 | 0 | 70 | 1 | 0 | 1 | 0 | 2 | 8 | 67 | 2 | 0 | 77 | 7 | 2 | 8 | 0 | 17 | 166 |
| Total | 18 | 255 | 39 | 0 | 312 | 15 | 0 | 9 | 1 | 25 | 45 | 295 | 11 | 0 | 351 | 31 | 5 | 49 | 0 | 85 | 773 |
| 02:00 PM | 1 | 60 | 7 | 0 | 68 | 3 | 0 | 3 | 0 | 6 | 11 | 75 | 2 | 0 | 88 | 9 | 0 | 13 | 0 | 22 | 184 |
| 02:15 PM | 0 | 69 | 10 | 0 | 79 | 4 | 0 | 1 | 1 | 6 | 11 | 94 | 1 | 0 | 106 | 3 | 0 | 9 | 0 | 12 | 203 |
| 02:30 PM | 1 | 79 | 9 | 0 | 89 | 6 | 1 | 5 | 0 | 12 | 13 | 77 | 2 | 0 | 92 | 8 | 2 | 13 | 0 | 23 | 216 |
| 02:45 PM | 2 | 78 | 7 | 0 | 87 | 1 | 0 | 4 | 0 | 5 | 13 | 83 | 5 | 0 | 101 | 6 | 0 | 14 | 1 | 21 | 214 |
| Total | 4 | 286 | 33 | 0 | 323 | 14 | 1 | 13 | 1 | 29 | 48 | 329 | 10 | 0 | 387 | 26 | 2 | 49 | 1 | 78 | 817 |
| 03:00 PM | 1 | 74 | 9 | 0 | 84 | 3 | 0 | 4 | 0 | 7 | 9 | 97 | 3 | 0 | 109 | 5 | 1 | 12 | 0 | 18 | 218 |
| 03:15 PM | 4 | 95 | 7 | 0 | 106 | 6 | 0 | 3 | 0 | 9 | 9 | 79 | 6 | 0 | 94 | 3 | 0 | 6 | 0 | 9 | 218 |
| 03:30 PM | 2 | 84 | 6 | 0 | 92 | 3 | 2 | 1 | 0 | 6 | 15 | 114 | 3 | 0 | 132 | 6 | 0 | 15 | 2 | 23 | 253 |
| 03:45 PM | 4 | 76 | 5 | 0 | 85 | 3 | 0 | 4 | 0 | 7 | 10 | 94 | 4 | 0 | 108 | 7 | 0 | 17 | 6 | 30 | 230 |
| Total | 11 | 329 | 27 | 0 | 367 | 15 | 2 | 12 | 0 | 29 | 43 | 384 | 16 | 0 | 443 | 21 | 1 | 50 | 8 | 80 | 919 |
| 04:00 PM | 2 | 81 | 10 | 2 | 95 | 7 | 3 | 6 | 0 | 16 | 9 | 82 | 2 | 0 | 93 | 4 | 1 | 8 | 0 | 13 | 217 |
| 04:15 PM | 2 | 91 | 5 | 0 | 98 | 5 | 0 | 3 | 0 | 8 | 9 | 94 | 3 | 0 | 106 | 2 | 1 | 11 | 1 | 15 | 227 |
| 04:30 PM | 0 | 101 | 4 | 0 | 105 | 9 | 0 | 7 | 0 | 16 | 13 | 75 | 3 | 0 | 91 | 4 | 0 | 17 | 0 | 21 | 233 |
| 04:45 PM | 2 | 106 | 13 | 1 | 122 | 7 | 0 | 8 | 0 | 15 | 14 | 92 | 1 | 0 | 107 | 1 | 1 | 6 | 0 | 8 | 252 |
| Total | 6 | 379 | 32 | 3 | 420 | 28 | 3 | 24 | 0 | 55 | 45 | 343 | 9 | 0 | 397 | 11 | 3 | 42 | 1 | 57 | 929 |

Gorrill-Palmer Consulting Engineers, Inc.

15 Shaker Road, P.O. Box 1237

Gray, Maine 04039

(207) 657-6910

File Name : Rand @ Lowes_12h

Site Code : 00000935

Start Date : 4/10/2007

Page No : 2

Groups Printed- CARS - SINGLE UNIT - COMBINATION VEHICLES

| Start Time | RAND RD From North | | | | | QUIRK From East | | | | | RAND RD From South | | | | | LOWES From West | | | | | Int. Total |
|-------------------------------|-----------------------|-------------|-------------|------------|-------------|--------------------|------------|-------------|------------|-------------|-----------------------|-------------|-------------|-------------|-------------|--------------------|-------------|-------------|------------|-------------|-------------|
| | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | |
| 05:00 PM | 5 | 99 | 6 | 0 | 110 | 9 | 1 | 4 | 0 | 14 | 12 | 109 | 3 | 0 | 124 | 8 | 0 | 11 | 0 | 19 | 267 |
| 05:15 PM | 1 | 95 | 9 | 0 | 105 | 3 | 0 | 1 | 0 | 4 | 14 | 97 | 1 | 0 | 112 | 7 | 0 | 14 | 1 | 22 | 243 |
| 05:30 PM | 3 | 76 | 8 | 0 | 87 | 3 | 0 | 2 | 0 | 5 | 11 | 107 | 3 | 1 | 122 | 3 | 0 | 12 | 0 | 15 | 229 |
| 05:45 PM | 1 | 60 | 4 | 0 | 65 | 1 | 0 | 2 | 0 | 3 | 2 | 88 | 0 | 0 | 90 | 5 | 1 | 15 | 1 | 22 | 180 |
| Total | 10 | 330 | 27 | 0 | 367 | 16 | 1 | 9 | 0 | 26 | 39 | 401 | 7 | 1 | 448 | 23 | 1 | 52 | 2 | 78 | 919 |
| 06:00 PM | 1 | 52 | 3 | 1 | 57 | 0 | 0 | 2 | 0 | 2 | 9 | 71 | 1 | 0 | 81 | 3 | 1 | 9 | 0 | 13 | 153 |
| 06:15 PM | 1 | 50 | 3 | 0 | 54 | 2 | 0 | 0 | 0 | 2 | 11 | 65 | 0 | 0 | 76 | 6 | 0 | 12 | 3 | 21 | 153 |
| 06:30 PM | 0 | 46 | 3 | 0 | 49 | 0 | 0 | 2 | 0 | 2 | 4 | 62 | 0 | 0 | 66 | 1 | 0 | 8 | 0 | 9 | 126 |
| 06:45 PM | 0 | 45 | 6 | 0 | 51 | 5 | 0 | 3 | 0 | 8 | 5 | 64 | 1 | 0 | 70 | 5 | 0 | 2 | 0 | 7 | 136 |
| Total | 2 | 193 | 15 | 1 | 211 | 7 | 0 | 7 | 0 | 14 | 29 | 262 | 2 | 0 | 293 | 15 | 1 | 31 | 3 | 50 | 568 |
| Grand Total | 114 | 3156 | 309 | 10 | 3589 | 181 | 20 | 139 | 3 | 343 | 488 | 4281 | 149 | 3 | 4921 | 228 | 24 | 426 | 20 | 698 | 9551 |
| Apprch % | 3.2 | 87.9 | 8.6 | 0.3 | | 52.8 | 5.8 | 40.5 | 0.9 | | 9.9 | 87 | 3 | 0.1 | | 32.7 | 3.4 | 61 | 2.9 | | |
| Total % | 1.2 | 33 | 3.2 | 0.1 | 37.6 | 1.9 | 0.2 | 1.5 | 0 | 3.6 | 5.1 | 44.8 | 1.6 | 0 | 51.5 | 2.4 | 0.3 | 4.5 | 0.2 | 7.3 | |
| CARS | 111 | 3030 | 301 | 6 | 3448 | 173 | 20 | 132 | 3 | 328 | 473 | 4118 | 139 | 2 | 4732 | 216 | 23 | 408 | 18 | 665 | 9173 |
| % CARS | 97.4 | 96 | 97.4 | 60 | 96.1 | 95.6 | 100 | 95 | 100 | 95.6 | 96.9 | 96.2 | 93.3 | 66.7 | 96.2 | 94.7 | 95.8 | 95.8 | 90 | 95.3 | 96 |
| SINGLE UNIT | 1 | 98 | 7 | 4 | 110 | 5 | 0 | 6 | 0 | 11 | 8 | 135 | 9 | 1 | 153 | 6 | 1 | 12 | 2 | 21 | 295 |
| % SINGLE UNIT | 0.9 | 3.1 | 2.3 | 40 | 3.1 | 2.8 | 0 | 4.3 | 0 | 3.2 | 1.6 | 3.2 | 6 | 33.3 | 3.1 | 2.6 | 4.2 | 2.8 | 10 | 3 | 3.1 |
| COMBINATION VEHICLES | 2 | 28 | 1 | 0 | 31 | 3 | 0 | 1 | 0 | 4 | 7 | 28 | 1 | 0 | 36 | 6 | 0 | 6 | 0 | 12 | 83 |
| % COMBINATION VEHICLES | 1.8 | 0.9 | 0.3 | 0 | 0.9 | 1.7 | 0 | 0.7 | 0 | 1.2 | 1.4 | 0.7 | 0.7 | 0 | 0.7 | 2.6 | 0 | 1.4 | 0 | 1.7 | 0.9 |

Gorrill-Palmer Consulting Engineers, Inc.

15 Shaker Road, P.O. Box 1237

Gray, Maine 04039

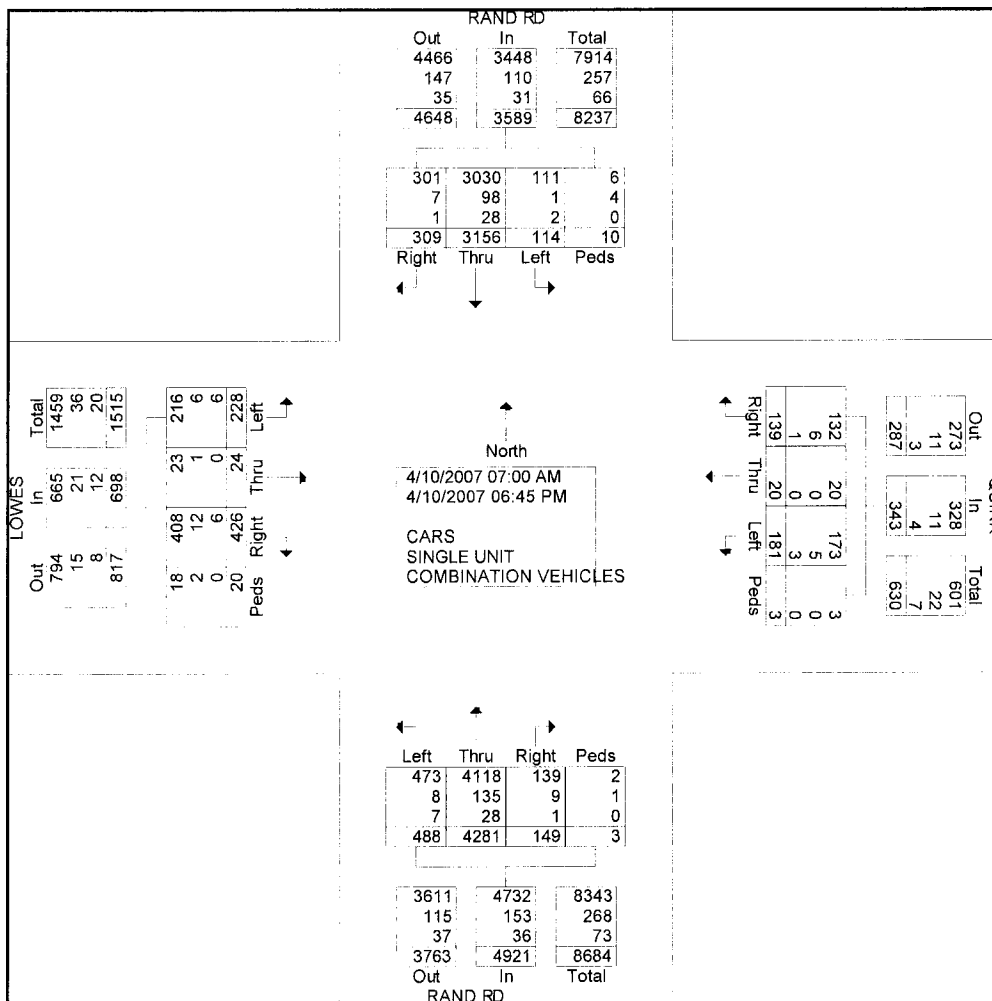
(207) 657-6910

File Name : Rand @ Lowes_12h

Site Code : 00000935

Start Date : 4/10/2007

Page No : 3



Gorrill-Palmer Consulting Engineers, Inc.

15 Shaker Road, P.O. Box 1237
Gray, Maine 04039
(207) 657-6910

File Name : Rand @ Lowes_12h
Site Code : 00000935
Start Date : 4/10/2007
Page No : 4

| Start Time | RAND RD From North | | | | | QUIRK From East | | | | | RAND RD From South | | | | | LOWES From West | | | | | Int. Total |
|--|-----------------------|------|-------|------|------------|--------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|--------------------|------|-------|------|------------|------------|
| | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | Left | Thru | Right | Peds | App. Total | |
| Peak Hour Analysis From 07:00 AM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 04:30 PM | 0 | 101 | 4 | 0 | 105 | 9 | 0 | 7 | 0 | 16 | 13 | 75 | 3 | 0 | 91 | 4 | 0 | 17 | 0 | 21 | 233 |
| 04:45 PM | 2 | 106 | 13 | 1 | 122 | 7 | 0 | 8 | 0 | 15 | 14 | 92 | 1 | 0 | 107 | 1 | 1 | 6 | 0 | 8 | 252 |
| 05:00 PM | 5 | 99 | 6 | 0 | 110 | 9 | 1 | 4 | 0 | 14 | 12 | 109 | 3 | 0 | 124 | 8 | 0 | 11 | 0 | 19 | 267 |
| 05:15 PM | 1 | 95 | 9 | 0 | 105 | 3 | 0 | 1 | 0 | 4 | 14 | 97 | 1 | 0 | 112 | 7 | 0 | 14 | 1 | 22 | 243 |
| Total Volume | 8 | 401 | 32 | 1 | 442 | 28 | 1 | 20 | 0 | 49 | 53 | 373 | 8 | 0 | 434 | 20 | 1 | 48 | 1 | 70 | 995 |
| % App. Total | 1.8 | 90.7 | 7.2 | 0.2 | | 57.1 | 2 | 40.8 | 0 | | 12.2 | 85.9 | 1.8 | 0 | | 28.6 | 1.4 | 68.6 | 1.4 | | |
| PHF | .400 | .946 | .615 | .250 | .906 | .778 | .250 | .625 | .000 | .766 | .946 | .856 | .667 | .000 | .875 | .625 | .250 | .706 | .250 | .795 | .932 |

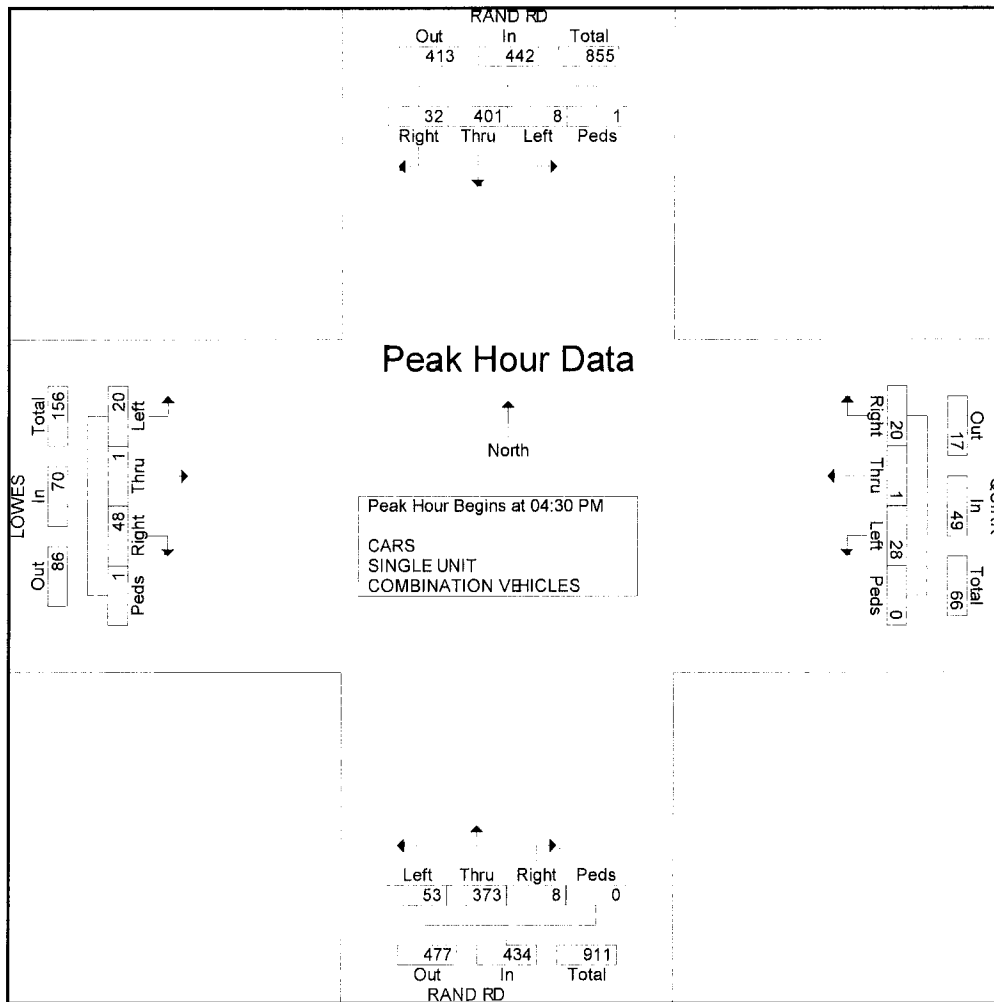


Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

| Condition A—Minimum Vehicular Volume | | | | | | | | | |
|---|----------------|--|------------------|------------------|------------------|---|------------------|------------------|------------------|
| Number of lanes for moving traffic on each approach | | Vehicles per hour on major street (total of both approaches) | | | | Vehicles per hour on higher-volume minor-street approach (one direction only) | | | |
| Major Street | Minor Street | 100% ^a | 80% ^b | 70% ^c | 56% ^d | 100% ^a | 80% ^b | 70% ^c | 56% ^d |
| 1..... | 1..... | 500 | 400 | 350 | 280 | 150 | 120 | 105 | 84 |
| 2 or more... | 1..... | 600 | 480 | 420 | 336 | 150 | 120 | 105 | 84 |
| 2 or more... | 2 or more ... | 600 | 480 | 420 | 336 | 200 | 160 | 140 | 112 |
| 1..... | 2 or more | 500 | 400 | 350 | 280 | 200 | 160 | 140 | 112 |

| Condition B—Interruption of Continuous Traffic | | | | | | | | | |
|---|----------------|--|------------------|------------------|------------------|---|------------------|------------------|------------------|
| Number of lanes for moving traffic on each approach | | Vehicles per hour on major street (total of both approaches) | | | | Vehicles per hour on higher-volume minor-street approach (one direction only) | | | |
| Major Street | Minor Street | 100% ^a | 80% ^b | 70% ^c | 56% ^d | 100% ^a | 80% ^b | 70% ^c | 56% ^d |
| 1..... | 1..... | 750 | 600 | 525 | 420 | 75 | 60 | 53 | 42 |
| 2 or more... | 1..... | 900 | 720 | 630 | 504 | 75 | 60 | 53 | 42 |
| 2 or more... | 2 or more ... | 900 | 720 | 630 | 504 | 100 | 80 | 70 | 56 |
| 1..... | 2 or more | 750 | 600 | 525 | 420 | 100 | 80 | 70 | 56 |

^a Basic minimum hourly volume.
^b Used for combination of Conditions A and B after adequate trial of other remedial measures.
^c May be used when the major-street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.
^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Signal Warrant Analysis Review
 Lowe's Drive/Quirk Drive at Rand Road
 Portland, Maine

| Hour Beginning | Warrant 1 (Eight Hour Volume)* | | | | | | | |
|-----------------|--------------------------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
| | Major Street | | | Minor Street | | | Condition A | Condition B |
| | Volume | A Satisfied? | B Satisfied? | Volume | A Satisfied? | B Satisfied? | Satisfied? | Satisfied? |
| | PM | PM | PM | PM | PM | PM | PM | PM |
| 7:00 AM | 821 | Yes | No | 9 | No | No | No | No |
| 8:00 AM | 799 | Yes | No | 13 | No | No | No | No |
| 9:00 AM | 623 | Yes | No | 20 | No | No | No | No |
| 10:00 AM | 564 | No | No | 27 | No | No | No | No |
| 11:00 AM | 637 | Yes | No | 30 | No | No | No | No |
| 12:00 PM | 739 | Yes | No | 26 | No | No | No | No |
| 1:00 PM | 663 | Yes | No | 36 | No | No | No | No |
| 2:00 PM | 710 | Yes | No | 28 | No | No | No | No |
| 3:00 PM | 810 | Yes | No | 22 | No | No | No | No |
| 4:00 PM | 814 | Yes | No | 31 | No | No | No | No |
| 5:00 PM | 814 | Yes | No | 24 | No | No | No | No |
| 6:00 PM | 503 | No | No | 16 | No | No | No | No |

*Analysis was performed using Condition A, Subcondition A and Condition B, Subcondition A.
 Note: Numbers in Italics denote minor street volume from Quirk Drive.