

*Appendix J*  
*Noise Monitoring Results*



## *Appendices*

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# Sound Levels - Little League Drive

The Planning Center

1-Aug-09

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: MEL-01  
 BARRIER DESIGN: Little League Drive

ATMOSPHERICS: 68 deg F, 50% RH

|                  | LAeq1h dBA |                   |                     | Change in Noise Levels |                |
|------------------|------------|-------------------|---------------------|------------------------|----------------|
|                  | Existing   | Future No Project | Future With Project | From Existing          | Due to Project |
| no Kendall_East  | 59.4       | 67.3              | n/a                 | 7.9                    | 0.0            |
| no Kendall_West  | 59.4       | 67.3              |                     | 7.9                    | -67.3          |
| no Frontage_East | 62.2       | 68.3              |                     | 6.1                    | -68.3          |
| no Frontage_West | 61.3       | 67.4              |                     | 6.1                    | -67.4          |
| no Belmont_East  | 55.8       | 65.6              |                     | 9.8                    | -65.6          |
| no Belmont_West  | 55.9       | 65.7              |                     | 9.8                    | -65.7          |
| no Meyers_East   | 48.2       | 65.0              |                     | 16.8                   | -65.0          |
| no Meyers_West   | 48.2       | 65.0              |                     | 16.8                   | -65.0          |

# Receivers - Little League Drive

The Planning Center

1-Aug-09  
TNM 2.5

INPUT: RECEIVERS  
PROJECT/CONTRACT:  
RUN:

MEL-01  
Little League Drive

Receiver  
Name

|                  | Coordinates (ground) |         |         | Height above<br>Ground<br>ft |
|------------------|----------------------|---------|---------|------------------------------|
|                  | X<br>ft              | Y<br>ft | Z<br>ft |                              |
| no Kendall_East  | 50.0                 | -       | 0       | 4.92                         |
| no Kendall_West  | -50.0                | -       | 0       | 4.92                         |
| no Frontage_East | 50.0                 | 1,000.0 | 0       | 4.92                         |
| no Frontage_West | -50.0                | 1,000.0 | 0       | 4.92                         |
| no Belmont_East  | 50.0                 | 2,000.0 | 0       | 4.92                         |
| no Belmont_West  | -50.0                | 2,000.0 | 0       | 4.92                         |
| no Meyers_East   | 50.0                 | 3,000.0 | 0       | 4.92                         |
| no Meyers_West   | -50.0                | 3,000.0 | 0       | 4.92                         |

## Roadway - Little League Drive

The Planning Center

1-Aug-09  
TNM 2.5

INPUT: ROADWAYS  
PROJECT/CONTRACT:  
RUN:

MEL-01  
Little League Drive  
Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with the approval of FHWA

Roadway  
Name

| Roadway Name   | Width | Points Name | Coordinates (pavement) |         |      | Segment Pvmt Type |
|----------------|-------|-------------|------------------------|---------|------|-------------------|
|                |       |             | X ft                   | Y ft    | Z ft |                   |
| no Kendall NB  | 20.0  | Point 4     | 10.0                   | -500.0  | 0    | Average           |
|                |       | Point 5     | 10.0                   | 500.0   | 0    |                   |
| no Kendall SB  | 20.0  | Point 6     | -10.0                  | 500.0   | 0    | Average           |
|                |       | Point 7     | -10.0                  | -500.0  | 0    |                   |
| no Frontage NB | 30.0  | Point 14    | 15.0                   | 500.1   | 0    | Average           |
|                |       | Point 15    | 15.0                   | 1,500.0 | 0    |                   |
| no Frontage SB | 12.0  | Point 16    | -6.0                   | 1,500.0 | 0    | Average           |
|                |       | Point 17    | -6.0                   | 500.1   | 0    |                   |
| no Belmont NB  | 20.0  | Point 18    | 10.0                   | 1500.1  | 0    | Average           |
|                |       | Point 19    | 10.0                   | 2500    | 0    |                   |
| no Belmont SB  | 22.0  | Point 20    | -11.0                  | 2500    | 0    | Average           |
|                |       | Point 21    | -11.0                  | 1500.1  | 0    |                   |
| no Meyers NB   | 9.0   | Point 22    | 4.5                    | 2500.1  | 0    | Average           |
|                |       | Point 23    | 4.5                    | 3500    | 0    |                   |
| no Meyers SB   | 9.0   | Point 24    | -4.5                   | 3500    | 0    | Average           |
|                |       | Point 25    | -4.5                   | 2500.1  | 0    |                   |

**Traffic - Little League Drive**

The Planning Center

DATE 8/1/2009  
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:

MEL-01  
Little League Drive

RUN:

| Roadway Name   | ADT veh/24 hrs | Auto     |     |     |     |       | Mtrucks |     |     |       | Htrucks |     |     |       | Buses |     |     |       | Motorcycles |     |     |       |
|----------------|----------------|----------|-----|-----|-----|-------|---------|-----|-----|-------|---------|-----|-----|-------|-------|-----|-----|-------|-------------|-----|-----|-------|
|                | Points Name    | Existing | % D | % E | % N | S mph | % D     | % E | % N | S mph | % D     | % E | % N | S mph | % D   | % E | % N | S mph | % D         | % E | % N | S mph |
| no Kendall NB  | Point 4        | 500      | 97  | 97  | 97  | 40    | 2       | 2   | 2   | 40    | 1       | 1   | 1   | 40    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
| no Kendall SB  | Point 5        | 500      | 97  | 97  | 97  | 40    | 2       | 2   | 2   | 40    | 1       | 1   | 1   | 40    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 6        |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
| no Frontage NB | Point 7        | 850      | 97  | 97  | 97  | 40    | 2       | 2   | 2   | 40    | 1       | 1   | 1   | 40    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 14       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
| no Frontage SB | Point 15       | 850      | 97  | 97  | 97  | 40    | 2       | 2   | 2   | 40    | 1       | 1   | 1   | 40    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 16       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
| no Belmont NB  | Point 17       | 650      | 97  | 97  | 97  | 25    | 2       | 2   | 2   | 25    | 1       | 1   | 1   | 25    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 18       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
| no Belmont SB  | Point 19       | 650      | 97  | 97  | 97  | 25    | 2       | 2   | 2   | 25    | 1       | 1   | 1   | 25    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 20       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
| no Meyers NB   | Point 21       | 100      | 97  | 97  | 97  | 25    | 2       | 2   | 2   | 25    | 1       | 1   | 1   | 25    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 22       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
| no Meyers SB   | Point 23       | 100      | 97  | 97  | 97  | 25    | 2       | 2   | 2   | 25    | 1       | 1   | 1   | 25    | 0     | 0   | 0   | 0     | 0           | 0   | 0   | 0     |
|                | Point 24       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |
|                | Point 25       |          |     |     |     |       |         |     |     |       |         |     |     |       |       |     |     |       |             |     |     |       |

| Roadway Name   | FutureNP    | ADT        | Auto |     |     |       |     | Mtrucks |     |       |     | Htrucks |     |       |     | Buses |     |       |     | Motorcycles |     |       |  |
|----------------|-------------|------------|------|-----|-----|-------|-----|---------|-----|-------|-----|---------|-----|-------|-----|-------|-----|-------|-----|-------------|-----|-------|--|
|                | Points Name | V veh/24hr | % D  | % E | % N | S mph | % D | % E     | % N | S mph | % D | % E     | % N | S mph | % D | % E   | % N | S mph | % D | % E         | % N | S mph |  |
| no Kendall NB  | Point 4     | 742        | 65   | 65  | 65  | 40    | 1   | 1       | 1   | 40    | 33  | 33      | 33  | 40    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
| no Kendall SB  | Point 5     | 742        | 65   | 65  | 65  | 40    | 1   | 1       | 1   | 40    | 33  | 33      | 33  | 40    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 6     |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
| no Frontage NB | Point 7     | 1,092      | 75   | 75  | 75  | 40    | 2   | 2       | 2   | 40    | 23  | 23      | 23  | 40    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 14    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
| no Frontage SB | Point 15    | 1,092      | 75   | 75  | 75  | 40    | 2   | 2       | 2   | 40    | 23  | 23      | 23  | 40    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 16    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
| no Belmont NB  | Point 17    | 892        | 71   | 71  | 71  | 25    | 1   | 1       | 1   | 25    | 28  | 28      | 28  | 25    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 18    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
| no Belmont SB  | Point 19    | 892        | 71   | 71  | 71  | 25    | 1   | 1       | 1   | 25    | 28  | 28      | 28  | 25    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 20    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
| no Meyers NB   | Point 21    | 342        | 28   | 28  | 28  | 25    | 1   | 1       | 1   | 25    | 71  | 71      | 71  | 25    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 22    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
| no Meyers SB   | Point 23    | 342        | 28   | 28  | 28  | 25    | 1   | 1       | 1   | 25    | 71  | 71      | 71  | 25    | 0   | 0     | 0   | 0     | 0   | 0           | 0   | 0     |  |
|                | Point 24    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |
|                | Point 25    |            |      |     |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |             |     |       |  |

## Construction Generated Average Noise - Spring Trails

| Construction Noise at 50 Feet (dBA Leq)         |                                   |                                     | 50                          | hard or soft | 0 |
|---|-----------------------------------|-------------------------------------|-----------------------------|--------------|---|
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Demolition                      | 83                                | 83                                  |                             |              |   |
| Excavation                                      | 88                                | 75                                  |                             |              |   |
| Foundation Construction                         | 81                                | 81                                  |                             |              |   |
| Building Construction                           | 81                                | 65                                  |                             |              |   |
| Finishing and Site Cleanup                      | 88                                | 72                                  |                             |              |   |
| <b>Construction Noise at 199 Feet (dBA Leq)</b> |                                   |                                     | <b>Receptor Location 1</b>  | <b>1210</b>  |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Grading                         | 55                                | 55                                  |                             |              |   |
| Excavation                                      | 60                                | 47                                  |                             |              |   |
| Foundation Construction                         | 53                                | 53                                  |                             |              |   |
| Building Construction                           | 53                                | 37                                  |                             |              |   |
| Finishing and Site Cleanup                      | 60                                | 44                                  |                             |              |   |
| <b>Construction Noise at 151 Feet (dBA Leq)</b> |                                   |                                     | <b>Receptor Location 2</b>  | <b>1382</b>  |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Grading                         | 54                                | 54                                  |                             |              |   |
| Excavation                                      | 59                                | 46                                  |                             |              |   |
| Foundation Construction                         | 52                                | 52                                  |                             |              |   |
| Building Construction                           | 52                                | 36                                  |                             |              |   |
| Finishing and Site Cleanup                      | 59                                | 43                                  |                             |              |   |
| <b>Construction Noise at 25 Feet (dBA Leq)</b>  |                                   |                                     | <b>Receptor Location 3</b>  | <b>710</b>   |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Demolition                      | 60                                | 60                                  |                             |              |   |
| Excavation                                      | 65                                | 52                                  |                             |              |   |
| Foundation Construction                         | 58                                | 58                                  |                             |              |   |
| Building Construction                           | 58                                | 42                                  |                             |              |   |
| Finishing and Site Cleanup                      | 65                                | 49                                  |                             |              |   |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |                                   |                                     | <b>Receptor Location 4</b>  | <b>1321</b>  |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Demolition                      | 55                                | 55                                  |                             |              |   |
| Excavation                                      | 60                                | 47                                  |                             |              |   |
| Foundation Construction                         | 53                                | 53                                  |                             |              |   |
| Building Construction                           | 53                                | 37                                  |                             |              |   |
| Finishing and Site Cleanup                      | 60                                | 44                                  |                             |              |   |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |                                   |                                     | <b>Receptor Location 6</b>  | <b>2507</b>  |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Demolition                      | 49                                | 49                                  |                             |              |   |
| Excavation                                      | 54                                | 41                                  |                             |              |   |
| Foundation Construction                         | 47                                | 47                                  |                             |              |   |
| Building Construction                           | 47                                | 31                                  |                             |              |   |
| Finishing and Site Cleanup                      | 54                                | 38                                  |                             |              |   |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |                                   |                                     | <b>Receptor Location 8</b>  | <b>2332</b>  |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Demolition                      | 50                                | 50                                  |                             |              |   |
| Excavation                                      | 55                                | 42                                  |                             |              |   |
| Foundation Construction                         | 48                                | 48                                  |                             |              |   |
| Building Construction                           | 48                                | 32                                  |                             |              |   |
| Finishing and Site Cleanup                      | 55                                | 39                                  |                             |              |   |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |                                   |                                     | <b>Receptor Location 11</b> | <b>2507</b>  |   |
| Construction Phase                              | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |                             |              |   |
| Ground Clearing/Demolition                      | 49                                | 49                                  |                             |              |   |
| Excavation                                      | 54                                | 41                                  |                             |              |   |
| Foundation Construction                         | 47                                | 47                                  |                             |              |   |
| Building Construction                           | 47                                | 31                                  |                             |              |   |
| Finishing and Site Cleanup                      | 54                                | 38                                  |                             |              |   |

**Construction Noise at 783 Feet (dBA Leq)** Receptor Location 12 3577

| Construction Phase         | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |
|----------------------------|-----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 46                                | 46                                  |
| Excavation                 | 51                                | 38                                  |
| Foundation Construction    | 44                                | 44                                  |
| Building Construction      | 44                                | 28                                  |
| Finishing and Site Cleanup | 51                                | 35                                  |

**Construction Noise at 783 Feet (dBA Leq)** Receptor Location 15 4538

| Construction Phase         | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |
|----------------------------|-----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 44                                | 44                                  |
| Excavation                 | 49                                | 36                                  |
| Foundation Construction    | 42                                | 42                                  |
| Building Construction      | 42                                | 26                                  |
| Finishing and Site Cleanup | 49                                | 33                                  |

**Construction Noise at 783 Feet (dBA Leq)** Receptor Location 18 4478

| Construction Phase         | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |
|----------------------------|-----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 44                                | 44                                  |
| Excavation                 | 49                                | 36                                  |
| Foundation Construction    | 42                                | 42                                  |
| Building Construction      | 42                                | 26                                  |
| Finishing and Site Cleanup | 49                                | 33                                  |

**Construction Noise at 783 Feet (dBA Leq)** Receptor Location 19 6880

| Construction Phase         | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |
|----------------------------|-----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 40                                | 40                                  |
| Excavation                 | 45                                | 32                                  |
| Foundation Construction    | 38                                | 38                                  |
| Building Construction      | 38                                | 22                                  |
| Finishing and Site Cleanup | 45                                | 29                                  |

**Construction Noise at 783 Feet (dBA Leq)** North Vermont Elementary School 7105

| Construction Phase         | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |
|----------------------------|-----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 40                                | 40                                  |
| Excavation                 | 45                                | 32                                  |
| Foundation Construction    | 38                                | 38                                  |
| Building Construction      | 38                                | 22                                  |
| Finishing and Site Cleanup | 45                                | 29                                  |

**Construction Noise at 783 Feet (dBA Leq)** Existing On-Site Residence 1272

| Construction Phase         | All Applicable Equipment in Use 1 | Minimum Required Equipment in Use 1 |
|----------------------------|-----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 55                                | 55                                  |
| Excavation                 | 60                                | 47                                  |
| Foundation Construction    | 53                                | 53                                  |
| Building Construction      | 53                                | 37                                  |
| Finishing and Site Cleanup | 60                                | 44                                  |

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.



## Construction Generated Maximum Noise - Spring Trails

### Construction Noise at 50 Feet (dBA Leq)

50 hard or soft 0

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 83                               | 83                                  |
| Excavation                 | 88                               | 75                                  |
| Foundation Construction    | 81                               | 81                                  |
| Building Construction      | 81                               | 65                                  |
| Finishing and Site Cleanup | 88                               | 72                                  |

### Construction Noise at 199 Feet (dBA Leq)

#### Receptor Location 1

38

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Grading    | 85                               | 85                                  |
| Excavation                 | 90                               | 77                                  |
| Foundation Construction    | 83                               | 83                                  |
| Building Construction      | 83                               | 67                                  |
| Finishing and Site Cleanup | 90                               | 74                                  |

### Construction Noise at 151 Feet (dBA Leq)

#### Receptor Location 2

176

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Grading    | 72                               | 72                                  |
| Excavation                 | 77                               | 64                                  |
| Foundation Construction    | 70                               | 70                                  |
| Building Construction      | 70                               | 54                                  |
| Finishing and Site Cleanup | 77                               | 61                                  |

### Construction Noise at 25 Feet (dBA Leq)

#### Receptor Location 3

57

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 82                               | 82                                  |
| Excavation                 | 87                               | 74                                  |
| Foundation Construction    | 80                               | 80                                  |
| Building Construction      | 80                               | 64                                  |
| Finishing and Site Cleanup | 87                               | 71                                  |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 4

372

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 66                               | 66                                  |
| Excavation                 | 71                               | 58                                  |
| Foundation Construction    | 64                               | 64                                  |
| Building Construction      | 64                               | 48                                  |
| Finishing and Site Cleanup | 71                               | 55                                  |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 6

467

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 64                               | 64                                  |
| Excavation                 | 69                               | 56                                  |
| Foundation Construction    | 62                               | 62                                  |
| Building Construction      | 62                               | 46                                  |
| Finishing and Site Cleanup | 69                               | 53                                  |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 8

295

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 68                               | 68                                  |
| Excavation                 | 73                               | 60                                  |
| Foundation Construction    | 66                               | 66                                  |
| Building Construction      | 66                               | 50                                  |
| Finishing and Site Cleanup | 73                               | 57                                  |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 11

88

| Construction Phase         | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |
|----------------------------|----------------------------------|-------------------------------------|
| Ground Clearing/Demolition | 78                               | 78                                  |
| Excavation                 | 83                               | 70                                  |
| Foundation Construction    | 76                               | 76                                  |
| Building Construction      | 76                               | 60                                  |
| Finishing and Site Cleanup | 83                               | 67                                  |

## Construction Generated Maximum Noise - Spring Trails

| Construction Noise at 783 Feet (dBA Leq) |                                  | Receptor Location 12                |  | 255  |
|--|----------------------------------|-------------------------------------|--|------|
| Construction Phase                       | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |  |      |
| Ground Clearing/Demolition               | 69                               | 69                                  |  |      |
| Excavation                               | 74                               | 61                                  |  |      |
| Foundation Construction                  | 67                               | 67                                  |  |      |
| Building Construction                    | 67                               | 51                                  |  |      |
| Finishing and Site Cleanup               | 74                               | 58                                  |  |      |
| Construction Noise at 783 Feet (dBA Leq) |                                  | Receptor Location 15                |  | 609  |
| Construction Phase                       | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |  |      |
| Ground Clearing/Demolition               | 61                               | 61                                  |  |      |
| Excavation                               | 66                               | 53                                  |  |      |
| Foundation Construction                  | 59                               | 59                                  |  |      |
| Building Construction                    | 59                               | 43                                  |  |      |
| Finishing and Site Cleanup               | 66                               | 50                                  |  |      |
| Construction Noise at 783 Feet (dBA Leq) |                                  | Receptor Location 18                |  | 3140 |
| Construction Phase                       | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |  |      |
| Ground Clearing/Demolition               | 47                               | 47                                  |  |      |
| Excavation                               | 52                               | 39                                  |  |      |
| Foundation Construction                  | 45                               | 45                                  |  |      |
| Building Construction                    | 45                               | 29                                  |  |      |
| Finishing and Site Cleanup               | 52                               | 36                                  |  |      |
| Construction Noise at 783 Feet (dBA Leq) |                                  | Receptor Location 19                |  | 2864 |
| Construction Phase                       | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |  |      |
| Ground Clearing/Demolition               | 48                               | 48                                  |  |      |
| Excavation                               | 53                               | 40                                  |  |      |
| Foundation Construction                  | 46                               | 46                                  |  |      |
| Building Construction                    | 46                               | 30                                  |  |      |
| Finishing and Site Cleanup               | 53                               | 37                                  |  |      |
| Construction Noise at 783 Feet (dBA Leq) |                                  | North Vermont Elementary School     |  | 3013 |
| Construction Phase                       | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |  |      |
| Ground Clearing/Demolition               | 47                               | 47                                  |  |      |
| Excavation                               | 52                               | 39                                  |  |      |
| Foundation Construction                  | 45                               | 45                                  |  |      |
| Building Construction                    | 45                               | 29                                  |  |      |
| Finishing and Site Cleanup               | 52                               | 36                                  |  |      |
| Construction Noise at 783 Feet (dBA Leq) |                                  | Existing On-Site Residence          |  | 133  |
| Construction Phase                       | All Applicable Equipment in Use1 | Minimum Required Equipment in Use 1 |  |      |
| Ground Clearing/Demolition               | 75                               | 75                                  |  |      |
| Excavation                               | 80                               | 67                                  |  |      |
| Foundation Construction                  | 73                               | 73                                  |  |      |
| Building Construction                    | 73                               | 57                                  |  |      |
| Finishing and Site Cleanup               | 80                               | 64                                  |  |      |

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

## Roadway Construction Generated Average Noise - Spring Trails

### Construction Noise at 50 Feet (dBA Leq)

50

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 84   | 84   |
| Excavation                 | 88   | 78   |
| Foundation Construction    | 88   | 88   |
| Building Construction      | 79   | 78   |
| Finishing and Site Cleanup | 84   | 84   |

### Construction Noise at 199 Feet (dBA Leq)

#### Receptor Location 1

3174

| Construction Phase      | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|-------------------------|--|--|
| Ground Clearing/Grading | 48   | 48   |
| Excavation              | 52   | 42   |
| Foundation Construction | 52   | 52   |

### Construction Noise at 151 Feet (dBA Leq)

#### Receptor Location 2

3056

| Construction Phase      | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|-------------------------|--|--|
| Ground Clearing/Grading | 48   | 48   |
| Excavation              | 52   | 42   |
| Foundation Construction | 52   | 52   |

### Construction Noise at 25 Feet (dBA Leq)

#### Receptor Location 3

3274

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 48   | 48   |
| Excavation                 | 52   | 42   |
| Foundation Construction    | 52   | 52   |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 4

2500

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 50   | 50   |
| Excavation                 | 54   | 44   |
| Foundation Construction    | 54   | 54   |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 5

2091

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 52   | 52   |
| Excavation                 | 56   | 46   |
| Foundation Construction    | 56   | 56   |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 6

1320

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 56   | 56   |
| Excavation                 | 60   | 50   |
| Foundation Construction    | 60   | 60   |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 7

1461

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 55   | 55   |
| Excavation                 | 59   | 49   |
| Foundation Construction    | 59   | 59   |

### Construction Noise at 783 Feet (dBA Leq)

#### Receptor Location 10

715

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 61   | 61   |
| Excavation                 | 65   | 55   |
| Foundation Construction    | 65   | 65   |

| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>Receptor Location 13</b>                          |  | 152  |
|---|--|--|--|------|
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 74   | 74   |  |      |
| Excavation                                      | 78   | 68   |  |      |
| Foundation Construction                         | 78   | 78   |  |      |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>Receptor Location 15</b>                          |  | 2057 |
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 52   | 52   |  |      |
| Excavation                                      | 56   | 46   |  |      |
| Foundation Construction                         | 56   | 56   |  |      |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>Receptor Location 16</b>                          |  | 1660 |
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 54   | 54   |  |      |
| Excavation                                      | 58   | 48   |  |      |
| Foundation Construction                         | 58   | 58   |  |      |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>Receptor Location 17</b>                          |  | 1678 |
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 53   | 53   |  |      |
| Excavation                                      | 57   | 47   |  |      |
| Foundation Construction                         | 57   | 57   |  |      |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>Receptor Location 19</b>                          |  | 4342 |
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 45   | 45   |  |      |
| Excavation                                      | 49   | 39   |  |      |
| Foundation Construction                         | 49   | 49   |  |      |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>Receptor Location 20</b>                          |  | 3496 |
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 47   | 47   |  |      |
| Excavation                                      | 51   | 41   |  |      |
| Foundation Construction                         | 51   | 51   |  |      |
| <b>Construction Noise at 783 Feet (dBA Leq)</b> |  | <b>North Vermont Elementary School</b>               |  | 5114 |
| <b>Construction Phase</b>                       | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |  |      |
| Ground Clearing/Demolition                      | 44   | 44   |  |      |
| Excavation                                      | 48   | 38   |  |      |
| Foundation Construction                         | 48   | 48   |  |      |

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

## Roadway Construction Generated Maximum Noise - Spring Trails

**Construction Noise at 50 Feet (dBA Leq)** 50

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 84   | 84   |
| Excavation                 | 88   | 78   |
| Foundation Construction    | 88   | 88   |
| Building Construction      | 79   | 78   |
| Finishing and Site Cleanup | 84   | 84   |

**Construction Noise at 25 Feet (dBA Leq)** **Receptor Location 1** 25

| Construction Phase      | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|-------------------------|--|--|
| Ground Clearing/Grading | 90   | 90   |
| Excavation              | 94   | 84   |
| Foundation Construction | 94   | 94   |

**Construction Noise at 40 Feet (dBA Leq)** **Receptor Location 2** 40

| Construction Phase      | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|-------------------------|--|--|
| Ground Clearing/Grading | 86   | 86   |
| Excavation              | 90   | 80   |
| Foundation Construction | 90   | 90   |

**Construction Noise at 255 Feet (dBA Leq)** **Receptor Location 3** 255

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 70   | 70   |
| Excavation                 | 74   | 64   |
| Foundation Construction    | 74   | 74   |

**Construction Noise at 36 Feet (dBA Leq)** **Receptor Location 4** 36

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 87   | 87   |
| Excavation                 | 91   | 81   |
| Foundation Construction    | 91   | 91   |

**Construction Noise at 200 Feet (dBA Leq)** **Receptor Location 5** 200

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 72   | 72   |
| Excavation                 | 76   | 66   |
| Foundation Construction    | 76   | 76   |

**Construction Noise at 100 Feet (dBA Leq)** **Receptor Location 6** 100

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 78   | 78   |
| Excavation                 | 82   | 72   |
| Foundation Construction    | 82   | 82   |

**Construction Noise at 450 Feet (dBA Leq)** **Receptor Location 7** 450

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 65   | 65   |
| Excavation                 | 69   | 59   |
| Foundation Construction    | 69   | 69   |

**Construction Noise at 173 Feet (dBA Leq)** **Receptor Location 10** 173

| Construction Phase         | All Applicable Equipment in Use <sup>1</sup> | Minimum Required Equipment in Use <sup>1</sup> |
|----------------------------|--|--|
| Ground Clearing/Demolition | 73   | 73   |
| Excavation                 | 77   | 67   |
| Foundation Construction    | 77   | 77   |

|   |  |  |      |
|---|--|--|------|
| <b>Construction Noise at 110 Feet (dBA Leq)</b>   |  | Receptor Location 13                                 | 110  |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 77   | 77   |      |
| Excavation  | 81   | 71   |      |
| Foundation Construction                           | 81   | 81   |      |
| <b>Construction Noise at 722 Feet (dBA Leq)</b>   |  | Receptor Location 15                                 | 722  |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 61   | 61   |      |
| Excavation  | 65   | 55   |      |
| Foundation Construction                           | 65   | 65   |      |
| <b>Construction Noise at 215 Feet (dBA Leq)</b>   |  | Receptor Location 16                                 | 215  |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 71   | 71   |      |
| Excavation  | 75   | 65   |      |
| Foundation Construction                           | 75   | 75   |      |
| <b>Construction Noise at 1,407 Feet (dBA Leq)</b> |  | Receptor Location 17                                 | 1407 |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 55   | 55   |      |
| Excavation  | 59   | 49   |      |
| Foundation Construction                           | 59   | 59   |      |
| <b>Construction Noise at 2,226 Feet (dBA Leq)</b> |  | Receptor Location 19                                 | 2226 |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 51   | 51   |      |
| Excavation  | 55   | 45   |      |
| Foundation Construction                           | 55   | 55   |      |
| <b>Construction Noise at 805 Feet (dBA Leq)</b>   |  | Receptor Location 20                                 | 805  |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 60   | 60   |      |
| Excavation  | 64   | 54   |      |
| Foundation Construction                           | 64   | 64   |      |
| <b>Construction Noise at 2,180 Feet (dBA Leq)</b> |  | North Vermont Elementary School                      | 2180 |
| <b>Construction Phase</b>                         | <b>All Applicable Equipment in Use<sup>1</sup></b> | <b>Minimum Required Equipment in Use<sup>1</sup></b> |      |
| Ground Clearing/Demolition                        | 51   | 51   |      |
| Excavation  | 55   | 45   |      |
| Foundation Construction                           | 55   | 55   |      |

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

## Construction Generated Vibration at Nearest Structures

### Vibration Annoyance Criteria

Receptor: Average Vibration Level - Existing On-Site Residence Average Distance (feet): 1272

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Caisson Drill   | 87                                       | 53                              |
| Large bulldozer | 87                                       | 53                              |
| Small bulldozer | 58                                       | 24                              |
| Jackhammer      | 79                                       | 45                              |
| Loaded trucks   | 86                                       | 52                              |
| Criteria        |  | 78                              |

Receptor: Maximum Vibration Levels - Existing On-Site Residence Closest Distance (feet): 133

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Caisson Drill   | 87                                       | 72                              |
| Large bulldozer | 87                                       | 72                              |
| Small bulldozer | 58                                       | 43                              |
| Jackhammer      | 79                                       | 64                              |
| Loaded trucks   | 86                                       | 71                              |
| Criteria        |  | 78                              |

Receptor: Average Vibration Level - Receptor Location 1 Average Distance (feet): 1248

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 53                              |
| Small bulldozer | 58                                       | 24                              |
| Jackhammer      | 79                                       | 45                              |
| Loaded trucks   | 86                                       | 52                              |
| Criteria        |  | 78                              |

Receptor: Maximum Vibration Levels -Receptor Location 1 Closest Distance (feet): 65

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 79                              |
| Small bulldozer | 58                                       | 50                              |
| Jackhammer      | 79                                       | 71                              |
| Loaded trucks   | 86                                       | 78                              |
| Criteria        |  | 78                              |

Receptor: Average Vibration Level - Receptor Location 3 Closest Distance (feet): 761

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 57                              |
| Small bulldozer | 58                                       | 28                              |
| Jackhammer      | 79                                       | 49                              |
| Loaded trucks   | 86                                       | 56                              |
| Criteria        |  | 78                              |

Receptor: Maximum Vibration Levels -Receptor Location 3 Average Distance (feet): 75

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 77                              |
| Small bulldozer | 58                                       | 48                              |
| Jackhammer      | 79                                       | 69                              |
| Loaded trucks   | 86                                       | 76                              |
| Criteria        |  | 78                              |

**Construction Generated Vibration at Nearest Structures**  
Structural Damage Criteria

| Receptor:       | Maximum Vibration Levels -Receptor Location 1          | Closest Distance (feet):                          | 65 |
|-----------------|--|---|----|
| Equipment       | Approximate RMS a<br>Velocity at 25 ft,<br>inch/second | Approximate RMS<br>Velocity Level,<br>inch/second |    |
| Large bulldozer | 0.089  | 0.021   |    |
| Small bulldozer | 0.003  | 0.001   |    |
| Jackhammer      | 0.035  | 0.008   |    |
| Loaded trucks   | 0.076  | 0.018   |    |
|                 | <b>Criteria</b>  | <b>0.500</b>                                      |    |

| Receptor:       | Maximum Vibration Levels - On-Site Existing Residence  | Closest Distance (feet):                          | 133 |
|-----------------|--|---|-----|
| Equipment       | Approximate RMS a<br>Velocity at 25 ft,<br>inch/second | Approximate RMS<br>Velocity Level,<br>inch/second |     |
| Large bulldozer | 0.089  | 0.007   |     |
| Small bulldozer | 0.003  | 0.0002  |     |
| Jackhammer      | 0.035  | 0.003   |     |
| Loaded trucks   | 0.076  | 0.006   |     |
|                 | <b>Criteria</b>  | <b>0.500</b>                                      |     |

<sup>1</sup>. Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).



## Construction Generated Vibration at Off-ste Receptors from Roadways

### Vibration Annoyance Criteria

**Receptor:** Average Vibration Level - Receptor Location 1 **Average Distance (feet):** 3174

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 45                              |
| Small bulldozer | 58                                       | 16                              |
| Jackhammer      | 79                                       | 37                              |
| Loaded trucks   | 86                                       | 44                              |
| Criteria        |  | 78                              |

**Receptor:** Maximum Vibration Levels - Receptor Location 1 **Closest Distance (feet):** 55

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 80                              |
| Small bulldozer | 58                                       | 51                              |
| Jackhammer      | 79                                       | 72                              |
| Loaded trucks   | 86                                       | 79                              |
| Criteria        |  | 78                              |

**Receptor:** Average Vibration Level - Receptor Location 2 **Closest Distance (feet):** 3056

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 45                              |
| Small bulldozer | 58                                       | 16                              |
| Jackhammer      | 79                                       | 37                              |
| Loaded trucks   | 86                                       | 44                              |
| Criteria        |  | 78                              |

**Receptor:** Maximum Vibration Levels - Receptor Location 2 **Average Distance (feet):** 188

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 69                              |
| Small bulldozer | 58                                       | 40                              |
| Jackhammer      | 79                                       | 61                              |
| Loaded trucks   | 86                                       | 68                              |
| Criteria        |  | 78                              |

**Receptor:** Average Vibration Level - Receptor Location 3 **Average Distance (feet):** 3274

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 45                              |
| Small bulldozer | 58                                       | 16                              |
| Jackhammer      | 79                                       | 37                              |
| Loaded trucks   | 86                                       | 44                              |
| Criteria        |  | 78                              |

**Receptor:** Maximum Vibration Levels - Receptor Location 3 **Closest Distance (feet):** 180

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 70                              |
| Small bulldozer | 58                                       | 41                              |
| Jackhammer      | 79                                       | 62                              |
| Loaded trucks   | 86                                       | 69                              |
| Criteria        |  | 78                              |

**Receptor:** Average Vibration Level - Receptor Location 4 **Closest Distance (feet):** 2500

### Construction Generated Vibration at Off-site Receptors from Roadways

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 47                              |
| Small bulldozer | 58                                       | 18                              |
| Jackhammer      | 79                                       | 39                              |
| Loaded trucks   | 86                                       | 46                              |
|                 | <b>Criteria</b>                          | <b>78</b>                       |

**Receptor:** Maximum Vibration Levels - Receptor Location 4 **Average Distance (feet):** 70

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 78                              |
| Small bulldozer | 58                                       | 49                              |
| Jackhammer      | 79                                       | 70                              |
| Loaded trucks   | 86                                       | 77                              |
|                 | <b>Criteria</b>                          | <b>78</b>                       |

**Receptor:** Average Vibration Level - Receptor Location 13 **Closest Distance (feet):** 152

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 71                              |
| Small bulldozer | 58                                       | 42                              |
| Jackhammer      | 79                                       | 63                              |
| Loaded trucks   | 86                                       | 70                              |
|                 | <b>Criteria</b>                          | <b>78</b>                       |

**Receptor:** Maximum Vibration Levels - Receptor Location 13 **Average Distance (feet):** 134

| Equipment       | Approximate Velocity Level at 25 ft, VdB | Approximate Velocity Level, VdB |
|-----------------|--|---------------------------------|
| Large bulldozer | 87                                       | 72                              |
| Small bulldozer | 58                                       | 43                              |
| Jackhammer      | 79                                       | 64                              |
| Loaded trucks   | 86                                       | 71                              |
|                 | <b>Criteria</b>                          | <b>78</b>                       |

### Structural Damage Criteria

**Receptor:** Maximum Vibration Levels - Receptor Location 1 **Closest Distance (feet):** 55

| Equipment       | Approximate RMS a Velocity at 25 ft, inch/second | Approximate RMS Velocity Level, inch/second |
|-----------------|--|---|
| Large bulldozer | 0.089  | 0.027                                       |
| Small bulldozer | 0.003  | 0.001                                       |
| Jackhammer      | 0.035  | 0.011                                       |
| Loaded trucks   | 0.076  | 0.023                                       |
|                 | <b>Criteria</b>                                  | <b>0.200</b>                                |

**Receptor:** Maximum Vibration Levels - Receptor Location 4 **Closest Distance (feet):** 70

| Equipment       | Approximate RMS a Velocity at 25 ft, inch/second | Approximate RMS Velocity Level, inch/second |
|-----------------|--|---|
| Large bulldozer | 0.089  | 0.019                                       |
| Small bulldozer | 0.003  | 0.001                                       |
| Jackhammer      | 0.035  | 0.007                                       |
| Loaded trucks   | 0.076  | 0.016                                       |
|                 | <b>Criteria</b>                                  | <b>0.200</b>                                |

**Receptor:** Maximum Vibration Levels - Receptor Location 3 **Closest Distance (feet):** 0

| Equipment       | Approximate RMS a Velocity at 25 ft, inch/second | Approximate RMS Velocity Level, inch/second |
|-----------------|--|---|
| Caisson Drill   | 0.089  | #DIV/0!                                     |
| Large bulldozer | 0.089  | #DIV/0!                                     |
| Small bulldozer | 0.003  | #DIV/0!                                     |
| Jackhammer      | 0.035  | #DIV/0!                                     |
| Loaded trucks   | 0.076  | #DIV/0!                                     |
|                 | <b>Criteria</b>                                  | <b>0.200</b>                                |

<sup>1</sup>. Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).