

# Appendix H-1

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## Supplemental Construction Noise Analysis

# DUDEK

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## MEMORANDUM

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**To:** Kara Peterson  
**From:** Nick Segovia (Dudek); Mark Storm, INCE Bd. Cert. (Dudek)  
**Subject:** SDSU Evolve Student Housing Project EIR  
Supplemental Construction Noise Analysis  
**Date:** April 28, 2025  
**cc:** Sarah Lozano (Dudek); Jonathan Leech (Dudek); Corinne Resha (Dudek); Emily Seklecki (Dudek); Anne Collins-Doehne (CSU); Michael Haberkorn (GDB)  
**Attachment:** 1 – Construction Noise Model Worksheets

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The purpose of this technical memorandum is to provide supplementary predictive noise assessment, evaluating potential outdoor and indoor noise exposures at San Diego State University (SDSU) existing on-campus housing nearest to proposed Evolve Student Housing (Project) construction activities.

## Methodology

In a manner comparable to the prediction of Project construction noise exposure levels at off-campus residential receptors as disclosed in Section 4.11.4 of Project Draft EIR, a Microsoft Excel-based noise prediction model emulating and using reference data from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) was used to estimate aggregate Project construction noise levels from activity groupings (“phases”) for six of the seven Phases of Project development (1a, 2, 3, 4, 5, and 6 for the Peninsula) at the nearest on-campus and occupied noise-sensitive land uses. Input variables for the predictive modeling consist of the following:

- the same construction equipment types and number of each (e.g., two dozers, three excavators, a backhoe) for each of the same seven phases (demolition, site preparation, grading, trenching, building construction, paving, and architectural coating) as studied in the Draft EIR;
- the “acoustical usage factor” (AUF) for each piece of equipment (i.e., percentage of time within a specific time period, such as an hour, when active and operating equipment is expected to perform a task at full power or load capacity and thus make noise at maximum sound level [ $L_{max}$ ] );
- the on-site equipment distances from an offsite noise-sensitive receiver (NSR) position, which vary with time over the course of a typical construction work day or shift; and
- the quantity of hours that the studied construction equipment may be on site and operating (or idling) within an established work shift (up to eight hours), which itself is a fraction of the 12-hour period used to evaluate the energy-averaged equivalent level ( $L_{eq,12hr}$ ) for appropriate contrast with the City of San Diego construction noise threshold.

Conservatively, no topographical shielding was assumed in the modeling. However, the studied receptor location is located within a courtyard or is otherwise occluded from direct sound paths to the active construction equipment by an intervening building structure that functions as a tall barrier.

Because the RCNM has default AUF values for a large variety of common mobile and stationary construction equipment, which were derived from an extensive study of typical construction activity patterns (FHWA 2006), those default AUF values were—as was done for the Draft EIR—used for this noise analysis to predict exterior exposures for nearest representative Huaxyacac Hall.

Additionally, an exterior-to-interior noise analysis was performed for Huaxyacac Hall in order to predict background sound levels—resulting solely from Project construction activity intrusion through the receiving building envelope (i.e., the exterior wall assembly, including closed windows)—for inhabited indoor spaces and compare them 45 dBA CNEL (as required by the California Building Code [CBC]). These interior background sound levels are calculated from the following additional steps applied to the aforementioned method for predicting the exterior noise exposures:

1. To account for the exterior-to-interior noise intrusion path through the building envelope, the predicted exterior noise exposure is reduced by 33 dB—consistent with net sound insulation performance (a.k.a., sound transmission class) of a typical exterior wall comprising a sandwich of materials with penetrations that frame a portion of the wall's surface area (e.g., a dormitory room window) with closed double-paned windows.
2. The hourly  $L_{eq}$  value resulting from the above step is then translated into a Community Noise Equivalent Level (CNEL) by the following expression: indoor CNEL = indoor hourly  $L_{eq}$  + 10\*LOG(8/24); where the 8/24 ratio is the number of daytime construction hours within a total 24-hour period when construction noise will occur.

One refinement to the exterior noise prediction model utilized to furnish the hourly  $L_{eq}$  values prior to application of the above two steps is a shortening of the evaluation time period from the work shift duration (up to eight hours) to a standardized one-hour period.

Using these methods, Attachment 1 shows worksheets comparable to those appearing in Appendix H (Noise Technical Report) of the Draft EIR which were prepared to predict aggregate exterior noise and interior noise exposures associated with up to seven construction phases, for each of six Phases of Project development, at the studied receiving structure (Huaxyacac Hall).

## Results

Applying the methodology described in the preceding Section 2 narrative, Table 1 presents the predicted exterior noise exposures (12-hour  $L_{eq}$  values) at the identified building façade locations and the corresponding indoor background noise levels at inhabited spaces resulting from exterior-to-interior sound transmission through the building structural envelope.

**Table 1. Predicted Construction Noise Exposures at Huaxyacac Hall**

| Construction Phase (and Equipment Types Involved) | Exterior Noise Exposure (12-hour $L_{eq}$ ) by Project Phase (and closest activity distance to receptor*) |                |                |                |                |                | Interior Noise CNEL from Intrusion** |
|---|---|----------------|----------------|----------------|----------------|----------------|--------------------------------------|
|   | Phase 1a (175')   | Phase 2 (570') | Phase 3 (900') | Phase 4 (870') | Phase 5 (570') | Phase 6 (340') |                                      |
| Demolition  | 57  | 48             | 44             | 45             | N/A            | N/A            | 41                                   |
| Site Preparation                                  | 57  | 48             | 45             | 45             | 48             | 52             | 41                                   |
| Grading   | 56  | 48             | 45             | 48             | 51             | 55             | 41                                   |
| Trenching   | 52  | 44             | 40             | 41             | 44             | 47             | 38                                   |

**Table 1. Predicted Construction Noise Exposures at Huaxyacac Hall**

| Construction Phase (and Equipment Types Involved) | Exterior Noise Exposure (12-hour $L_{eq}$ ) by Project Phase (and closest activity distance to receptor*) |                |                |                |                |                | Interior Noise CNEL from Intrusion** |
|---|---|----------------|----------------|----------------|----------------|----------------|--------------------------------------|
|   | Phase 1a (175')   | Phase 2 (570') | Phase 3 (900') | Phase 4 (870') | Phase 5 (570') | Phase 6 (340') |                                      |
| Building Construction                             | 55  | 46             | 43             | 43             | 46             | 51             | 40                                   |
| Paving  | 50  | 42             | 39             | 39             | 43             | 46             | 34                                   |
| Architectural Coating                             | 45  | 36             | 33             | 33             | 36             | 40             | 30                                   |
| <b>Threshold Exceedance?</b>                      | <b>No</b>   | <b>No</b>      | <b>No</b>      | <b>No</b>      | <b>No</b>      | <b>No</b>      | <b>No</b>                            |

Notes:  $L_{eq}$  = equivalent noise level; dBA = A-weighted decibels; N/A = not applicable.

\* receptor-to-activity direct sound path is occluded by a tall barrier (i.e., intervening building).

\*\* from outdoor construction activity as close as 175 feet to the studied sample inhabited space façade.

## References Cited

Federal Highway Administration (FHWA). 2006. *FHWA Roadway Construction Noise Model: User's Guide*. Final Report. FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. Cambridge, Massachusetts: DOT, Research and Innovative Technology Administration. August.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. John A. Volpe National Transportation Systems Center. September. Accessed January 25, 2022 at [https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123\\_0.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf).

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# **Attachment 1**

## Construction Noise Model Worksheets

SDSU Evolve Student Housing Project EIR  
Supplemental Construction Noise Analysis

To User: bordered cells are inputs, unbordered cells have formulae

|   |    |
|---|----|
| noise level limit (Leq) during 1-hour daytime construction to remain below 45 dBA CNEL interior = | 50 |
| allowable hours over which Leq is to be averaged =  | 1  |

Attachment 1 -- Construction Noise Model Worksheets

| Construction Activity (grouping or "phase") | FHWA RCNM Equipment Type | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 1-hour Leq | Source Elevation (ft) Receiver Elevation (ft) Barrier Height (ft) Source to Rcvr. ("A" Barr. Horiz. ("B") Horiz. ("C") Horiz. "A" (ft) "B" (ft) "C" (ft) Path Length Diff. "P" (ft) Abar (dB) Heff (with barrier) Heff (w/out barrier) G (with barrier) G (without barrier) ILbarr (dB) |  |  |  |  |  |  |  |  |  |
|---|--------------------------|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|----------------------|---|--|--|--|--|--|--|--|--|--|
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                      | 5 10 0 165 10 175 165.1 14.1 175.1 0.0 0.1 7.5 7.5 0.6 0.6 0.1  | 5 10 0 165 10 175 165.1 14.1 175.1 0.0 0.1 7.5 7.5 0.6 0.6 0.1 |  |  |  |  |  |  |  |  |
| Demolition                                  | excavator                | 3                   | 40                     | 81                                     |  | 175                          | 0.1                                   | 33.0                       | 34.0                   | 8                                | 480                                | 44                   |   |  |  |  |  |  |  |  |  |  |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 175                          | 0.1                                   | 33.0                       | 37.0                   | 8                                | 480                                | 42                   |   |  |  |  |  |  |  |  |  |  |
| Site Preparation                            | dozer                    | 1                   | 40                     | 82                                     |  | 175                          | 0.1                                   | 33.0                       | 35.0                   | 8                                | 480                                | 40                   | Total for Demolition Phase: 46.1  |  |  |  |  |  |  |  |  |  |
|   | tractor                  | 2                   | 40                     | 84                                     |  | 175                          | 0.1                                   | 33.0                       | 37.0                   | 8                                | 480                                | 45                   |   |  |  |  |  |  |  |  |  |  |
| Grading                                     | grader                   | 1                   | 40                     | 85                                     |  | 175                          | 0.1                                   | 33.0                       | 38.0                   | 7                                | 420                                | 42                   |   |  |  |  |  |  |  |  |  |  |
|   | excavator                | 1                   | 40                     | 81                                     |  | 175                          | 0.1                                   | 33.0                       | 34.0                   | 8                                | 480                                | 39                   |   |  |  |  |  |  |  |  |  |  |
|   | dozer                    | 1                   | 40                     | 82                                     |  | 175                          | 0.1                                   | 33.0                       | 35.0                   | 8                                | 480                                | 40                   | Total for Grading Phase: 45.6   |  |  |  |  |  |  |  |  |  |
| Trenching                                   | excavator                | 2                   | 40                     | 81                                     |  | 175                          | 0.1                                   | 33.0                       | 34.0                   | 7                                | 420                                | 42                   | Total for Trenching Phase: 41.5   |  |  |  |  |  |  |  |  |  |
| Building Construction                       | man lift                 | 1                   | 20                     | 75                                     | "forklift"   | 175                          | 0.1                                   | 33.0                       | 28.0                   | 8                                | 480                                | 30                   |   |  |  |  |  |  |  |  |  |  |
|   | generator                | 1                   | 50                     | 72                                     |  | 175                          | 0.1                                   | 33.0                       | 25.0                   | 8                                | 480                                | 31                   |   |  |  |  |  |  |  |  |  |  |
|   | crane                    | 1                   | 16                     | 81                                     |  | 175                          | 0.1                                   | 33.0                       | 34.0                   | 4                                | 240                                | 32                   |   |  |  |  |  |  |  |  |  |  |
|   | welder / torch           | 1                   | 40                     | 73                                     |  | 175                          | 0.1                                   | 33.0                       | 26.0                   | 8                                | 480                                | 31                   |   |  |  |  |  |  |  |  |  |  |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 175                          | 0.1                                   | 33.0                       | 37.0                   | 7                                | 420                                | 41                   |   |  |  |  |  |  |  |  |  |  |
|   | pumps                    | 1                   | 50                     | 77                                     |  | 175                          | 0.1                                   | 33.0                       | 30.0                   | 8                                | 480                                | 36                   |   |  |  |  |  |  |  |  |  |  |
|   | man lift                 | 2                   | 20                     | 75                                     | "aerial lift"  | 175                          | 0.1                                   | 33.0                       | 28.0                   | 8                                | 480                                | 33                   | Total for Building Construction Phase: 44.4   |  |  |  |  |  |  |  |  |  |
|   | auger drill rig          | 1                   | 20                     | 84                                     |  | 175                          | 0.1                                   | 33.0                       | 37.0                   | 2                                | 120                                | 33                   |   |  |  |  |  |  |  |  |  |  |
| Paving                                      | paver                    | 1                   | 50                     | 77                                     |  | 175                          | 0.1                                   | 33.0                       | 30.0                   | 6                                | 360                                | 35                   |   |  |  |  |  |  |  |  |  |  |
|   | paver                    | 1                   | 50                     | 77                                     | "paving equipment"                                     | 175                          | 0.1                                   | 33.0                       | 30.0                   | 6                                | 360                                | 35                   |   |  |  |  |  |  |  |  |  |  |
|   | roller                   | 1                   | 20                     | 80                                     |  | 175                          | 0.1                                   | 33.0                       | 33.0                   | 6                                | 360                                | 34                   | Total for Paving Phase: 39.3  |  |  |  |  |  |  |  |  |  |
| Architectural Coating                       | compressor (air)         | 1                   | 40                     | 78                                     |  | 175                          | 0.1                                   | 33.0                       | 31.0                   | 6                                | 360                                | 35                   | Total for Architectural Coating Phase: 34.8   |  |  |  |  |  |  |  |  |  |

*To User: bordered cells are inputs, unbordered cells have formulae*

|   |    |
|---|----|
| noise level limit for construction phase at residential land use, per City of San Diego = | 75 |
| allowable hours over which Leg is to be averaged, City of San Diego =                     | 12 |

75 All elevation values below are with respect to a common horizontal plane.

The Barrier Height value below refers to top elevation of intervening building, structure, or other inserted barrier between the sound emission source and the receiver.

| Construction Activity (grouping or "phase") | FHWA RCNM Equipment Type | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 12-hour Leq | Source Elevation (ft) Receiver Elevation (ft) Barrier Height (ft) Source to Barr. ("A" Horiz. (ft) Rcvr. to Barr. ("B") Horiz. (ft) Source to Rcvr. ("C" Horiz. (ft) "A" (ft) "B" (ft) "C" (ft) Path Length Diff. "P" (ft) Abarr (dB) Heff (with barrier) Heff (w/out barrier) G (with barrier) G (without barrier) ILbarr (dB) |                         |                     |                                  |                                  |                                  |          |          |          |                            |            |                     |                      |                  |                     |             |
|---|--------------------------|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|-----------------------|---|-------------------------|---------------------|----------------------------------|----------------------------------|----------------------------------|----------|----------|----------|----------------------------|------------|---------------------|----------------------|------------------|---------------------|-------------|
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Source Elevation (ft)   | Receiver Elevation (ft) | Barrier Height (ft) | Source to Barr. ("A" Horiz. (ft) | Rcvr. to Barr. ("B") Horiz. (ft) | Source to Rcvr. ("C" Horiz. (ft) | "A" (ft) | "B" (ft) | "C" (ft) | Path Length Diff. "P" (ft) | Abarr (dB) | Heff (with barrier) | Heff (w/out barrier) | G (with barrier) | G (without barrier) | ILbarr (dB) |
| Demolition                                  | excavator                | 3                   | 40                     | 81                                     |  | 175                          | 11.6                                  |                            | 55.4                   | 8                                | 480                                | 54                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 175                          | 11.6                                  |                            | 58.4                   | 8                                | 480                                | 53                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
| Site Preparation                            | dozer                    | 1                   | 40                     | 82                                     |  | 175                          | 11.6                                  |                            | 56.4                   | 8                                | 480                                | 51                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | tractor                  | 2                   | 40                     | 84                                     |  | 175                          | 11.6                                  |                            | 58.4                   | 8                                | 480                                | 56                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
| Grading                                     | grader                   | 1                   | 40                     | 85                                     |  | 175                          | 11.6                                  |                            | 59.4                   | 7                                | 420                                | 53                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | excavator                | 1                   | 40                     | 81                                     |  | 175                          | 11.6                                  |                            | 55.4                   | 8                                | 480                                | 50                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
| Trenching                                   | dozer                    | 1                   | 40                     | 82                                     |  | 175                          | 11.6                                  |                            | 56.4                   | 8                                | 480                                | 51                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | excavator                | 2                   | 40                     | 81                                     |  | 175                          | 11.6                                  |                            | 55.4                   | 7                                | 420                                | 52                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
| Building Construction                       | man lift                 | 1                   | 20                     | 75                                     | "forklift"   | 175                          | 11.6                                  |                            | 49.4                   | 8                                | 480                                | 41                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | generator                | 1                   | 50                     | 72                                     |  | 175                          | 11.6                                  |                            | 46.4                   | 8                                | 480                                | 42                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | crane                    | 1                   | 16                     | 81                                     |  | 175                          | 11.6                                  |                            | 55.4                   | 4                                | 240                                | 43                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | welder / torch           | 1                   | 40                     | 73                                     |  | 175                          | 11.6                                  |                            | 47.4                   | 8                                | 480                                | 42                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 175                          | 11.6                                  |                            | 58.4                   | 7                                | 420                                | 52                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | pumps                    | 1                   | 50                     | 77                                     |  | 175                          | 11.6                                  |                            | 51.4                   | 8                                | 480                                | 47                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | man lift                 | 2                   | 20                     | 75                                     | "aerial lift"  | 175                          | 11.6                                  |                            | 49.4                   | 8                                | 480                                | 44                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | auger drill rig          | 1                   | 20                     | 84                                     |  | 175                          | 11.6                                  |                            | 58.4                   | 2                                | 120                                | 44                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
| Paving                                      | paver                    | 1                   | 50                     | 77                                     |  | 175                          | 11.6                                  |                            | 51.4                   | 6                                | 360                                | 45                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | paver                    | 1                   | 50                     | 77                                     | "paving equipment"                                     | 175                          | 11.6                                  |                            | 51.4                   | 6                                | 360                                | 45                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   | roller                   | 1                   | 20                     | 80                                     |  | 175                          | 11.6                                  |                            | 54.4                   | 6                                | 360                                | 44                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
| Architectural Coating                       | compressor (air)         | 1                   | 40                     | 78                                     |  | 175                          | 11.6                                  |                            | 52.4                   | 6                                | 360                                | 45                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |
|   |                          |                     |                        |  |  | 175                          | 11.6                                  |                            | 52.4                   | 6                                | 360                                | 45                    | 5   | 10                      | 50                  | 165                              | 10                               | 175                              | 171.0    | 41.2     | 175.1    | 37.19                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 11.6        |

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Supplemental Construction Noise Analysis

Attachment 1 -- Construction Noise Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

|   |    |
|---|----|
| noise level limit for construction phase at residential land use, per City of San Diego = | 75 |
| allowable hours over which Leq is to be averaged, City of San Diego =                     | 12 |

All elevation values below are with respect to a common horizontal plane.

The Barrier Height value below refers to top elevation of intervening building, structure, or other inserted barrier between the sound emission source and the receiver.

| Construction Activity (grouping or "phase") | FHWA RCNM Equipment Type | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 12-hour Leq | Source Elevation (ft) Receiver Elevation (ft) Barrier Height (ft) Source to Rcvr. ("A") Horiz. (ft) Source to Rcvr. ("C") Horiz. (ft) "A" (ft) "B" (ft) "C" (ft) Path Length Diff. "P" (ft) Abar (dB) Heff (with barrier) Heff (w/out barrier) G (with barrier) G (without barrier) ILbarr (dB) |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|---|--------------------------|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|-----------------------|---|----|----|-----|-----|-----|-------|-------|-------|-------|-------|------|------|-----|-----|-----|-----|
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | 5   | 10 | 50 | 560 | 10  | 570 | 561.8 | 41.2  | 570.0 | 33.01 | 15.0  | 57.5 | 7.5  | 0.0 | 0.6 | 8.5 |     |
| Demolition                                  | excavator                | 3                   | 40                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 8                                | 480                                | 46                    | Total for Demolition Phase: 47.7  | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 570                          | 8.5                                   |                            | 49.5                   | 8                                | 480                                | 44                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
| Site Preparation                            | dozer                    | 1                   | 40                     | 82                                     |  | 570                          | 8.5                                   |                            | 47.5                   | 8                                | 480                                | 42                    | Total for Site Preparation Phase: 48.0  | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|   | tractor                  | 2                   | 40                     | 84                                     |  | 570                          | 8.5                                   |                            | 49.5                   | 8                                | 480                                | 47                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
| Grading                                     | grader                   | 1                   | 40                     | 85                                     |  | 570                          | 8.5                                   |                            | 50.5                   | 8                                | 480                                | 45                    | Total for Grading Phase: 48.4   | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|   | excavator                | 2                   | 40                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 8                                | 480                                | 44                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | dozer                    | 1                   | 40                     | 82                                     |  | 570                          | 8.5                                   |                            | 47.5                   | 8                                | 480                                | 42                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
| Trenching                                   | excavator                | 2                   | 40                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 8                                | 480                                | 44                    | Total for Trenching Phase: 43.8   | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
| Building Construction                       | man lift                 | 1                   | 20                     | 75                                     | "forklift"   | 570                          | 8.5                                   |                            | 40.5                   | 8                                | 480                                | 32                    | Total for Building Construction Phase: 45.9   | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|   | generator                | 1                   | 50                     | 72                                     |  | 570                          | 8.5                                   |                            | 37.5                   | 8                                | 480                                | 33                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | crane                    | 1                   | 16                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 7                                | 420                                | 36                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | welder / torch           | 1                   | 40                     | 73                                     |  | 570                          | 8.5                                   |                            | 38.5                   | 8                                | 480                                | 33                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 570                          | 8.5                                   |                            | 49.5                   | 7                                | 420                                | 43                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | pumps                    | 1                   | 50                     | 77                                     |  | 570                          | 8.5                                   |                            | 42.5                   | 8                                | 480                                | 38                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | man lift                 | 2                   | 20                     | 75                                     | "aerial lift"  | 570                          | 8.5                                   |                            | 40.5                   | 8                                | 480                                | 35                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
| Paving                                      | paver                    | 1                   | 50                     | 77                                     |  | 570                          | 8.5                                   |                            | 42.5                   | 6                                | 360                                | 36                    | Total for Paving Phase: 42.0  | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|   | paver                    | 1                   | 50                     | 77                                     | "paving equipment"                                     | 570                          | 8.5                                   |                            | 42.5                   | 6                                | 360                                | 36                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
|   | roller                   | 2                   | 20                     | 80                                     |  | 570                          | 8.5                                   |                            | 45.5                   | 6                                | 360                                | 39                    |   |    |    |     |     |     |       |       |       |       |       |      |      |     |     |     |     |
| Architectural Coating                       | compressor (air)         | 1                   | 40                     | 78                                     |  | 570                          | 8.5                                   |                            | 43.5                   | 6                                | 360                                | 37                    | Total for Architectural Coating Phase: 36.5   | 5  | 10 | 50  | 560 | 10  | 570   | 561.8 | 41.2  | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |

*To User: bordered cells are inputs, unbordered cells have formulae*

noise level limit for construction phase at residential land use, per City of San Diego = 75  
allowable hours over which Leg is to be averaged, City of San Diego = 12

**75** All elevation values below are with respect to a common horizontal plane.

The Barrier Height value below refers to top elevation of intervening building, structure, or other inserted barrier between the sound emission source and the receiver.

| Construction Activity (grouping or "phase") | FHWA RCNM Equipment Type               | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 12-hour Leq | Source Elevation (ft) Receiver Elevation (ft) Barrier Height (ft) Source to Barr. ("A" Horiz. (ft) Rcvr. to Barr. ("B") Horiz. (ft) Source to Rcvr. ("C" Horiz. (ft) "A" (ft) "B" (ft) "C" (ft) Path Length Diff. "P" (ft) Abarr (dB) Heff (with barrier) Heff (w/out barrier) G (with barrier) G (without barrier) ILbarr (dB) |                         |                     |                                  |                                  |                                  |          |          |          |                            |            |                     |                      |                  |                     |             |
|---|--|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|-----------------------|---|-------------------------|---------------------|----------------------------------|----------------------------------|----------------------------------|----------|----------|----------|----------------------------|------------|---------------------|----------------------|------------------|---------------------|-------------|
|   |  |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Source Elevation (ft)   | Receiver Elevation (ft) | Barrier Height (ft) | Source to Barr. ("A" Horiz. (ft) | Rcvr. to Barr. ("B") Horiz. (ft) | Source to Rcvr. ("C" Horiz. (ft) | "A" (ft) | "B" (ft) | "C" (ft) | Path Length Diff. "P" (ft) | Abarr (dB) | Heff (with barrier) | Heff (w/out barrier) | G (with barrier) | G (without barrier) | ILbarr (dB) |
| Demolition                                  | excavator                              | 3                   | 40                     | 81                                     |  | 900                          | 7.3                                   |                            | 43.2                   | 8                                | 480                                | 42                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | tractor                                | 1                   | 40                     | 84                                     |  | 900                          | 7.3                                   |                            | 46.2                   | 8                                | 480                                | 40                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Site Preparation                            | dozer                                  | 1                   | 40                     | 82                                     |  | 900                          | 7.3                                   |                            | 44.2                   | 8                                | 480                                | 38                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | tractor                                | 2                   | 40                     | 84                                     |  | 900                          | 7.3                                   |                            | 46.2                   | 8                                | 480                                | 43                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Grading                                     | grader                                 | 1                   | 40                     | 85                                     |  | 900                          | 7.3                                   |                            | 47.2                   | 7                                | 420                                | 41                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | excavator                              | 2                   | 40                     | 81                                     |  | 900                          | 7.3                                   |                            | 43.2                   | 7                                | 420                                | 40                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Trenching                                   | dozer                                  | 1                   | 40                     | 82                                     |  | 900                          | 7.3                                   |                            | 44.2                   | 8                                | 480                                | 38                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | excavator                              | 2                   | 40                     | 81                                     |  | 900                          | 7.3                                   |                            | 43.2                   | 8                                | 480                                | 40                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Building Construction                       | man lift                               | 1                   | 20                     | 75                                     | "forklift"   | 900                          | 7.3                                   |                            | 37.2                   | 8                                | 480                                | 28                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | generator                              | 1                   | 50                     | 72                                     |  | 900                          | 7.3                                   |                            | 34.2                   | 8                                | 480                                | 29                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | crane                                  | 1                   | 16                     | 81                                     |  | 900                          | 7.3                                   |                            | 43.2                   | 7                                | 420                                | 33                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | welder / torch                         | 1                   | 40                     | 73                                     |  | 900                          | 7.3                                   |                            | 35.2                   | 8                                | 480                                | 29                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | tractor                                | 1                   | 40                     | 84                                     |  | 900                          | 7.3                                   |                            | 46.2                   | 7                                | 420                                | 40                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | pumps                                  | 1                   | 50                     | 77                                     |  | 900                          | 7.3                                   |                            | 39.2                   | 8                                | 480                                | 34                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | man lift                               | 2                   | 20                     | 75                                     | "aerial lift"  | 900                          | 7.3                                   |                            | 37.2                   | 8                                | 480                                | 31                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | Total for Building Construction Phase: |                     |                        |  |  |                              |                                       |                            |                        |                                  | 42.7                               | 31                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Paving                                      | paver                                  | 1                   | 50                     | 77                                     |  | 900                          | 7.3                                   |                            | 39.2                   | 6                                | 360                                | 33                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | paver                                  | 1                   | 50                     | 77                                     | "paving equipment"                                     | 900                          | 7.3                                   |                            | 39.2                   | 6                                | 360                                | 33                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | roller                                 | 2                   | 20                     | 80                                     |  | 900                          | 7.3                                   |                            | 42.2                   | 6                                | 360                                | 35                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
|   | Total for Paving Phase:                |                     |                        |  |  |                              |                                       |                            |                        |                                  | 38.8                               | 35                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Architectural Coating                       | compressor (air)                       | 1                   | 40                     | 78                                     |  | 900                          | 7.3                                   |                            | 40.2                   | 6                                | 360                                | 33                    | 5   | 10                      | 50                  | 890                              | 10                               | 900                              | 891.1    | 41.2     | 900.0    | 32.35                      | 15.0       | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.3         |
| Total for Architectural Coating Phase:      |  |                     |                        |  |  |                              |                                       |                            |                        | 33.2                             | 33                                 | 5                     | 10  | 50                      | 890                 | 10                               | 900                              | 891.1                            | 41.2     | 900.0    | 32.35    | 15.0                       | 57.5       | 7.5                 | 0.0                  | 0.6              | 7.3                 |             |

*To User: bordered cells are inputs, unbordered cells have formulae*

|   |    |
|---|----|
| noise level limit for construction phase at residential land use, per City of San Diego = | 75 |
| allowable hours over which Leg is to be averaged, City of San Diego =                     | 12 |

**75** All elevation values below are with respect to a common horizontal plane.

The Barrier Height value below refers to top elevation of intervening building, structure, or other inserted barrier between the sound emission source and the receiver.

| Construction Activity (grouping or "phase") | FHWA RCNM Equipment Type | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 12-hour Leq | Site Characterization and Impact Metrics |                         |                     |                                 |                                  |                                   |          |          |          |                            |           |                     |                      |                  |                     |             |
|---|--------------------------|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|-----------------------|--|-------------------------|---------------------|---------------------------------|----------------------------------|-----------------------------------|----------|----------|----------|----------------------------|-----------|---------------------|----------------------|------------------|---------------------|-------------|
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Source Elevation (ft)                    | Receiver Elevation (ft) | Barrier Height (ft) | Source to Rcvr. ("A" Horiz. ft) | Rcvr. to Barr. ("B") Horiz. (ft) | Source to Rcvr. ("C") Horiz. (ft) | "A" (ft) | "B" (ft) | "C" (ft) | Path Length Diff. "P" (ft) | Abar (dB) | Heff (with barrier) | Heff (w/out barrier) | G (with barrier) | G (without barrier) | ILbarr (dB) |
| Demolition                                  | excavator                | 3                   | 40                     | 81                                     |  | 870                          | 7.4                                   |                            | 43.5                   | 8                                | 480                                | 43                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 870                          | 7.4                                   |                            | 46.5                   | 8                                | 480                                | 41                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Site Preparation                            | dozer                    | 1                   | 40                     | 82                                     |  | 870                          | 7.4                                   |                            | 44.5                   | 8                                | 480                                | 39                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | tractor                  | 2                   | 40                     | 84                                     |  | 870                          | 7.4                                   |                            | 46.5                   | 8                                | 480                                | 44                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Grading                                     | grader                   | 1                   | 40                     | 85                                     |  | 870                          | 7.4                                   |                            | 47.5                   | 7                                | 420                                | 41                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | excavator                | 2                   | 40                     | 81                                     |  | 870                          | 7.4                                   |                            | 43.5                   | 7                                | 420                                | 40                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Trenching                                   | tractor                  | 2                   | 40                     | 84                                     |  | 870                          | 7.4                                   |                            | 46.5                   | 8                                | 480                                | 44                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | dozer                    | 2                   | 40                     | 82                                     |  | 870                          | 7.4                                   |                            | 44.5                   | 8                                | 480                                | 42                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Trenching                                   | excavator                | 2                   | 40                     | 81                                     |  | 870                          | 7.4                                   |                            | 43.5                   | 8                                | 480                                | 41                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    | 40.7                  |  |                         |                     |                                 |                                  | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Building Construction                       | man lift                 | 1                   | 20                     | 75                                     | "forklift"   | 870                          | 7.4                                   |                            | 37.5                   | 8                                | 480                                | 29                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | generator                | 1                   | 50                     | 72                                     |  | 870                          | 7.4                                   |                            | 34.5                   | 8                                | 480                                | 30                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Building Construction                       | crane                    | 1                   | 16                     | 81                                     |  | 870                          | 7.4                                   |                            | 43.5                   | 7                                | 420                                | 33                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | welder / torch           | 1                   | 40                     | 73                                     |  | 870                          | 7.4                                   |                            | 35.5                   | 8                                | 480                                | 30                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Building Construction                       | tractor                  | 1                   | 40                     | 84                                     |  | 870                          | 7.4                                   |                            | 46.5                   | 7                                | 420                                | 40                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | pumps                    | 1                   | 50                     | 77                                     |  | 870                          | 7.4                                   |                            | 39.5                   | 8                                | 480                                | 35                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Building Construction                       | man lift                 | 2                   | 20                     | 75                                     | "aerial lift"  | 870                          | 7.4                                   |                            | 37.5                   | 8                                | 480                                | 32                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    | 42.9                  |  |                         |                     |                                 |                                  | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Paving                                      | paver                    | 1                   | 50                     | 77                                     |  | 870                          | 7.4                                   |                            | 39.5                   | 6                                | 360                                | 33                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   | paver                    | 1                   | 50                     | 77                                     | "paving equipment"                                     | 870                          | 7.4                                   |                            | 39.5                   | 6                                | 360                                | 33                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Paving                                      | roller                   | 2                   | 20                     | 80                                     |  | 870                          | 7.4                                   |                            | 42.5                   | 6                                | 360                                | 35                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    | 39.0                  |  |                         |                     |                                 |                                  | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
| Architectural Coating                       | compressor (air)         | 1                   | 40                     | 78                                     |  | 870                          | 7.4                                   |                            | 40.5                   | 6                                | 360                                | 33                    | 5  | 10                      | 50                  | 860                             | 10                               | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    | 33.5                  |  |                         |                     |                                 |                                  | 870                               | 861.2    | 41.2     | 870.0    | 32.39                      | 15.0      | 57.5                | 7.5                  | 0.0              | 0.6                 | 7.4         |

SDSU Evolve Student Housing Project EIR  
Supplemental Construction Noise Analysis

Attachment 1 -- Construction Noise Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at residential land use, per City of San Diego = **75**

allowable hours over which Leq is to be averaged, City of San Diego = **12**

All elevation values below are with respect to a common horizontal plane.

The Barrier Height value below refers to top elevation of intervening building, structure, or other inserted barrier between the sound emission source and the receiver.

| Construction Activity (grouping or "phase")        | FHWA RCNM Equipment Type | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 12-hour Leq | Source Elevation (ft) Receiver Elevation (ft) Barrier Height (ft) Source to Rcvr. ("A") Barr. ("A") Horiz. (ft) Source to Rcvr. ("C") Horiz. (ft) "A" (ft) "B" (ft) "C" (ft) Path Length Diff. "P" (ft) Abar (dB) Heff (with barrier) Heff (w/out barrier) G (with barrier) G (without barrier) ILbar (dB) |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
|--|--------------------------|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|-----------------------|--|----|----|-----|----|-----|-------|------|-------|-------|------|------|-----|-----|-----|-----|
|  |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | 5  | 10 | 50 | 560 | 10 | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Site Preparation                                   | dozer                    | 1                   | 40                     | 82                                     |  | 570                          | 8.5                                   |                            | 47.5                   | 8                                | 480                                | 42                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | tractor                  | 2                   | 40                     | 84                                     |  | 570                          | 8.5                                   |                            | 49.5                   | 8                                | 480                                | 47                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Total for Site Preparation Phase: <b>48.0</b>      |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Grading  | grader                   | 1                   | 40                     | 85                                     |  | 570                          | 8.5                                   |                            | 50.5                   | 8                                | 480                                | 45                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | excavator                | 4                   | 40                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 8                                | 480                                | 47                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | dozer                    | 1                   | 40                     | 82                                     |  | 570                          | 8.5                                   |                            | 47.5                   | 8                                | 480                                | 42                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | tractor                  | 2                   | 40                     | 84                                     |  | 570                          | 8.5                                   |                            | 49.5                   | 8                                | 480                                | 47                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Total for Grading Phase: <b>51.5</b>               |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Trenching  | excavator                | 2                   | 40                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 8                                | 480                                | 44                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Total for Trenching Phase: <b>43.8</b>             |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Building Construction                              | man lift                 | 1                   | 20                     | 75                                     | "forklift"   | 570                          | 8.5                                   |                            | 40.5                   | 8                                | 480                                | 32                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | generator                | 1                   | 50                     | 72                                     |  | 570                          | 8.5                                   |                            | 37.5                   | 8                                | 480                                | 33                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | crane                    | 1                   | 16                     | 81                                     |  | 570                          | 8.5                                   |                            | 46.5                   | 7                                | 420                                | 36                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | welder / torch           | 1                   | 40                     | 73                                     |  | 570                          | 8.5                                   |                            | 38.5                   | 8                                | 480                                | 33                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | tractor                  | 1                   | 40                     | 84                                     |  | 570                          | 8.5                                   |                            | 49.5                   | 7                                | 420                                | 43                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | pumps                    | 1                   | 50                     | 77                                     |  | 570                          | 8.5                                   |                            | 42.5                   | 8                                | 480                                | 38                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | man lift                 | 2                   | 20                     | 75                                     | "aerial lift"  | 570                          | 8.5                                   |                            | 40.5                   | 8                                | 480                                | 35                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Total for Building Construction Phase: <b>45.9</b> |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Paving   | paver                    | 1                   | 50                     | 77                                     |  | 570                          | 8.5                                   |                            | 42.5                   | 6                                | 360                                | 36                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | paver                    | 1                   | 50                     | 77                                     | "paving equipment"                                     | 570                          | 8.5                                   |                            | 42.5                   | 6                                | 360                                | 36                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
|  | roller                   | 2                   | 20                     | 80                                     |  | 570                          | 8.5                                   |                            | 45.5                   | 6                                | 360                                | 39                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Total for Paving Phase: <b>42.0</b>                |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Architectural Coating                              | compressor (air)         | 1                   | 40                     | 78                                     |  | 570                          | 8.5                                   |                            | 43.5                   | 6                                | 360                                | 37                    |  |    |    |     |    | 570 | 561.8 | 41.2 | 570.0 | 33.01 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 8.5 |
| Total for Architectural Coating Phase: <b>36.5</b> |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       |  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |

SDSU Evolve Student Housing Project EIR  
Supplemental Construction Noise Analysis

Attachment 1 -- Construction Noise Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at residential land use, per City of San Diego = **75**

allowable hours over which Leq is to be averaged, City of San Diego = **12**

All elevation values below are with respect to a common horizontal plane.

The Barrier Height value below refers to top elevation of intervening building, structure, or other inserted barrier between the sound emission source and the receiver.

| Construction Activity (grouping or "phase") | FHWA RCNM Equipment Type | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | Temporary Barrier Insertion Loss (dB) | Additional Noise Reduction | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 12-hour Leq | Source Elevation (ft) Receiver Elevation (ft) Barrier Height (ft) Source to Rcvr. ("A" Barr. ("A") Horiz. ("B") Horiz. ("C") Horiz. "A" (ft) "B" (ft) "C" (ft) Path Length Diff. "P" (ft) Abar (dB) Heff (with barrier) Heff (w/out barrier) G (with barrier) G (without barrier) ILbarr (dB) |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
|---|--------------------------|---------------------|------------------------|--|--|------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|------------------------------------|-----------------------|---|----|----|-----|----|-----|-------|------|-------|-------|------|------|-----|-----|-----|-----|
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | 5   | 10 | 50 | 330 | 10 | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
| Site Preparation                            | dozer                    | 1                   | 40                     | 82                                     |  | 340                          | 9.9                                   |                            | 51.2                   | 8                                | 480                                | 45                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | tractor                  | 2                   | 40                     | 84                                     |  | 340                          | 9.9                                   |                            | 53.2                   | 8                                | 480                                | 50                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Total for Site Preparation Phase: 51.7  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Grading                                     | grader                   | 1                   | 40                     | 85                                     |  | 340                          | 9.9                                   |                            | 54.2                   | 8                                | 480                                | 48                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | excavator                | 4                   | 40                     | 81                                     |  | 340                          | 9.9                                   |                            | 50.2                   | 8                                | 480                                | 50                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | dozer                    | 1                   | 40                     | 82                                     |  | 340                          | 9.9                                   |                            | 51.2                   | 8                                | 480                                | 45                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | tractor                  | 2                   | 40                     | 84                                     |  | 340                          | 9.9                                   |                            | 53.2                   | 8                                | 480                                | 50                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Total for Grading Phase: 55.2   |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Trenching                                   | excavator                | 2                   | 40                     | 81                                     |  | 340                          | 9.9                                   |                            | 50.2                   | 8                                | 480                                | 47                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Total for Trenching Phase: 47.5   |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Building Construction                       | man lift                 | 1                   | 20                     | 75                                     | "forklift"   | 340                          | 9.9                                   |                            | 44.2                   | 8                                | 480                                | 35                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | generator                | 1                   | 50                     | 72                                     |  | 340                          | 9.9                                   |                            | 41.2                   | 8                                | 480                                | 36                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | crane                    | 1                   | 16                     | 81                                     |  | 340                          | 9.9                                   |                            | 50.2                   | 7                                | 420                                | 40                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | welder / torch           | 1                   | 40                     | 73                                     |  | 340                          | 9.9                                   |                            | 42.2                   | 8                                | 480                                | 36                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | tractor                  | 1                   | 40                     | 84                                     |  | 340                          | 9.9                                   |                            | 53.2                   | 7                                | 420                                | 47                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | pumps                    | 1                   | 50                     | 77                                     |  | 340                          | 9.9                                   |                            | 46.2                   | 8                                | 480                                | 41                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | man lift                 | 2                   | 20                     | 75                                     | "aerial lift"  | 340                          | 9.9                                   |                            | 44.2                   | 8                                | 480                                | 38                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | auger drill rig          | 1                   | 20                     | 84                                     |  | 340                          | 9.9                                   |                            | 53.2                   | 8                                | 480                                | 44                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Total for Building Construction Phase: 50.8   |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Paving                                      | paver                    | 1                   | 50                     | 77                                     |  | 340                          | 9.9                                   |                            | 46.2                   | 6                                | 360                                | 40                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | paver                    | 1                   | 50                     | 77                                     | "paving equipment"                                     | 340                          | 9.9                                   |                            | 46.2                   | 6                                | 360                                | 40                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   | roller                   | 2                   | 20                     | 80                                     |  | 340                          | 9.9                                   |                            | 49.2                   | 6                                | 360                                | 42                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Total for Paving Phase: 45.8  |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |
| Architectural Coating                       | compressor (air)         | 1                   | 40                     | 78                                     |  | 340                          | 9.9                                   |                            | 47.2                   | 6                                | 360                                | 40                    |   |    |    |     |    | 340 | 333.1 | 41.2 | 340.0 | 34.25 | 15.0 | 57.5 | 7.5 | 0.0 | 0.6 | 9.9 |
|   |                          |                     |                        |  |  |                              |                                       |                            |                        |                                  |                                    |                       | Total for Architectural Coating Phase: 40.2   |    |    |     |    |     |       |      |       |       |      |      |     |     |     |     |